The Operationalization of Capacity Development: The Case of Urban Infrastructure Projects in India

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ABSTRACT

Since the 1950s, Capacity Development (CD) has been an important component of international development agendas. It established the widespread consensus that the capacity of individuals and organizations is critical to maintaining and enhancing the effectiveness of development projects and programs. A problem, however, is that the concept has been applied without due consideration to how it should be adapted to the local context, making it more of a symbolic gesture. The application of CD to urban infrastructure projects in India is one such example. Recognizing the shortage of urban infrastructure as one of the major impediments in India's economic growth and rapid urbanization, the Government of India (GOI) launched the Jawaharlal Nehru National Urban Renewal Mission (JNNURM) in December 2005 to provide substantial central financial assistance to cities for urban development over a period of seven years. The GOI expected the JNNURM to reform institutions and strengthen human resource capability related to many areas of project delivery. During its implementation, however, the JNNURM has been confronted by problems related to a lack of capacity. This research reviews the capacity challenges related to the JNNURM program and considers the broader implications for urban infrastructure development in other developing countries.

This research begins with the question "How can CD be operationalized?" From this starting point, the research seeks to reveal the operational values of CD. Following a detailed literature review on CD, capacity factors that are applicable to the urban sector in India are identified and a CD framework is developed. Two research methods—case studies and fuzzy-set Qualitative Comparative Analysis (fsQCA)—are adopted to answer the primary research questions. By leveraging the strength of these two methods, this research advances our understanding of the relationship between capacity and development goals such as improving project performance. In the case studies, this research investigates the gaps between CD theory and practice through the lens of practitioner perceptions of CD. In addition, unlike traditional thinking on the linear relationship between capacity and project outcomes, the case studies reveal two-way causal relationships between capacity and project outcomes that form a spiral structure between the project delivery process and capacity factors. Better capacity can enhance project performance and lead to better outcomes, and project performance and outcomes also influence and reinforce capacity in the reverse direction. Moreover, through the fsQCA, this research identified causal relationships between capacity factors and outcomes and demonstrated that the capacity factors generate different outcomes through their interactions with other capacity factors. This finding contributes to our understanding of how capacity is interconnected with development goals.

In summary, this research contributes to both CD theory and CD practice based on a comprehensive approach that not only considers CD at multiple levels (environmental, organizational/network, and individual/project), but also covers different CD subjects such as context, actors, dimensions, processes, and impacts. Through this comprehensive approach, a range of important findings are developed that can help researchers and practitioners operationalize the complex concept of CD.

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TABLE OF CONTENTS

List of Figures

List of Tables

CHAPTER 1 INTRODUCTION

1.1 BACKGROUND

Since the 1950s, Capacity Development (CD) has been an important component of international development agendas. The capacity of individuals and organizations is considered as critical to maintaining and enhancing the effectiveness of development projects and programs. However, from its emergence, CD has been criticized for its ambiguous nature and inadequate theory (Boyd, 2009; CDRA, 1995). The practices, meanings, and importance of CD are often simply assumed, rather than explicitly stated (Kenny & Clarke, 2010).

In response to such criticism, major international organizations have attempted to define capacity and CD, and many standardized frameworks and guidelines are currently provided by these organizations. However, even if the term is included in a development project or program, "it is generally adopted without appropriate review" (Kenny & Clarke, 2010, p.248) and tends to fill a symbolic role.

This research focuses on determining how CD was operationalized in a large urban infrastructure development program in India, and whether the capacity that was developed can be associated with project performance and outcomes. In recognizing the shortage of urban infrastructure as one of the major impediments to India's economic growth and rapid urbanization, the Government of India (GOI) launched the Jawaharlal Nehru National Urban Renewal Mission (JNNURM) in December, 2005, to provide substantial central financial assistance to cities for infrastructure and urban development for a duration of seven years. According to the Mid-term Appraisal of India's 11th Five-Year Plan, the JNNURM has been achieving its goals effectively, but the lack of capacity of individuals and organizations is considered to undermine the program. For example, the Planning Commission (2011a, p. 383 and p. 381) argues that "many states and cities have inadequate capacity to plan for complex, large-scale projects" and "considering the huge numbers required for urban projects, it will be worthwhile to develop a large cadre of 'specialists' in this area".

The JNNURM required mandatory reforms to local governments to facilitate urban infrastructure projects. The GOI expected the JNNURM to reform institutions and strengthen human resource capability related to many areas of project delivery such as project planning and design, project implementation, construction management, legal and administrative skills, and finance and accounts. To support these reforms, the JNNURM earmarked five percent of the program's funds for CD which could be utilized for any type of activity designed to advance the objectives of the JNNURM and develop relevant knowledge and skills. However, only a few agencies used the available funds to support CD within their organization. The High Powered Expert Committee (HPEC) set up by the GOI for estimating the investment requirement for the JNNURM, also indicated that little demand for CD initiatives had come forth from Urban Local Bodies (ULBs) (HPEC, 2011). In other words, even if urban infrastructure projects in India suffered due to a lack of capacity, the people who are involved in the projects gave CD a low priority.

To address the perceived capacity deficit, the HPEC (2011) recommended launching a more aggressive program for CD. After completing the JNNURM in 2012, the GOI decided to delay launching the JNNURM

II until 2014 to concentrate on enhancing the capacity of ULBs to develop effective urban infrastructure projects. To achieve this objective, the GOI initiated various projects on CD including the Capacity Building for Urban Development (CBUD) project. However, given the different interpretations of CD that exist, there is no clear consensus on how CD was operationalized in the JNNURM and few studies have focused on understanding capacity in the urban sector in India. Therefore, before a more aggressive program for CD can be established, research is needed to identify how capacity was conceived and operationalized under the JNNURM and whether this capacity (in its different forms) can be associated with the performance of JNNURM projects.

1.2 OBJECTIVES OF THE STUDY

This research aims to develop operational values of CD relating to urban infrastructure projects in India. To achieve this aim, the research has five specific objectives:

1) Develop a theoretical framework for CD research;
2) Understand how capacity and CD are perceived and applied in the urban sector in India;
3) Identify how capacity is connected with project performance and outcomes;
4) Empirically examine the impacts of capacity on project outcomes; and
5) Identify ways to operationalize CD in India that have broader implications for other developing countries.

Each of these objectives is discussed in more detail below.

Objective 1

Problem 1: No theoretical framework for CD exists that can be directly applied to the urban sector in India.

While several CD frameworks have been developed by international organizations, these frameworks were designed for a specific application or purpose. Using these existing frameworks as a foundation, a new theoretical framework for CD was created that enabled the study of capacity and CD in the urban sector in India. This framework was informed by an extensive review of CD literature (Chapter 2) and a study of the contextual factors that characterize the urban sector in India (Chapter 3). The new theoretical framework was then used to design the research methodology (Chapter 4).

Objective 2

Problem 2: There are gaps between CD theory and practice in the urban sector in India.

This research aims to understand the perception of CD in India, identify the gaps that exist between theory and practice, and seek relevant measures to fill these gaps. To address these objectives, this research answers the following questions:

- RQ1: How do urban infrastructure practitioners in India conceptualize capacity and CD? What gaps exist between the theory of CD and practitioners' perceptions of CD?
- RQ2: How do different entities within the urban infrastructure sector in India view CD? If there are differences in the perceptions of CD across these entities, what explains these differences?
- RQ3: How can the theory of CD be improved and what should be done in practice to bridge the gaps?

The research findings for Objective #2 are discussed in Chapter 5.

Objective 3

Problem 3: There is a lack of understanding of the relationship between capacity and project performance and outcomes.

While the GOI considers the 'capacity deficit' as the main problem in project delivery, few studies have been conducted to understand the relationships between capacity and project performance and outcomes in the JNNURM. This research seeks to understand project delivery hurdles through the lens of CD, investigates the relationship between capacity and project performance, and draws implications for better project performance and outcomes.

The research questions for Objective 3 are as follows:

- RQ4: What project implementation hurdles exist in the urban sector in India?
- RQ5: How are capacity factors related to the hurdles? How do capacity factors affect different stages of JNNURM projects? How do the JNNURM projects affect the capacity factors?
- RQ6: What kinds of measures related to CD should be adopted to improve performance and project outcomes?

The research findings for Objective 3 are discussed in Chapter 6.

Objective 4

Problem 4: There are few empirical studies that focus on identifying the causal relationships between capacity and project outcomes.

While empirical evidence is critical to understanding causality between capacity and development goals, since the majority of CD research adopts a case study approach that typically focuses on a single project, the findings cannot be easily generalized (Rihoux & Ragin, 2009b). Using Qualitative Comparative Analysis (QCA), this research identifies combinations of capacity factors that lead to success in project implementation, reveals the complex web of causality between capacity factors and project outcomes, and provides empirical data that advances CD theory and enriches the case studies (discussed in Chapter 5 and 6).

The research questions for Objective 4 are as follows:

- RQ7: Which combinations of capacity factors at different levels (i.e., individual, organizational, or environmental) led to successful/unsuccessful project implementation in terms of project cost?
- RQ8: What kinds of CD actions are needed to improve project implementation?

The research findings for Objective 4 are discussed in Chapter 7.

Objective 5

The final section of this research identifies how the main research findings can advance CD theories and urban policies and programs in India and other emerging countries (Chapter 8).

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Figure 1-1 provides a visual representation of how Chapters 2 to 7 relate to the first four research objectives.

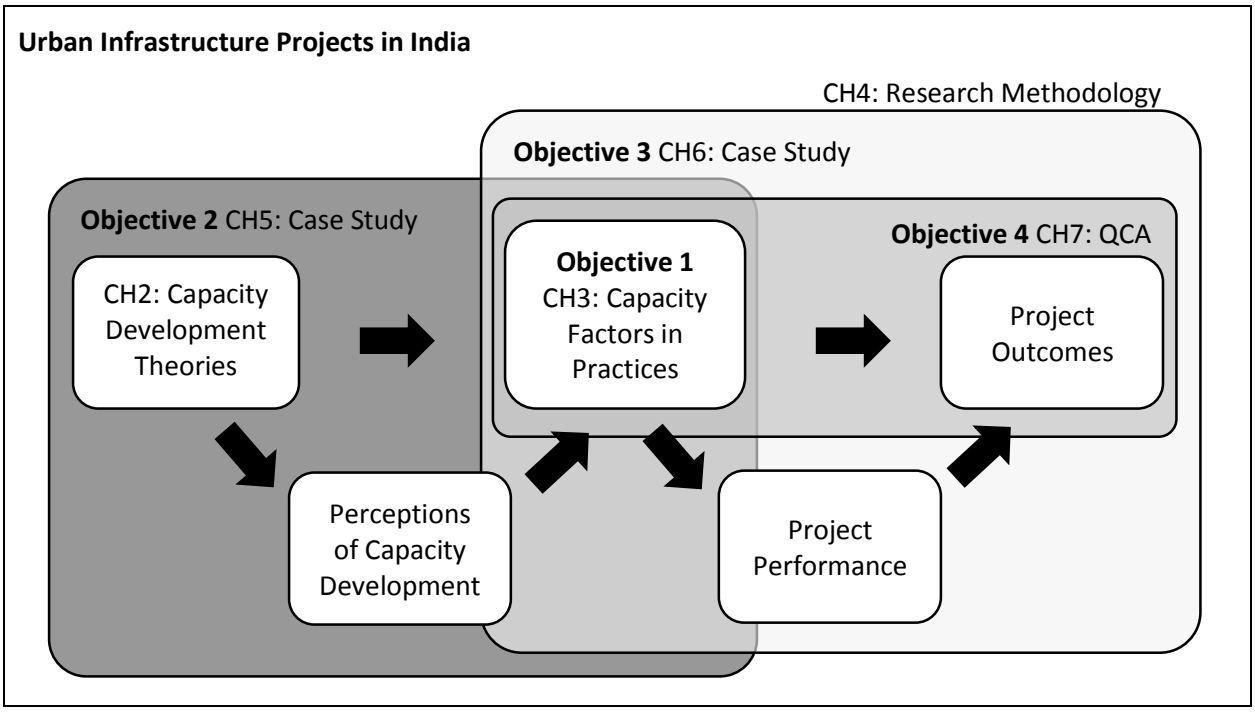

Figure 1-1 Relationship between the Research Objectives and Chapters

1.3 STRUCTURE OF THE STUDY

This research is organized as follows:

Chapter 2 reviews the existing literature on capacity and CD, and identifies the operational values for CD that are applicable for empirical studies. The chapter reviews how the concept of capacity has evolved over time, explores major international agencies' approaches to CD, and summarizes the key features of these approaches.

Chapter 3 develops a new theoretical framework for CD that can be applied to the urban sector in India. In order to develop the framework, the chapter reviews the status of urban infrastructure development in India and provides an overview of the JNNURM. The chapter also explores past and current CD interventions under the JNNURM and determines the capacity factors related to these interventions. The chapter concludes by presenting a conceptual framework that is used to guide the subsequent research.

Chapter 4 introduces the research methodology. The chapter provides an overview of the scope of the research and explains how the selected research methods are applied.

Chapter 5 focuses on the multi-dimensionality of capacity and CD, and investigates Indian perceptions of the concept. Using these perceptions, the chapter identifies the gaps that exist between the theory and practice of CD. The major principles of capacity and CD are compared with the perceptions of capacity and CD held by practitioners in India. The chapter draws implications on how the theory of capacity and CD could be applied to the urban sector in India.

Chapter 6 focuses on the relationship between capacity and performance. The chapter presents the results of case study focusing on the impacts of capacity on project delivery, and interprets the findings through the lens of CD. The chapter applies a theoretical CD lens to the urban sector in India.

Chapter 7 focuses on capacity and outcomes, and investigates the impacts of capacity factors on project implementation. Using QCA, this chapter seeks to answer which combinations of capacity factors lead to successful or unsuccessful project implementation. The analysis uses the capacity factors identified in Chapter 3, and empirically analyzes relationships between these capacity factors and project outcomes. The chapter presents the results of the QCA, and interprets them in relation to the focus of this research.

Chapter 8 draws broader implications for other developing countries for how CD could be used to improve the project delivery and sustainability of urban infrastructure. The chapter provides a summary of the main research findings, discusses the implications of these findings on policy and practices, outlines the limitations of the research, and provides recommendations for future research.

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CHAPTER 2 CAPACITY DEVELOPMENT

2.1 INTRODUCTION

This chapter reviews the Capacity Development (CD) literature and develops a CD framework to support the proposed research. The chapter provides a historical review of CD, explores current approaches to CD, and summarizes the features of the approaches discussed.

Section 2.2 poses the questions "Why does capacity matter?" and "How did capacity become a major issue in international development", and reviews how capacity has evolved in the context of international development. Section 2.3 examines existing definitions and dimensions of capacity by asking "What is capacity?" and "Which form of capacity is needed?" The definitions and dimensions are explored by reviewing debates on the characteristics of capacity. Focusing more on CD, Section 2.4 investigates existing frameworks and measurements of CD provided by major international organizations. By considering the various features of CD, the constraints to measuring CD are investigated. Finally, this chapter develops a conceptual framework to understand CD.

2.2 HISTORICAL PERSPECTIVES

2.2.1 The Emergence of Capacity

Capacity Development (CD) has its roots in Institution-Building, Institution-Strengthening, Human Resource Development, and New Institutionalism that emerged from the 1950s to 1990s. Each concept has its own objectives and emphasis. Human Resource Development (1970s) focuses on the individual, Institution-Building (1950s) and Institution-Strengthening (1960s) emphasize capacity issues from the perspective of organizational learning and development, and New Institutionalism (1980s) highlights the system in which organizations operate. In contrast, CD (2000s) recognizes the interdependency between each level (i.e., the individual, organizational, and environmental) and utilizes a multi-level approach, which deals with specific interventions targeted at a given context. Table 2-1 presents a timeline showing the evolution of CD from 1950s to today.

CD is an umbrella concept under which various approaches to development assistance are subsumed (Kühl, 2009). As seen in Table 2-1, as the overall development approach evolved, so too did the approach to capacity development. The growth of overseas development assistance in the 1950s/60s required effective institutions to manage the funds provided, which led to Institution-Building and Institution-Strengthening. The focus on technical assistance and cooperation during the 1970s that relied on knowledge transfer, required Human Resource Development in the recipient nations. In the 1980s, New Institutionalism emerged and emphasized a systems approach, such as macro-economic policy and administration improvement. The concept of CD evolved with each of these changes. Thus, as

the general approach to development is likely to evolve in the future, so too is the concept of CD. The following subsections explore several of these key ideas in more detail.

Table 2-1 Timeline Showing the Evolution of Capacity Development Concepts

Decade	Key International Agreements and Publications	Development Approach	Approach to Capacity Development
1950s	Influence of the Marshall Plan	**Development Aid** – Developed countries lend or grant money to developing countries	**Institution Building** – Buildup of a basic stock of functional institutions
1960s	–	**Technical Assistance** – Foreign experts operate their own projects **Technical Cooperation** – Emphasis on training, transferring knowledge, based on national policies and priorities	**Institution Strengthening** – Strengthening and restructuring of existing local institutions
1970s	–		**Human Resource Development** – Concentration on education, health, and population development
1980s	–		**New Institutionalism** – Strengthening of existing institutions (networks and external conditions)
1990s	Principles for Effective Aid, 1992 Local Agenda 21, 1992 Jaycox's speech, 1993 Berg's study, 1993	–	**Capacity Building** – Capacities on the individual, institutional, and systemic level
2000s	MDGs, 2000 Fukuda-Parr's (UNDP) report, 2002 Paris Declaration, 2005 OECD's report, 2006 Accra Agenda for Action, 2008 Busan Partnership Agreement, 2011	**Aids Effectiveness** – Emphasis on ownership and leadership of recipient countries	**Capacity Development** – Focus on empowering and strengthening endogenous capabilities

Sources: Kühl (2009); UNDP (2010); Pearson (2011).

2.2.1.1 Institution Building/Strengthening: The Influence of the Marshall Plan

Developing capacity has been a fundamental component of international development assistance since the Marshall Plan (Fukuda-Parr, Lopes, & Malik, 2002). In the 1950s, the Marshall Plan achieved substantial success in Western European countries. These countries were rehabilitated from the devastation of World War II and were able to rebuild and revitalize their economy with the support of foreign aid. From this experience, it was considered that the lack of resources—mainly capital—was the largest constraint on development. To receive financial aid, the recipient countries were required to

establish institutions to handle capital, receive know-how, and implement development programs. The objective was to emulate the success that had been achieved with the Marshall Plan in Europe, imagining that it would be possible to achieve the same results in developing countries with the help of efficient public institutions (Kühl, 2009).

During the 1960s, the emphasis began to shift towards strengthening institutions rather than building new institutions. However, the basis of the approach still came from the perspective of institutional development, which places an emphasis on individual institutions. Since then, Institution-Building and Institution-Strengthening have been key components of international development. Most donor-funded projects, both from bilateral and multilateral sources, have usually required and included an institutional component to complement physical development work (Fukuda-Parr et al., 2002). The concepts of Institution-Building and Institution-Strengthening share much in common with CD, but they not identical (OECD, 2006a, p.14).

2.2.1.2 Technical Cooperation/Assistance and Human Resource Development

In spite of huge capital investments, the emphasis on development aid and institution development did not achieve the expected outcomes (OECD, 2005, 2006a; Otoo, Agapitova, & Behrens, 2009; World Bank, 2007). The failure of the approach led to the perception that recipient countries lacked technical abilities, skills, and knowledge to implement projects and apply western development models. From this background, technical assistance and cooperation started to be utilized in development assistance. The underlying assumption was, "that developing countries lacked important skills and abilities—and that outsiders could fill these gaps with quick injections of know-how" (Fukuda-Parr et al., 2002, p.2).

In order to fill the gaps, the main intervention was to send foreign experts to developing nations expecting that they could help governments carry out projects and produce the intended results. However, projects led by foreign experts were often criticized due to their irrelevancy in the local context. In addition, it was widely recognized that this approach resulted in an unequal partnership between foreign and local experts and increased the dependency on foreign expertise. Following this criticism, donor agencies focused more on fostering local experts through knowledge transfer—e.g., workshops and trainings.

In the transition to technical cooperation in the 1970s, "development policy became increasingly concentrated on the self-help potential of individuals under the slogan 'Development is about people', and the Human Resource Development concept started to dominate CD programs" (Kühl, 2009, p.555). This concept played an important role in areas such as the economy, politics, and health by encouraging development organizations to be in charge of training individuals. Technical cooperation and Human Resource Development were generally perceived as "a key instrument for improving policies and project design, enhancing skills and strengthening implementation capacity, and for institutional development in general" (Fukuda-Parr et al., 2002, p.232).

This pattern began to change in 2001, with a major initiative of the United Nations Development Programme (UNDP), entitled "Reforming Technical Cooperation", which was critical of the weak contribution of technical assistance to CD (Baser & Morgan, 2008; Fukuda-Parr et al., 2002). Both

technical assistance and cooperation rely on “knowledge transfer” not “knowledge creation”, and still have limitations in reflecting the local context and strengthening local capacity. Moreover, even if technical cooperation may be appropriate in some instances to address short-term needs, it tends to be donor-driven, expensive, and relies on foreign expertise while distorting national priorities (UNDP, 2009).

2.2.1.3 New Institutionalism and the Influence of Agenda 21

During the 1980s, Human Resource Development was replaced by the programs of New Institutionalism, which reduced the focus on individual projects and increasingly directed attention to the influence of economic and political conditions and the interplay of organizations and institutions (Kühl, 2009). New Institutionalism is rooted in institutional economics and focuses on national economic behaviors. The influence of New Institutionalism broadened the scope of interventions for development assistance to cover the public and private sectors and operated at different levels from the individual to the enabling environment. In addition, the new trend “set the scene for the emergence of the ‘governance’ focus that is now prominent” (Pearson, 2011, p.12). Based on the concept of New Institutionalism, the trend for strengthening endogenous capacity was shifted from individual projects to broad networks and systems.

In addition to New Institutionalism, Agenda 21, developed by the United Nations (UN) in 1992, accelerated the expansion of decentralization, which became another keystone of CD. Agenda 21 promoted the idea that, “the success of ‘sustainable development’ largely depends on a country’s ‘capabilities’ to promote the development of ‘personnel and institutional capacities’” (Kühl, 2009, p.564). In Agenda 21, which emphasizes strengthening capacities at multiple levels, Capacity Building (CB) is identified as one of the main implementation mechanisms. For example, Section 37 of Agenda 21 is devoted to national mechanisms and international cooperation for CB in developing countries. In this section, the stated overall objectives of endogenous CB are, “to develop and improve national and related subregional and regional capacities and capabilities for sustainable development, with the involvement of the nongovernmental sectors” (Geoff, 2002, p.551; UN, 1992). Moreover, Agenda 21 argues that “it is essential for individual countries to identify priorities and determine the means for building the capacity and capability to implement Agenda 21, taking into account their environmental and economic needs” (UN, 1992, article 37.2). In other words, along with New Institutionalism, Agenda 21 moved the focus of capacity issues from an individual and organizational level to a system and national level.

2.2.1.4 The Rise of the Umbrella Concept: Initiatives by WB and UNDP

In the early 1990s, the former concepts—Institution-Building, Institution-Strengthening, Human Resource Development, New Institutionalism—were largely replaced by the concept of Capacity Building (CB) and, later, by the concept of Capacity Development (CD) (Kühl, 2009). The CD approach focused on

linking the former concepts, creating a new comprehensive model whereby the individual, organizational, and environmental levels are simultaneously considered.

In the transition to CB/CD, major international organizations played a critical role in the diffusion of the concept through their publications or policies. In 1993, Edward V.K. Jaycox, the vice-president of the African region of the World Bank, stressed the need for a new approach to development cooperation. In his speech at the African-American Institute Conference, he addressed CB as an invented term "to describe a 'new mode of activities' that would be different from those of the past" (Kühl, 2009, p.564).

In the early 1990s, UNDP was also critical of the existing approach of technical cooperation. From this critical perspective, UNDP published a study by Berg (1993), which suggested a radical change for technical cooperation. Berg (1993) considered it important to conduct CB programs that would lead to 'better trained personnel' and 'stronger institutions' (Kühl, 2009). These arguments prevailed in development organizations, and CB became mainstreamed. After that, other publications further reinforced the concept (CDRA, 1995; Fukuda-Parr et al., 2002; Kaplan, 2000; OECD, 2006a). However, it should be noted that, "training and technical assistance are still widely used to develop capacity" (Boyd, 2009, p.20), and "CD has not replaced aid, technical assistance, or technical cooperation" (Pearson, 2011, p.10).

2.2.2 Transition to Capacity Development

2.2.2.1 Capacity Building (CB) and Capacity Development (CD): The Focus on Endogenous Capacity

Capacity Building (CB) and Capacity Development (CD) are generally interchangeable, since both aim to develop capacities comprehensively. Many development programs utilize both CB and CD. However, the concepts have slightly different meanings. CB is usually utilized in the initial stage of CD by assuming the absence of existing capacities to initiate development projects. On the other hand, CD focuses on empowering endogenous capacities. CD can be regarded as the 'more politically correct' term and as the successor of CB (Kühl, 2009). Reflecting the differences, CB was used more in the 1990s and early of 2000s, but it began to be replaced by CD in the 2000s.

One of the key studies exploring the transition from CB to CD was conducted by Fukuda-Parr et al. (2002). They noted that perspectives on development cooperation over the past few decades "ignored—or at least underestimated—the importance of local knowledge, institutions, and social capital in the process of economic and social development" (Fukuda-Parr et al., 2002, p.vii). This approach led to the displacement of, rather than transformation in, endogenous development processes. This displacement led to many negative impacts such as the distortion of local priorities and expensive methods of development. Hence, reconsidering the negative effects of this displacement, Fukuda-Parr et al. (2002) argue that international agencies should focus more on transformation, and rethink the underlying assumptions about:

- "the nature of development as a process of societal transformation, and the fundamental importance of indigenous capacity for this transformation;
- the nature of capacity and capacity development, including individual skills, institutions and societal capacities;
- the nature of knowledge, where it is located and how it can or cannot be transferred and shared; and
- the nature of the aid-recipient relationship, which has profound consequences for success and failure in developing lasting capacities" (Fukuda-Parr et al., 2002, p.viii).

Since their study was published, and once international agencies acknowledged that CD can be more relevant and effective in a local context, CD replaced CB and took center stage. Table 2-2 provides a comparison between the CB (conventional) and CD (alternative) paradigms. As can be seen, "local" actors play a more central role in CD.

Table 2-2 Dimensions of Capacity Development Practice based on Chambers (2005)

Factor	**<---------- Continuum ----------->**				
Paradigm	Conventional				Alternative
Ownership	Outsiders				Locals
Outsiders' actions	Command				Support
Locals' actions	Comply				Initiate
Locals'/outsiders' relationship	Compliance	Consultation	Cooperation	Co-learning	Collective action
Locals' motivation	Extrinsic				Intrinsic
Locals' role	Slave				Owner/controller
Outsiders' role	Dictator				Supporter
Change process	Exogenous/ Outsider driven				Endogenous/ Locally driven
Power dynamics locals/outsiders	High differential				Low differential
Partnerships	Weak				Strong

Source: Boyd (2009).

2.2.2.2 Main Impetus: Aid Effectiveness and High Level Forums on Aid Effectiveness

Since the early 2000s, Aid Effectiveness, which concerns how to deliver aid in a more effective way, has been an important agenda item for the international community. Many studies suggest that increased awareness of Aid Effectiveness is an important impetuses for the shift from CB to CD. The interactions between Aid Effectiveness and CD are well presented in documents by High Level Forums (HLFs) on Aid Effectiveness. In 2003, the Rome Forum was the first to open a debate concerning Aid Effectiveness and CD. The Rome Declaration on Harmonisation notes that "the key element … is a country-based approach that emphasizes country ownership and government leadership, includes capacity building, recognizes diverse aid modalities (projects, sector approaches, and budget or balance of payments support), and engages civil society including the private sector" (OECD, 2003, p.10). In other words, the Rome Declaration put high importance on recipient countries' strong leadership to coordinate development assistance and build their capacity. Even though the Declaration utilizes the term of CB in order to emphasize the country-led approach, it appears that its focus is more on developing countries' endogenous capacity.

After the First Rome Forum, the consensus on the importance of CD was strongly articulated in the 2005 Paris Declaration and the 2008 Accra Agenda for Action (Pearson, 2011). The Rome Declaration includes CB instead of CD. However, since the Paris Declaration, many development agencies have utilized CD rather than CB. The Paris Declaration became a catalyst for discussions on CD by clarifying the importance of the roles of recipient countries in CD, such as the ownership and leadership of development strategies and processes. The Declaration notes that CD "need not only to be based on sound technical analysis, but also to be responsive to the broader social, political and economic environment, including the need to strengthen human resources" (OECD, 2005, p.4).

After the Paris Declaration, the OECD (2006a) published "The Challenge of Capacity Development: Working towards Good Practice" to explain "what CD is, why it matters, and what can be done to support it" and to provide frameworks for policy makers and practitioners. It clarifies that "CD is primarily the responsibility of partner countries, with donors playing a supportive role" (OECD, 2006a, p.15). In addition, donors and partner countries investigated six CD operational priorities in the Bonn Consensus. The six priorities are 1) integration of CD as a core element, 2) leadership by developing countries, 3) conditions of technical cooperation for ownership, 4) involvement of civil society and private sector, 5) tailored support for fragile states, and 6) expansion of knowledge and application of good practice on CD.

The six priorities became a part of the Accra Agenda for Action (AAA), which was developed by the third HLF in Accra in 2008. While the Paris Declaration includes CD in one of five fundamental principles for Aid Effectiveness, CD takes a more central role in the AAA, penetrating the three main areas of the Agenda. In order to strengthen CD in developing countries, the AAA suggests following actions:

a) "Developing countries will systematically identify areas where there is a need to strengthen the capacity to perform and deliver services at all levels—national, sub-national, sectoral, and thematic—and design strategies to address them. Donors will strengthen their own capacity and skills to be more responsive to developing countries' needs.

b) Donors' support for CD will be demand-driven and designed to support country ownership. To this end, developing countries and donors will i) jointly select and manage technical co-operation, and ii) promote the provision of technical co-operation by local and regional resources, including through South-South co-operation.
c) Developing countries and donors will work together at all levels to promote operational changes that make CD support more effective" (OECD, 2011).

These HLFs have stimulated the transition from CB to CD by emphasizing recipient countries' ownership and leadership. Through changes in the approach to development, there have been many new consensuses between donors and recipient countries. These consensuses are mainly related to how to enhance the effectiveness of international aid. One of the most accepted ideas is that the capacity of recipient countries is key to achieving Aid Effectiveness. From the 2003 Rome Forum to the 2011 Busan Forum, CD has developed into one of the main themes in the HLFs and has become mainstream in the international development community.

2.3 CONCEPTUALIZATION OF CAPACITY

2.3.1 Definitions

As the concept of endogenous capacity has evolved, it has become more refined and complicated. Since the concept is widely utilized by the international development community, "nearly every major national or transnational development assistance organization has published at least one policy paper on CD" (Kühl, 2009, p.562). Along with the increased interest, specific interventions for CD have become vital components in most development projects.

Notwithstanding the broad acceptance of the need for CD, the concept is still considered as jargon, filling more of a symbolic role in development programs and projects. The problem begins with a lack of consensus about the operational definition of CD and the results that can be expected from CD efforts (Otoo et al., 2009). As shown in Table 2-3, each organization has its own definition, and there is no one agreed upon definition of capacity and CD.

Table 2-3 Examples of Definitions of Capacity and Capacity Development

Definitions of Capacity	
ECDPM	"That emergent combination of individual competencies, collective capabilities, assets and relationships that enables a human system to create value" (Baser & Morgan, 2008, p.3).
OECD	"The ability of people, organisations and society as a whole to manage their affairs successfully" (OECD, 2006a, p.12).
SNV	"The ability of a human system to perform, sustain itself and self-renew" (Ubels, Acquaye-Baddoo, & Fowler, 2010, p.4).
UNDP	"The ability of individuals, institutions and societies to perform functions, solve problems, and set and achieve objectives in a sustainable manner" (UNDP, 2009, p.53).
WB	"The availability of resources and the efficiency and effectiveness with which societies deploy these resources to identify and pursue their development goals on a sustainable basis" (Otoo et al., 2009, p.3).
Definitions of Capacity Development	
ECDPM	"The process of enhancing, improving and unleashing capacity; it is a form of change which focuses on improvements" (Baser & Morgan, 2008, p.3).
OECD	"The processes whereby people, organisations and society as a whole unleash, strengthen, create, adapt and maintain capacity over time" (OECD, 2006a, p.12). (EuropeAid, GIZ, and ADB have adopted this definition.)
SNV	"The changes in capacity over time/in practice, deliberate efforts to make capacities grow" (Ubels et al., 2010, p.4).
UNDP	"The process through which individuals, organizations and societies obtain, strengthen and maintain the capabilities to set and achieve their own development objectives over time" (UNDP, 2009, p.54).
WB	"a locally driven process of learning by leaders, coalitions and other agents of change that brings about changes in sociopolitical, policy-related, and organizational factors to enhance local ownership for and the effectiveness and efficiency of efforts to achieve a development goal" (Otoo et al., 2009, p.3).

The definitions of each agency share common features. Above all, capacity includes various subjects (e.g., individuals, people, organizations, institutions, and societies) and purposes (e.g., to create value, manage affairs, perform functions, solve problems, set and achieve objectives, and identify and pursue development goals). In terms of types of capacity, while other literature (Baser & Morgan, 2008; OECD, 2006a; Ubels et al., 2010; UNDP, 2009) explains capacity as an ability or capability for the indicated purposes, Otoo et al. (2009) ties the ability with the "efficiency and effectiveness of resources". In addition to capacity, the definitions of CD share similar meanings. General definitions of CD link to broad target groups and general development results (Pearson, 2011). In most literature, CD is recognized as a process (or change) that enhances capacity.

Even though the definitions show similarities between agencies, there are divergent perceptions of capacity which has led to different approaches to CD. As capacity has become more complicated, researchers reflect different perceptions across a spectrum of characteristics of capacity. For example, Honadle (1981) summarizes five prevailing perceptions of the concept: 1) survival vs. service, 2) politics vs. rationality, 3) inputs vs. total systems, 4) capacity building for whom?, and 5) means vs. results improvement. In particular, she notes that, "definitions of capacity vary in the extent to which they

specify the activities that should be performed versus the results that are sought" (Honadle, 1981, p.577).

Of the various debates about the meaning of capacity, one of the most divergent perceptions is whether researchers should consider capacity as a means of development or as an end in and of itself. The former perception is applicable to many evaluation frameworks provided by major development agencies, and the usual question is 'capacity for what'. This approach uses CD to drive local solutions "as a strategic instrument, which leads to transformative, sustainable change" (World Bank, 2011b, p.10).

In contrast, the latter approach sees improved capacity as the end to the process. Thus, capacity can be evaluated independently regardless of the results of development goals. Sen (1999) supports this approach to CD and notes that "development is fundamentally about developing the capabilities of people by increasing the options available to them … by focusing on the freedoms generated by conventional outcomes rather than just on the outcomes themselves" (Morgan, 2006, p.17). In other words, he emphasizes that developed capacity could be the ultimate goal of any development activity.

In practice, the debate about whether capacity is a means or an end of development generates little interest amongst most practitioners and analysts (Morgan, 2006). Furthermore, in the instructional frameworks of major organizations, the perception of seeing capacity as a means prevails, which leads to result-focused thinking and approaches.

2.3.2 Dimensions of Capacity and Capacity Development

Even though several useful definitions of capacity and CD exist, there are still problems with operationalizing these definitions. In this regard, some studies have focused on clarifying the operational meanings of capacity. By specifying the different dimensions of capacity, the approach to CD can be more targeted and measurable.

2.3.2.1 Hierarchical Dimensions of Capacity

The way capacity is defined is linked to how a CD framework considers endogenous factors at different levels. Most capacity literature uses two to five hierarchical levels to specify different forms of capacity (see the following section for a non-hierarchical framing of capacity). In spite of minor differences in the naming of the levels, they can generally be labeled as individual, organizational, and environmental. Table 2-4 shows the differences between the classifications that are used in several major reports.

Table 2-4 Hierarchical Dimension of Capacity

<table>
<tr><th rowspan="2"></th><th colspan="6">Organization / Author</th></tr>
<tr><th>UNDP (2009)</th><th>Pearson (2011)</th><th>SDC (2006)</th><th>Baser and Morgan (2008)</th><th>Ubels et al. (2010)</th><th>Grindle and Hilderbrand (1995)</th></tr>
<tr><td rowspan="6">Levels</td><td>Individual</td><td>Individual</td><td>Individual</td><td rowspan="2">Individual competencies</td><td>Micro</td><td>Human resource</td></tr>
<tr><td rowspan="2">Organizational</td><td>Organizational</td><td>Organization</td><td rowspan="2">Meso</td><td>Organization</td></tr>
<tr><td>Sectoral</td><td>Networks</td><td rowspan="3">Collective capabilities</td><td>Task network</td></tr>
<tr><td rowspan="2">Enabling environment</td><td>Institutional</td><td rowspan="2">Institution/ system</td><td rowspan="2">Macro</td><td>Institutional context</td></tr>
<tr><td>Global</td><td>Action environment</td></tr>
</table>

It is not possible to offer clear cut definitions for each of the levels (Pearson, 2011). However, there are common components for each level. The individual level usually means a person's competencies, including skills and knowledge, and it may include motivations, attitudes, and personalities which can be affected by other higher levels capacities. Secondly, components shared in an agency or network of agencies—such as goals, structure, policies, behavioral norms, partnership, communications, and incentive systems—can belong to the organizational level. Some literature includes organizational networks or sectoral linkages in this organizational level, but others classify the level beyond an organization as a separate capacity level. At this organization level, capacities of individuals are collected, and the benefits of the enabling environment are put into action (UNDP, 2009). Lastly, the enabling environment contains elements at sub-national, national, regional, and global levels, which are related to broad social systems. This level includes policies, laws, politics, social norms, cultures, and other important institutional/environmental factors which form settings where people and organizations function.

Based on the identified levels, capacity interventions can be designed according to the context. The important point is that if CD initiatives are to have any chance of achieving sustainable results, then capacity needs to be considered not just at one level, but in terms of the linkages between levels and the complexity of the whole system (Pearson, 2011). In other words, the levels are interrelated to each other, and an intervention for one level may not bring the intended results if the actions of or responses from the other levels are not taken into account.

So far, education and training systems have been mainstreamed in capacity interventions. However, the impact of these education and training systems is inseparable from the environments in which they are embedded (Kenneth, 2009). The interrelationships between the different levels of capacity provide a basis for criticizing existing non-integrated approaches to CD. Kühl (2009, p.555) emphasizes that "sustainable development is not possible without simultaneous human resource development, organizational strengthening and establishing supportive environment conditions".

2.3.2.2 Non-hierarchical Dimensions of Capacity

There is also literature which develops dimensions of capacity in a non-hierarchical manner. One alternative approach developed by EuropeAid is shown in Table 2-5. The framework has four dimensions combining the characteristic of capacity with the focus of capacity.

Table 2-5 EuropeAid's Four Dimensions Shaping Capacity

	Functional Dimension	Political Dimension
Internal Dimension	**Internal, functional dimension** Strategy, systems, structures, work processes, internal relationships.	**Internal, political dimension** Leaderships, poser distribution, material and nonmaterial incentives, rewards and sanctions, possible vested interests, conflicts.
External Dimension	**External, functional dimension** Legal framework, timeliness and adequacy of resources, results-based performance target, oversight bodies, formal accountability requirements.	**External, political dimension** Political governance, possible vested interests, pressure from clients/customers, competitors, media attention.

Source: EuropeAid (2010).

Capacity resides and develops internally, but whether and how capacity develops may largely be determined by the 'demand-side' or external factors (EuropeAid, 2010). Capacity can be divided into internal and external dimensions and these dimensions can be connected to the hierarchical levels by classifying the individual and organizational levels as the internal dimension and the environmental level as the external dimension. The other criterion relates to the purposes or roles of an organization, which can be classified by 'functional' and 'political' dimensions. Even though all organizations have both dimensions (EuropeAid, 2010), the main characteristic of capacity can be divided into either a functional or political dimension depending on the organization's focus.

There is another classification similar to the functional and political dimensions used by EuropeAid. Pearson (2011, pp.3-4) introduces the dimension of hard and soft capacities as types of capacity that are "a synthesis of current ideas drawn from many different sources". The hard capacities are often explained as technical, functional, tangible, and visible capacities, while the soft capacities are described as social, relational, intangible, and invisible capacities in other literature. These types of capacity are applicable to the hierarchical levels of capacity, and based on its context, relevant capacity intervention should be selected in different combinations of capacity types and levels. The hard and soft capacities are shown in Table 2-6. The dimensions of capacity vary from the community level to the global level, and the various classifications show that the use of dimensions is differentiated agency by agency.

Table 2-6 Examples of Hard and Soft Capacities

Hard	Soft
• Technical skills, explicit knowledge and methodologies (which for individuals can be considered as competencies) • Organisational capacity to function: appropriate structures; systems and procedures for management, planning, finance, human resources, monitoring and evaluation, and project cycle management; the ability to mobilise resources • Laws, policies, systems and strategies (enabling conditions) Note: tangible resources like infrastructure, money, buildings, equipment and documentation can be considered as the material expression or product of capacity, but they are not capacity in and of themselves.	**Operational capacities** • Organisational culture and values • Leadership, political relationships and functioning • Implicit knowledge and experience • Relational skills: negotiation, teamwork, conflict resolution, facilitation, etc. • Problem solving skills • Intercultural communication **Adaptive capacities** • Ability and willingness to self-reflect and learn from experience • Ability to analyse and adapt • Change readiness and change management • Confidence, empowerment and/or participation for legitimacy to act

Source: Pearson (2011, pp. 3-4).

In addition, the core themes used by the Organisation of Economic Cooperation and Development (OECD, 2006a) are an example how hierarchical and non-hierarchical dimensions can be combined. The OCED sorts the themes of capacity into the following six categories: enabling environment, sector strategy, country system, civil society, technical cooperation, and fragile situation. Considering the applications of CD, this classification develops particular dimensions that are able to reflect the local context. In summary, the dimensions of capacity vary from the community level to the global level, and the various classifications show that the use of dimensions is differentiated agency by agency.

2.3.3 Core Capacities and the Capacity Development Process

In spite of the various perspectives on CD, there is a common question that arises in all the studies: “Which abilities are needed?” Some of the literature answers this question with the term “core capabilities”, while other literature refers to “functional capacities”. These capacities can be a subset of the dimensions of capacity described above, but many studies emphasize core capacities as a separate concept. For this reason, a review of core capacities can enrich our understanding of CD.

2.3.3.1 Five Core Capabilities by ECDPM

Many reports (Brinkerhoff & Morgan, 2010; Simister & Smith, 2010; Ubels et al., 2010; Walters, 2007) refer to five core capabilities defined by the European Centre for Development Policy Management

(ECDPM). Based on sixteen in-depth case studies, the ECDPM team 'unpacked' the concept of capacity in terms of five 'core capabilities' that seem to be present across all the situations where effective capacity is displayed (Ubels et al., 2010). Brinkerhoff and Morgan (2010, p.3) summarize the five capabilities as follows:

- "**The capability to commit and engage**: Actors are able to: mobilize resources (financial, human, and organizational); create space and autonomy for independent action; motivate unwilling or unresponsive partners; plan, decide, and engage collectively to exercise their other capabilities.
- **The capability to carry out technical, service delivery, and logistical tasks**: Actors are able to: produce acceptable levels of performance; generate substantive outputs and outcomes (e.g., health or education services, employment opportunities, justice, and rule of law); sustain production over time; and add value for their clients, beneficiaries, citizens, etc.
- **The capability to relate and attract support**: Actors can: establish and manage linkages, alliances, and/or partnerships with others to leverage resources and actions; build legitimacy in the eyes of key stakeholders; deal effectively with competition, politics, and power differentials.
- **The capability to adapt and self-renew**: Actors are able to: adapt and modify plans and operations based on monitoring of progress and outcomes; proactively anticipate change and new challenges; learn by doing; cope with changing contexts and develop resiliency.
- **The capability to balance diversity and coherence**: Actors can: develop shared short- and long-term strategies and visions; balance control, flexibility, and consistency; integrate and harmonize plans and actions in complex, multi-actor settings; and cope with cycles of stability and change".

The subjects of these five core capabilities can be an individual, an organization, networks of organizations, a system, or a country, and the essence of these five core capabilities is that "none of these capabilities can by itself create capacity" (Lange, 2009, p.2).

2.3.3.2 Functional Capacities for Capacity Development Process by UNDP

While ECDPM suggests the five core capabilities do not have an order, some studies link capacities similar to the five core capabilities with a specific CD process. Like ECDPM, UNDP (2009) proposes five functional capacities, which determine development outcomes and support technical capacities. The five functional capacities are: 1) capacity to engage stakeholders; 2) capacity to assess a situation and define a vision; 3) capacity to formulate policies and strategies; 4) capacity to budget, manage and implement; and 5) capacity to evaluate. In the report, CD is described as "a perpetually evolving process of growth and positive change" (UNDP, 2009, p.19). These capacities drive the process as "all-purpose skills," which are distinguished from technical capacities for a specific purpose (Ibid 2009, p.21). As the driver of the process, the functional capacities form a five step cycle of "an upwardly spiraling cycle of events" (Ibid 2009, p.21).

Table 2-7 presents ECDPM's core capabilities and the process of CD suggested by some literature. As shown in Table 2-7, the other approaches are similar to the process used by UNDP. They use different

terms, but they are relevant to the functional capabilities defined by the UNDP. The UNDP's instructional process informs the planning, design, implementation, and monitoring of CD programs. The literature based on this process provides a guide to practitioners.

Table 2-7 Core Capacities and Process of Capacity Development

no	ECDPM (Baser & Morgan, 2008)'s core capabilities	CD process		
		UNDP (2009)	OECD (2006a)	Jackson (2010)
1	Capability to commit and engage	Engage stakeholders on capacity development	Understanding the international and country context	Relate
2	Capability to carry out technical, service delivery and logistical tasks	Assess capacity assets and needs	Identifying and supporting sources of country-owned change	Adopt
3	Capability to relate and to attract resources and support	Formulate a capacity development program	Delivering support	Integrate
4	Capability to adapt and self-renew	Implement a capacity development response		Act
5	Capability to balance diversity and coherence	Evaluate capacity development	Learning from experience and sharing lessons	Generate results

2.3.3.3 Interventions for Capacity Development

As described above, many existing studies suggest a formal CD process, and introduce tools and strategies for the CD process. For example, Pearson (2011) provides a comprehensive how-to guide for ten different types of capacity needs and the best practice that is relevant to each type. EuropeAid (2010) introduces eight tools to facilitate the CD process. The ADB's (2011) approach emphasizes that "the tool aims to enhance the realism and pertinence of CD ambitions and interventions in a sector", and provides "a set of tools and instruments that can be used to guide capacity development processes". Similarly, many agencies encourage formal interventions for CD process.

However, CD is not technical, but contextual. CD is not just a technical exercise in achieving better performance, but a process that allocates authority, opportunity, resources, and security to the target recipients (Baser & Morgan, 2008). CD is usually executed in diverse local contexts, and due to the case-by-case basis, tools applicable to one case and the findings from that case may not be helpful to other cases. The influence of contextual factors can determine the dynamics and outcomes of particular interventions. Thus, contextual factors should be considered in designing interventions (Baser & Morgan, 2008). In relation to this, EuropeAid (2010, p.15) notes that CD tools are "not intended to drive or predetermine a process dealing with capacity issues, but to be helpful—in most cases on a selective basis".

In this context, informal interventions are highlighted as much as formal interventions. Even though the existing literature focuses on formal interventions and measurable outcomes from these interventions, many capacity factors are not overt and visible. The hidden and invisible capacity factors facilitate informal interventions that shape the CD process together with formal interventions. In addition, the CD process involves uncertainty and complexity that cannot easily be predicted and controlled by the formal interventions. However, through the informal interventions in the CD process, people adapt themselves to the uncertainty and adjust the complexity in accordance with external conditions. Thus, Baser and Morgan (2008) emphasize that "the nature of the interplay between the overt and the hidden, the formal and the informal is a major determinant of the effectiveness of any effort to develop capacity".

2.4 MEASURING CAPACITY DEVELOPMENT

2.4.1 Comparison of Capacity Development Frameworks

As described in Section 2.2, it has been widely agreed that developing countries need to play a primary role in developing their capacity. These countries need to establish CD strategies that are suitable for their local context and enhance indigenous capacity. Today, most individual development projects include CD components. Despite the widespread agreement of the need for CD interventions, the impacts from CD interventions have persistently not met expectations (OECD, 2005, 2006a; Otoo et al., 2009; World Bank, 2007). There are various reasons for this. One of the main reasons is that many programs are poorly grounded in theory and lack a consistent conceptual framework (Otoo et al., 2009; Taylor & Clarke, 2008). Due to the ambiguousness of the concept, many CD programs are designed with insufficient evidence and unproven assumptions. Therefore, agencies need to develop a systemic approach to design an effective CD program and guide their processes. Moreover, after the implementation of a CD program, it is difficult to evaluate its results and impacts. Hence, better tools are needed to track, monitor, and evaluate CD efforts (Otoo et al., 2009).

2.4.1.1 Linkage between Inputs, Outputs, Outcomes, and Impacts

Recognizing the lack of a logical approach to CD, many development agencies have developed their own approach to CD in order to facilitate a more systemic process of CD that is assessed using monitoring and evaluation (M&E). The approaches are presented in their reports in various ways. Some reports use a specific checklist, and others develop their own framework utilizing diverse terms and steps to set indicators. Even though many differences exist between the frameworks of the development agencies, a common feature of many frameworks is that they follow an 'inputs–outputs–outcomes–impacts' model.

As explained in Section 2.3, two divergent perspectives on capacity are whether it should be approached as a means to an end or an end in itself. Those CD frameworks that are based on a linear progression of

thinking contain both perspectives and allow capacity to be measured as both a means and as an end. An assumption of these frameworks is that there is "a fairly direct line of causation between improved capacity and better results" (Baser & Morgan, 2008). Based on this linear thinking, the frameworks encourage the connection of changes in capacity and changes in development results.

Figure 2-1 presents outputs-outcomes-impacts identified by WBI and UNDP. Both agencies imply that changes in outputs and outcomes can be linked and promoted by specific CD activities. However, the two frameworks also show different components in each step. These differences mean that the applications of CD can vary widely by agency. Agencies also use analogous terms for different purposes or in different stages of CD. For example, while an agency might have accountability as a sub-component of democratic governance, the UNDP framework makes accountability one of its four core output issues (Pearson, 2011). Consequently, an agency has flexibility to apply the concept of CD depending on its mission and focus.

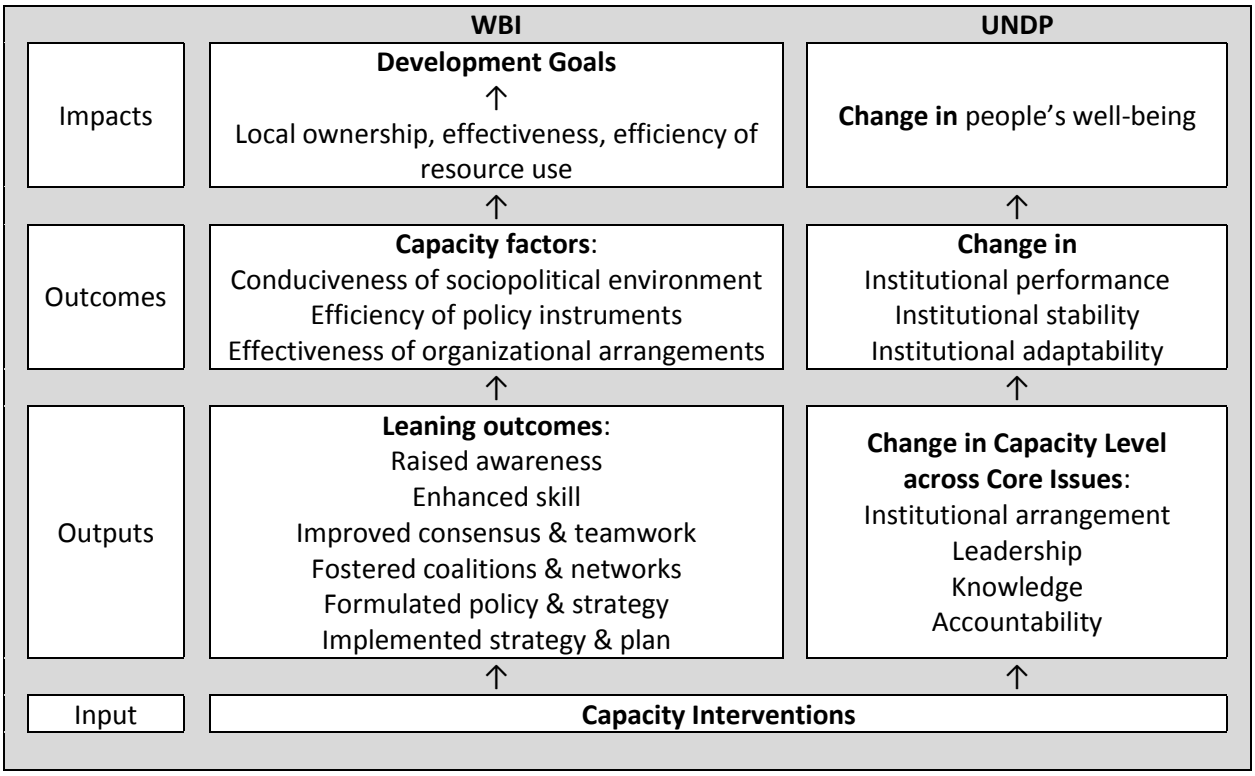

Figure 2-1 Diagram of Capacity Development Frameworks by WBI and UNDP

2.4.1.2 WBI – Capacity Development Results Framework

The approach of the World Bank Institute (WBI) to CD focuses on capacity as a means for achieving development results and emphasizes the role of learning to facilitate the change process by local agents. The WBI developed the Capacity Development Results Framework (CDRF) to promote a systemic approach to the identification, design, and M&E of learning for CD (Otoo et al., 2009). The CDRF

encourages stakeholders to look into relationships between components of the framework depending on their context, to model the process by learning, and to articulate clear results with evidence. Otoo et al. (2009, p.5) notes that the key features of the CDRF are as follows:

- "Emphasis on changes in the use of knowledge and information that empower local agents
- Focus on change efforts targeting institutional and policy-related constraints and opportunities
- Use of standardized indicators for needs assessment and results measurement
- Integration of M&E at all stages of CD programs to promote adaptive management".

As shown in Figure 2-1, the CDRF also follows the 'inputs-outputs-outcomes-impacts' model. In the framework, elements of each step are connected with the process of M&E. After planned learning activities are implemented as inputs, the activities generate six learning outcomes as immediate results of CD interventions. The learning outcomes are reflected in CD outcomes by agents of change, and the change processes are driven by the empowered agents. Hence, changes at the agent level can be measured by the learning outcomes.

The elements in each step play a role as indicators not only to analyze capacity constraints and opportunities, but also to assess the achievement of development goals. The learning outcomes, as outputs, have an effect on the larger system, which is directly connected to development goals. These learning outcomes help to achieve the development goals by generating or enhancing outcomes. In particular, the CDRF utilizes the term "three capacity factors" to describe the outcomes. Depending on the development of three capacity factors, achievement may be delayed or blocked altogether (Otoo et al., 2009).

Table 2-8 summarizes the indicators of the three capacity factors. These indicators can be tailored to the local context. However, any assessment of the capacity factors would be highly subjective and difficult to translate into operational solutions without standardized indicators that break the factors down into observable and measurable units (Otoo et al., 2009).

Table 2-8 Indicators for the Three Capacity Factors in the WBI Framework

Capacity Factors	Indicators
Conduciveness of the sociopolitical environment	• Commitment of leaders to the development goals (DG) • Compatibility of the DG with social norms and values, stakeholder participation in decisions about the DG • Stakeholders' voice in decisions about the DG • Accountability of public service providers for achieving the DG • Transparency of information to stakeholders about the DG
Efficiency of the policy instruments	• Clarity of the policy instrument in defining DG and the related rights and responsibilities of stakeholders • Consistency of policy instrument defining the DG with policy instruments for other DGs • Legitimacy of the policy instrument • Incentives for compliance provided by the policy instrument • Administrative ease of policy instrument implementation • Freedom of policy instrument from unintended negative consequences • Flexibility of the policy instrument in addressing varying DG situations • Resistance of policy instrument to corruption, rent seeking, and regulatory capture
Effectiveness of the organizational arrangements	• Clarity of mission with respect to the DG • Achievement of outcomes that lead directly to attainment of the DG • Operational efficiency in producing DG-related outputs • Financial viability and probity • Supportiveness of stakeholders • Adaptability in anticipating and responding to change

Source: Otoo et al. (2009).

2.4.1.3 UNDP – Transformation and Four Core Issues

While the framework of the WBI highlights results-focused thinking, the UNDP's approach attempts to combine capacity as means for results with capacity as an end or process. The UNDP's approach emphasizes the transformation based on endogenous capacity, and notes that "beyond performing tasks, [the transformation] is more a matter of changing mindsets and attitudes" (UNDP, 2009, p.5). Without a transformation of endogenous capacity, the results of development can be vulnerable to external impacts.

Reflecting the main concept of transformation, the UNDP developed its own framework to evaluate capacity by reviewing CD in an 'institutional' context. The UNDP's framework argues that M&E requires clear evidence of the capacity changes, even if it is difficult to capture the exact results of CD. First, the competitiveness of an institution, such as its availability to human, financial, and physical resources, is regarded as input in the framework. This input can bring changes in the outputs across core capacity issues (see Table 2-9). Progress and results are reflected by changes in performance, which can be evaluated in terms of improved efficiency and effectiveness (UNDP, 2009). In addition to the changes in performance, the stability and adaptability of a given institution are considered as outcomes. The stability contains changes in risk mitigation and institutionalization, and the adaptability includes

changes in investment for growth and continuous improvement. Hence, CD can be measured by changes in performance, stability, and adaptability via changes in the core capacity issues (UNDP, 2009).

Table 2-9 Outputs in the UNDP's Framework for Measuring Capacity Development

Core Issues	Outputs
Institutional Arrangement	• Streamlined processes • Clear definition of roles and responsibilities • Merit-based appraisal mechanism • Coordination mechanism
Leadership	• Clearly formulated vision • Communication standards • Management tools • Outreach mechanism
Knowledge	• Research supply and demand linkage mechanism • Brain gain and retention strategies • Knowledge sharing tools and mechanism
Accountability	• Audit systems and practice standards • Participatory planning mechanism • Stakeholder feedback mechanism

Source: UNDP (2009).

At many levels, the identified core issues can affect CD formally and informally, and activities for CD can be designed based on the core issues. The institutional arrangement accounts for "the policies, procedures and processes that countries have in place to legislate, plan and manage the execution of development and the rule of law, to measure change and to oversee other functions of state" (UNDP, 2009, p.57). Leadership is required to motivate stakeholders at various levels to react effectively. Knowledge can be fostered at the individual level and shared at higher levels. Knowledge, including information and expertise, can support capacity and produce better solutions for problems. Accountability exists when two parties adhere to a set of rules and procedures that govern their interactions and that are based on a mutual agreement or understanding of their roles and responsibilities vis-à-vis each other (UNDP, 2009). Based on accountability, institutions can monitor, regulate, and adjust their performance. It further helps enhance transparency and legitimacy.

2.4.1.4 Other Measurement Tools and Frameworks

In addition to the WBI and UNDP, other agencies provide their own tools to measure capacity and CD. Neilson and Lusthaus (2007) developed a set of tools to evaluate CD programs for practitioners in their agency and partner agencies. Unlike the WBI and UNDP frameworks, which do not distinguish between the dimensions of capacity, they reflected the hierarchical levels of capacity—individual, organizational, and networks levels—in the tool and suggested detailed items of outputs and outcomes depending on the level. Posing the question "Which ability should be developed for which solutions at which level?", they developed a tool to focus on the dynamics and interactions of the relationships between

individuals, organizations, and networks (Neilson & Lusthaus, 2007). Moreover, they emphasizes that evaluators should explore the result-chain of an expanded network that includes their partner agencies to evaluate the results in adequate performance.

Another tool to measure CD is the 'Toolkit for Capacity Development' developed by EuropeAid (2010). This toolkit reflects more the process of CD than the WBI and UNDP frameworks. This toolkit explains the CD process in a step-by-step way, and provides a practical checklist and various tools that are useful to each step. Hence, the toolkit highlights a process that is to be applied sequentially over a long period of time (EuropeAid, 2010).

Simister and Smith (2010) introduce many M&E tools and present practical guidelines for how civil society organizations can use their tools. Their paper deals with diverse subjects related to the M&E of capacity. One of their subjects is the direction of M&E, such as bottom-up, middle-up-and-down, and top-down. In addition, the paper adopts specific assessment methods, such as outcome mapping, ladder of change, etc. In particular, it summarizes thirteen tools for organizational assessment utilized by different agencies. Ultimately, it concludes that "where organizations are clear about what they want to achieve through improved capacity (or capacity building) and where there is a clear understanding of the purpose of M&E, it is not difficult to come up with a sensible blend of tools, methodologies and approaches that can meet the needs of different stakeholders" (Simister & Smith, 2010, p.3).

The ADB (2011) compiled a range of tools and instruments that have a sector-wide perspective. Building on Ubels et al. (2010)'s analytical framework that considers organizational capacity as a critical element in open systems, the ADB (2011) developed a CD framework focused on 'sectoral performance'. As shown in Table 2-10, the logical elements of sectoral performance—such as sector outcomes, sector outputs, and sector capacity—and CD interventions—such as CD impact, CD outcomes, and CD outcomes—can be linked systemically. Similar to the World Bank and UNDP, the ADB (2011) adopted a logical approach of 'impact-outcome-output-input' to CD interventions. However, it divides contextual factors into two groups: factors 'beyond' and 'within' the influence of CD initiatives. The ADB (2011) argues that CD can affect not only the capacity of a sector and organization, but also the contextual factors within the influence of CD activities. The ADB (2011, pp.58-59) describes a sector-wide perspective as incorporating the following factors:

a) "structural factors relevant to capacity (e.g., extended territory and limited public resources that are likely to have an impact on the ability to fund and deliver items, such as health and education services territory-wide);
a) institutional factors (including, but not limited to, the legal framework and how this is observed and enforced;
b) public sector-wide factors related to civil service conditions, and others;
c) decentralization;
d) patronage and/or client systems affecting the public sector's performance; and
e) effectiveness and modalities of sector governance and accountability mechanisms".

Table 2-10 Capacity Development Intervention Planning – Combining Logics

Open System Logic—The Desired and Feasible Vision of the Situation in the Sector		CD Intervention Results Framework
Sector impact This level of longer-term objectives focuses on overall sector policy goals, e.g., Millennium Development Goals.		While this will eventually contribute to impact, this would be beyond the scope of CD interventions.
Sector outcomes This level focuses on satisfying the priority demands of citizens.	↔	**CD impact** The purpose of the CD interventions is to contribute to sector outcomes. CD impact should be at the level of sector outcomes.
Sector outputs This is the supply side of sector performance, detailing the concrete service levels, quantities, and qualities, and/or the regulatory framework.	↔	**CD outcome** This level asks which specific and tangible changes CD will lead to in the outputs (services, regulatory products, etc.) of organization(s) at which the CD is directed. A baseline (present outputs) and a target (realistic future outputs) is required for effective accountability and learning during the CD process.
Sector capacity Sector capacity comprises the internal elements of individual organizations, their governance and accountability arrangements, their networking capability—as shaped by the context of drivers and constraints on capacity. The "sector machinery" will deliver the sector outputs.	↔	**CD outputs** The outputs of CD interventions are measured in specific changes in the capacity of the organization(s) going through a CD process.
Sector inputs These are the required steady and regular inputs, in terms of capital and operating funds, entry-level skills, technology, and others.		**CD activities** The activities will include CD and/or change management setup (defining structures, roles, and processes), and specific CD processes (preparing and conducting a workshop, coaching line staff in developing new procedures, courting and informing key stakeholders in the supporting coalition, and sidelining opposition).
		CD inputs This must include the key inputs from the organizations undergoing planned CD, external resources from other government agencies, resources acquired by the organizations, and those made available by development partners. A CD intervention only specifying inputs from external funding agencies maybe based on poor diagnosis and cannot be expected to be owned by local stakeholders, and is likely not to achieve a lasting impact.

Source: ADB (2011).

2.4.2 Constraints on Measurement of Capacity Development

Even though the existing frameworks of CD are diverse, the frameworks reveal common features of CD. These features have a significant influence on the approach to CD that is applied in practice and should be considered when CD is measured.

2.4.2.1 Comprehensiveness and Abstractness of Capacity Development

Capacity itself emerges from the interplay of a myriad of contextual, managerial, economic, social, and human factors (Baser & Morgan, 2008). Decision-makers and practitioners using the framework of CD need a holistic and comprehensive perspective from which to decide and execute suitable CD programs. In addition, the interventions for CD—from training to the reconstruction of a system—need to manage a broad array of issues in various fields. Furthermore, because the concept of CD has developed as an umbrella concept, it is derived from the perspective that the whole is different than the sum of the parts. In other words, an improvement of one dimension of capacity does not guarantee improvement as a whole, and vice versa. Hence, measuring one aspect of capacity does not have any significant meaning to the whole, and scrutinizing one aspect of capacity runs counter to the holistic view of the concept (Baser & Morgan, 2008).

Moreover, CD is abstract. Many components included in the frameworks of CD—such as accountability, leadership, ownership, etc.—are invisible and hard to measure quantitatively. Historically, most capacity analysis has arisen out of the operational experience of managing projects and programs (Baser & Morgan, 2008). Accordingly, even though some reports suggest quantitative methods to assess capacity by breaking it down into measurable components, the assessment methods are not easily operationalized in practice. The abstractness of the concept is one of the reasons why quantitative methods are not prevalent in research of CD.

2.4.2.2 Challenges in Monitoring and Evaluating Capacity Development

One of the pertinent challenges in the field of CD is measuring change and results in concrete terms (UNDP, 2009). As CD has become mainstreamed in the international development community, the need to monitor and evaluate the results of CD interventions has increased. However, there is growing frustration with the evaluation processes and results (Horton, 2011). Evaluators often struggle to measure the change and generate useful feedback based on supporting evidence.

There are many reasons for the failures. Horton (2011, p.6) indicates five major challenges evaluators face:

- “Evaluation has been mainstreamed as a tool for accountability, not improvement.

- Capacity-development processes are inherently complex.
- Capacity-development interventions are often badly designed.
- Evaluations are often weak in their design or methods.
- Knowledge sharing and professional development are often limited".

Based on these five challenges, three main questions— what, how, and why to measure?—can be raised in the design of an M&E framework for CD.

First, constraints concerning the objectives of M&E are highly related to the features of CD. The comprehensiveness, abstractness, and contextuality of CD form a complex process of M&E, which needs to deal with invisible components at multiple levels in accordance with the local context. These inherent characteristics of CD pose fundamental challenges to the M&E of CD. Furthermore, developing capacity involves cycles of learning through trial and error and applying lessons learned in the next cycle of activities (Horton, 2011). In other words, the dynamic process of CD needs to be handled longitudinally. For these reasons, few programs consider M&E at the design stage of the CD initiatives, and therefore, do not include detailed, indicator-based M&E processes in the programs. This lack of consideration in the design stage leads to inadequate M&E approaches.

Second, many agencies provide their own written materials including frameworks, indicators, and guidelines as a tool for M&E. The materials are intended to assist with the design of CD programs and the M&E of CD. However, although the conceptual frameworks were created from empirical data about endogenous CD, they are never applied "backwards" to look at past activities in the light of CD (Baser & Morgan, 2008). In addition, little information is available about how these guidelines have been used and what results have been obtained (Horton, 2011). Furthermore, few reports on evaluations of CD initiatives are available in the public domain and papers published in professional journals tend to be based on a single evaluation study (Horton, 2011). This gap between the written material and practices raises issues on the usefulness of tools focused on the M&E of CD. This means that the tools and references are not developed enough to be operational in practice. Furthermore, there is no ideal tool that can be applied in all cases, since CD is locality-based. The M&E methods need to be varied depending on their objectives and user groups. In practice, information on how to customize M&E in accordance with a local context is not provided.

The last constraint is related to the purposes of M&E. Like many divergent perspectives on capacity, there are different perspectives on the M&E of CD. In general, M&E plays a role in enhancing accountability and improving the process and results through learning. As shown in Table 2-11, the learning- and accountability-oriented evaluations have a different approach and focus. M&E can be utilized as an instrument for learning effectively. However, one constraint on the M&E of capacity is that, "CD efforts are usually evaluated to meet a donor agency's administrative requirements rather than to provide program managers or staffs with information that will improve their work" (Horton, 2011). The M&E focusing on securing external support is more likely to emphasize producing an M&E report that satisfies external evaluators than engaging stakeholders in the process for effective learning. Even though other advantages to using M&E exist, the current approach to M&E puts limits on the methods that could be used, which often result in adverse effects on the learning process by distorting the priorities of M&E.

Table 2-11 Evaluation Types

Object of the evaluation	Purpose of the Evaluation	
	Learning and Improvement	**Accountability**
Endogenous capacity development processes	A participatory, learning-oriented evaluation of capacity development processes	External evaluation of the costs and benefits of capacity development processes
External support for capacity development processes	A participatory, learning-oriented evaluation of support for capacity development processes	External evaluation of the costs and benefits of support for capacity development

Source: Horton (2011).

In conclusion, current M&E practices for CD face many challenges. Thus, M&E approaches need to pay careful attention to how CD interventions can be effectively incorporated into any development program or project. By doing so, practitioners and policy makers can use the M&E framework to identify and incorporate key principles of CD into interventions, apply them in accordance with the local context, and potentially achieve substantial changes in practices through capacity enhancements.

2.5 SUMMARY

This chapter reviews the existing literature on capacity and CD, and explores the various concepts emphasized by the literature. The ambiguousness of the concepts means that diverse perspectives on the meaning of capacity and CD exist. However, by synthesizing the existing literature on capacity and CD, the following propositions can be made:

- Proposition 1: Capacity development is largely determined by the local context.
- Proposition 2: Capacity development is based on the transformation of endogenous capacity.
- Proposition 3: Capacity development is an approach focused on various dimensions at multiple levels.
- Proposition 4: Capacity development is not a linear process and relies on both formal and informal interventions.
- Proposition 5: Capacity development is a goal in itself as well as a means for other development goals.

These propositions were used to frame the overall research approach and are discussed in more detail in subsequent chapters.

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CHAPTER 3 URBAN INFRASTRUCTURE DEVELOPMENT IN INDIA

3.1 INTRODUCTION

It is estimated that the urban population in India will reach 600 million by 2030, which is nearly double the 377 million urban population in 2011 (Planning Commission, 2012a). As a result of rapid urban growth, socio-economic conditions in urban areas are being put under increasing stress. The Government of India (GOI) has prioritized the need to manage the rapid urbanization in a holistic and planned way, with the objective of creating urban areas as accelerators for inclusive economic development. To realize this objective, the GOI initiated the Jawaharlal Nehru National Urban Renewal Mission (JNNURM) in December, 2005. This research focuses on the Urban Infrastructure and Governance (UIG) program under the JNNURM. In particular, it studies how capacity is operationalized by the program and how the capacity that does exist is associated with project performance and outcomes. The broader implications of the findings are also considered for urban infrastructure development in general.

This chapter begins by exploring the relationship between the urban infrastructure sector and capacity development in India (Section 3.2). Section 3.3 reviews the JNNURM and its stated objectives, main components and modalities, evaluations and achievements, and CD interventions. In particular, this section attempts to articulate the capacity issues related to urban infrastructure projects in India. In Section 3.4, the relevant capacity issues identified in the existing literature and from preliminary field research are classified into different capacity levels – i.e., the enabling environment, organization/network, and individual/project. Using the findings from Section 3.4, Section 3.5 develops a CD framework that can be used to study to the urban sector in India. This CD framework is used in Chapter 4 to structure the research methodology.

3.2 THE URBAN INFRASTRUCTURE SECTOR IN INDIA AND CAPACITY DEVELOPMENT

3.2.1 Urban Infrastructure and Capacity Development

Infrastructure development provides opportunities for broad-based economic growth and improved quality of life (OECD, 2006b; UNESCAP, 2007). The expansion of infrastructure can promote the growth of basic industries by facilitating mobility and social interaction. The increase in income from new jobs in these industries leads to increased savings and investment, which, in turn, raises overall standards of living by improving other sectors such as education and health. This virtuous cycle can result in returns on investment for infrastructure projects of around 30%-40% for telecommunications, more than 40% for electricity generation, and 80% for roads (Kingombe, 2011). Thus, infrastructure development is considered to be an essential aspect of a robust economy and infrastructure systems are often

described as the “backbone of the economy” (UNESCAP, 2007, p.9) and the “heart of economic and social development” (OECD, 2006b, p.1).

Together with economic development, population growth is considered the most important driver of the demand for infrastructure (OECD, 2006b). Rapid urbanization in developing countries has led to serious urban problems through an over-concentration of population and a failure of infrastructure development and service delivery to keep pace with demand. The major consequence of infrastructure and service deficits is the widespread “urbanization of poverty”. Uncontrolled urban growth, urban poverty, and slums are rapidly expanding, and through this growth they are exerting significant pressure on the environment (Ness, 2007). Responding to the challenges posed by rapid urbanization requires an urgent shift in the way urban infrastructure is planned, designed, and managed (UNESCAP, UNECLAC, UN-Habitat, & UDL, 2011). In particular, rapid urbanization requires that urban infrastructure is provided in efficient, effective, and innovative ways.

In this regard, many countries identify infrastructure development as a priority to overcome absolute poverty, build a robust economy, support sustained growth, and resolve problems from uncontrolled urbanization. However, there are many challenges in developing countries that make it difficult to facilitate infrastructure development. One challenge is the lack of institutional and regulatory frameworks and human resources that place severe constraints on the ability of countries to deliver infrastructure projects and maintain desired outcomes.

Infrastructure development has become “an increasingly complex and diverse process” (ASCE, 2007, p.19), and includes various stakeholders, multiple steps from planning to disposal, and integrated issues that emerge from interdisciplinary fields such as planning, engineering, and financing. It is generally known that the training and education of professionals throughout their careers is critical to infrastructure development, management, and disposal—an element that is often missing or under-resourced in developing countries. In addition to the capacity of professionals, the ability of institutional frameworks to cope with complex processes is closely related to the success of infrastructure projects. In this regard, the urban infrastructure sector can be considered as one of the most important sectors to investigate the relationship between development outcomes and capacity, as a means to achieve development goals.

3.2.2 India and Capacity Development

In India, infrastructure development is promoted at the national level. The GOI has established ambitious infrastructure development plans to address its growing infrastructure needs. The GOI’s 11th Plan (2007-2011) targeted USD 514 billion of investment to infrastructure development, and the 12th Plan (2012-2016) targeted USD 1,025 billion (Planning Commission, 2011a). However, during the first two years of the 11th plan, only 70% of the planned projects across all types of infrastructure were awarded. Of the total contracts awarded, nearly 60% of projects are troubled by time and cost over-runs (Chatterjee, 2011). In other words, there is a gap between GOI’s plan and its implementation.

India also faces a lack of institutional and human resource capacity, which is a challenge for infrastructure development. For example, the shortage of qualified human resources is regarded as one

of the main reasons for the under-performance of infrastructure development in India. According to a McKinsey report (Gupta, Gupta, & Netzer, 2009), the infrastructure deficit will cause a loss to Gross Domestic Product (GDP) of USD 200 billion in fiscal year 2017, and a loss of 30-35 million jobs related to infrastructure. Moreover, it is anticipated that the shortage of human resources is worsening. A World Bank report (World Bank, 2008) states that the supply of human resources in Indian construction industry will fall short by 55-65% over the next eight years. In other words, without efforts to promote capacity development (CD) of relevant institutions and human resources in India, it is likely that infrastructure development over the next decade will be severely constrained. Figure 3-1 presents the relationship between the dimensions of capacity and infrastructure development in India.

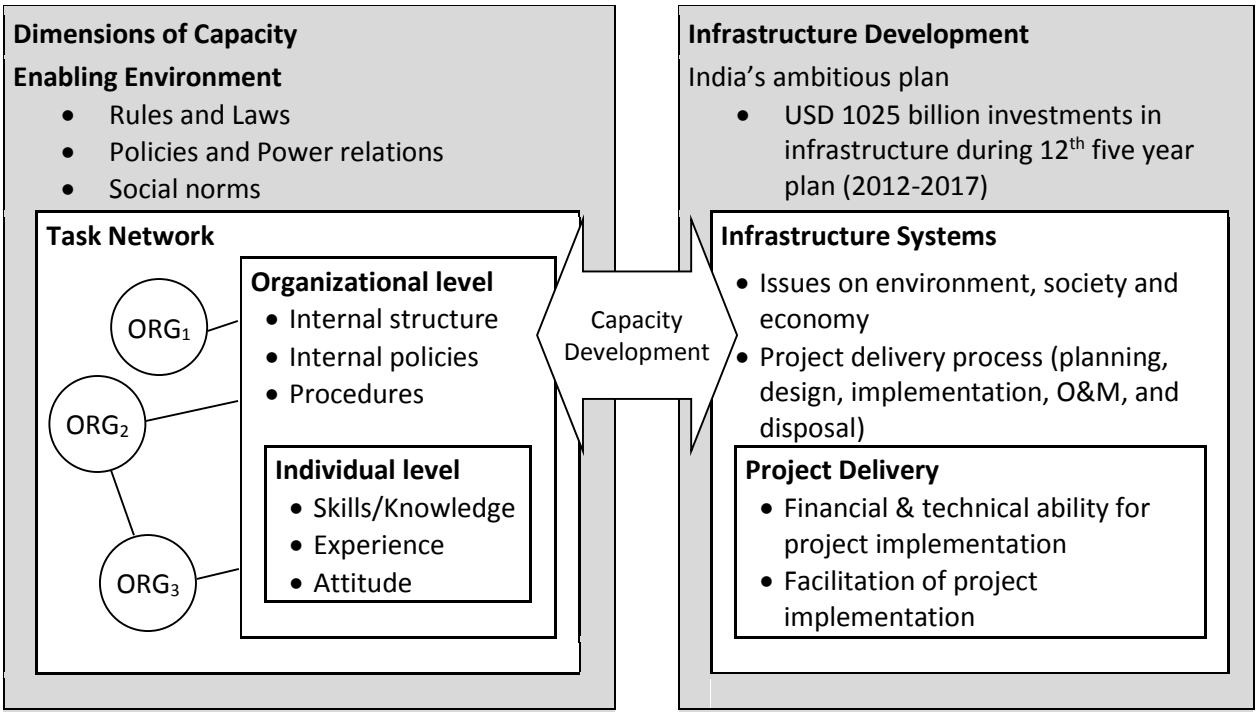

Figure 3-1 Dimension of Capacity and Infrastructure Development

As an emerging economy, India is poised to make huge investments in infrastructure. However, the performance of project implementation varies depending on the state, which indicates that different levels of capacity exist (Planning Commission, 2011b). For this reason, the diversity of development conditions in different states provides an opportunity to study CD and its impacts. This research focuses on the JNNURM, which is a nation-wide infrastructure development program designed to address the rapid urbanization occurring in many states.

3.3 JAWAHARLAL NEHRU NATIONAL URBAN RENEWAL MISSION

3.3.1 Objectives

In 2005, the GOI launched the JNNURM as the first national flagship program to manage its rapid urbanization. There have been many national urban programs, but the JNNURM was different in its size and modality. The JNNURM allocated more than Rs. 66,000 crore (approximately, USD 11 billion) as central government assistance for a seven year period to support holistic and planned development of 65 cities. The Mission has the following objectives:

a) "Integrated development of infrastructure service
b) Securing linkages between asset creation and maintenance for long-run project sustainability
c) Accelerating the flow of investment into urban infrastructure services
d) Planned development of cities including peri-urban areas, out growths, and urban corridors
e) Renewal and redevelopment of inner city areas
f) Universalisation of urban services so as to ensure their availability to the urban poor" (MOUEPA & MOUD, 2005).

In relation to these objectives, Sivaramakrishnan (2011) raised the question of "whether the JNNURM is a project or a policy response to India's rising and enormously complex urban problems?", and answered that "the stated objectives do combine both". The JNNURM has been designed as a comprehensive approach covering physical improvement and institutional enhancement for urban development.

3.3.2 Main Components and Modalities

In relation to the mission objectives, the JNNURM consists of two main parts: Reforms and Projects. Two ministries—the Ministry of Urban Development (MOUD) and the Ministry of Housing and Urban Poverty Alleviation (MOHUPA) are the guiding agencies for JNNURM projects. The project component has four Sub-Missions. The Urban Infrastructure and Governance (UIG) and the Urban Infrastructure Development Scheme for Small and Medium Towns (UIDSSMT) are being managed by the MOUD, and the Basic Services to Urban Poor (BSUP) and the Integrated Housing and Slum Development Programme (IHSDP) are administered by the MOHUPA. The UIG and BSUP are implemented in the 65 selected cities, and the other two Sub-Missions are initiated for other smaller cities. Figure 3-2 presents the structure of the JNNURM. The UIG is mainly discussed within the scope of this research.

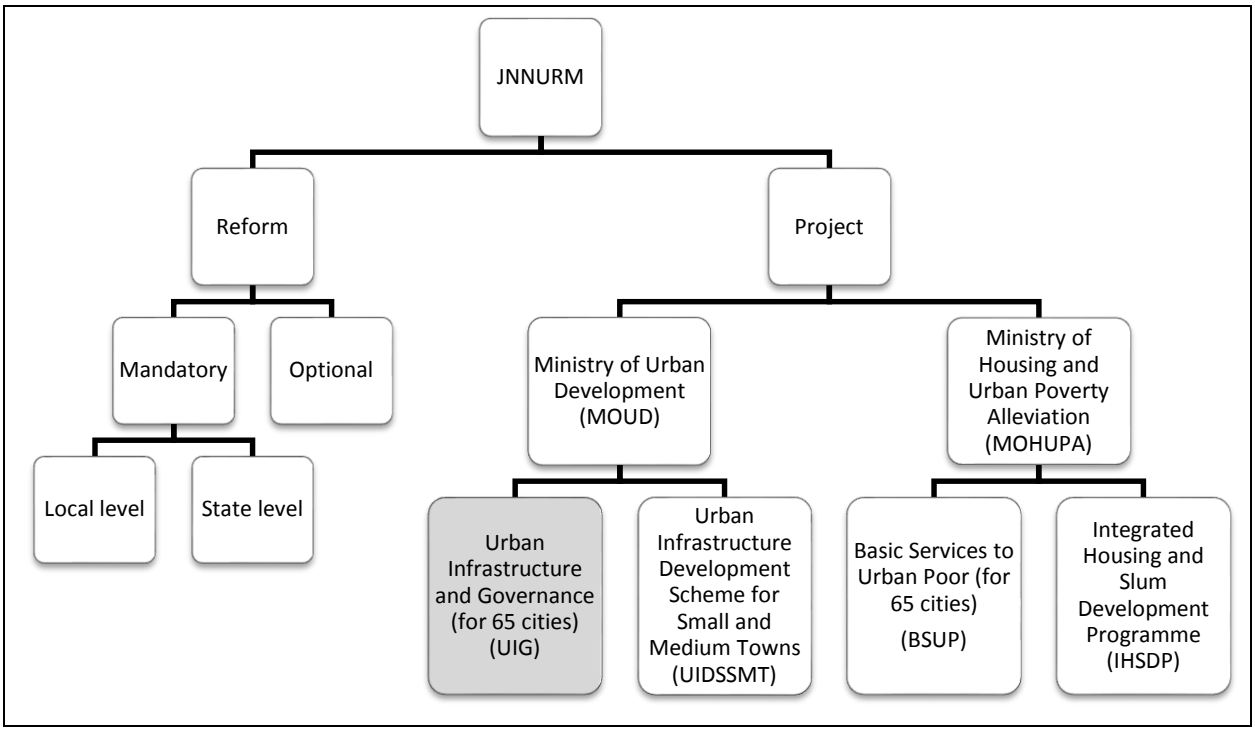

Figure 3-2 Structure of the JNNURM

In addition to the development of projects, state governments and municipalities are required to implement institutional reforms as a pre-requisite for assistance from central government. The JNNURM has seven mandatory state reform agendas, six municipal mandatory reform agendas, and ten optional reform agendas. Table 3-1 presents the reform agendas and scoring system. The GOI established the reform scoring system for monitoring the implementation of reforms, and created a scorecard to periodically evaluate progress in each city and state. The score for each type of reform varies from 3 to 10, depending on its complexity. The mandatory state reform agenda focused on the devolution of power to ULBs and on accountability; whereas the mandatory ULB (municipal) reform agenda focused on enhancing the financial capabilities of the ULBs and inclusive development. These institutional reforms are one of the key components emphasized by the GOI, and it is closely related to the empowerment of local government for decentralization.

Table 3-1 Reform Scoring System

No	Noncomplex reforms	Score	Complex reforms	Score
	Mandatory municipal reform			
1	E-governance set-up	10		
2	Shift to accrual based double entry accounting	10		
3	Property tax (85% coverage)	5		
4	Property tax (90% collection efficiency)	5		
5	100% cost recovery (water supply)	5	100% cost recovery (solid waste)	5
6	Internal earmarking of funds for services to urban poor	10		
7	Provision of basic services to urban poor	10		
	Mandatory state reform			
8	74th CAA (constitution of DPC)	3	74th CAA (transfer of 12 functions)	3.5
9	Transfer of water supply & sanitation	5	74th CAA (constitution of MPC)	3.5
10	Repeal of Urban Land Ceiling and Regulation Act	10	Transfer of city planning functions	5
11	Enactment of Community Participation Law	10	Reform in rent control	10
12	Enactment of Public Disclosure Law	10	Stamp duty rationalization to 5%	10
	Optional reform			
13	Revision of Building Bylaws - approval process	10	Property Title Certification system	10
14	Revision of Building Bylaws - mandatory rain water harvesting	10	Earmarking 25% developed land in all housing projects for EWS/LIG	10
15	Computerized process of registration of land and Property	10	Legal and procedural simplification for conversion of agricultural land	10
16	Bylaws on reuse of recycled Water	10	Administrative reforms	10
17	Encouraging Public Private Participation	10	Structural reforms	10
	Total	143	**Total**	87
	Grand Total	230		

Source: JNNURM website, *http://jnnurm.nic.in/scoring.html* (Retrieved April 27, 2013).

An interesting characteristic of the JNNURM is its fast-track "mission" mode. The GOI establishes a "mission" when a coherent, central vision is needed to address urgent national issues. By recognizing rapid urbanization as an urgent issue, the GOI planned to promote the quick supply of urban infrastructure through a "mission", and launched the JNNURM as a comprehensive package covering projects, reforms, and capacity development. Thus, as a comprehensive package, the JNNURM aims to implement programs more efficiently and maintain outcomes for long-run sustainability (MOUEPA & MOUD, 2005).

However, the two objectives of the JNNURM—the empowerment of local bodies and the quick implementation of infrastructure projects—create tensions that are reflected in the choice of which agency is selected to manage projects (Sivaramakrishnan, 2011). Historically, tasks in the urban sector have been handled by state governments, and the Urban Local Bodies (ULBs) have not been playing a main role in urban infrastructure development in many states. In order for ULBs to now lead the project implementation that they had not been previously engaged in, the program needed to establish a certain preparation time for the ULBs to build their capacity (for details, see Section 3.3.4). Due to this situation, the swift implementation and empowerment of the ULBs through the JNNURM were not

compatible with each other, and the contradiction between the two objectives of the program tended to encourage government agencies to focus more on swift project implementation rather than the empowerment of the ULBs.

3.3.3 Achievements and Evaluation

It is generally believed that the JNNURM has contributed to significant investments and improvements to the physical infrastructure of cities (Sivaramakrishnan, 2011, p.xxv). According to the mid-term appraisal by the GOI, the program has been achieving its goals effectively. The Planning Commission (2011a, p.382) notes that, "the JNNURM has been effective in renewing focus on the urban sector across the country, and has helped initiate a comprehensive process of urban reforms within states and ULBs".

On the other hand, there have been some negative assertions as well. In the official letter from the Planning Commission (2012a) it is stated that, "during the 11th plan period, MOUD could release ACA of about Rs. 23,000 cr[ore] under UIG and UIDSSMT as against its allocation of about Rs.43,000 cr[ore]. Hence, on one hand, while investment requirements in urban sector …… are huge, the pace of implementation of the programme is very slow". As with the under-performance of other infrastructure development efforts in India (Gupta et al., 2009), the JNNURM has experienced time and cost overruns, and some projects are suspended because state and local governments could not meet the requirements for fund release including the implementation of the reform agenda. Therefore, an appraisal of the JNNURM is that it contributes to building a foundation for new initiatives in the urban sector, but the main goals—efficient implementation and long-term sustainability of the outcomes—are not attained (Planning Commission, 2012a).

As shown in Table 3-2, 172 (or 31 percent) of 551 sanctioned projects were completed by 2012, the final year of the first phase of the JNNURM. In terms of the reform component of the JNNURM, on average, 65 percent of the planned reforms were achieved, but depending on the state, the achievement rates vary from 33 percent to 90 percent. Even though the JNNURM has been somewhat successful in terms of the total number of sanctioned projects and the size of funds allocated, many projects and reforms have remained incomplete.

Table 3-2 Completion of UIG Projects and Reforms in States

(Data as on 12/31/2012)

No.	State Name	UIG			Reforms (UIG)		
		No. of Projects Sanctioned	No. of Projects Completed	% of Completion in UIG	Reforms Status in 2008-03-31	Reforms Status as on 2012-12-31	Improvement in Reforms Achievement (2008-12)
1	Andaman & Nicobar	-	-	-	-	-	-
2	Andhra Pradesh	52	20	38%	51%	86%	35%
3	Arunachal Pradesh	3	-	-	4%	50%	46%
4	Assam	2	-	-	25%	70%	44%
5	Bihar	8	-	-	12%	36%	24%
6	Chandigarh	3	-	-	26%	54%	28%
7	Chatisgarh	1	-	-	16%	85%	69%
8	Dadra & Nagar Haveli	-	-	-	-	-	-
9	Daman & Diu	-	-	-	-	-	-
10	Delhi	23	8	35%	25%	73%	48%
11	Goa	2	-	-	14%	33%	18%
12	Gujarat	71	42	59%	51%	90%	38%
13	Haryana	4	-	-	15%	54%	39%
14	Himachal Pradesh	5	-	-	23%	74%	51%
15	Jammu & Kashmir	5	-	-	4%	48%	43%
16	Jharkhand	5	-	-	4%	59%	55%
17	Karnataka	47	23	49%	40%	82%	41%
18	Kerala	11	-	-	29%	70%	41%
19	Madhya Pradesh	23	9	39%	29%	83%	54%
20	Maharashtra	80	27	34%	43%	83%	40%
21	Meghalaya	2	-	-	4%	67%	63%
22	Manipur	3	-	-	9%	46%	37%
23	Mizoram	4	-	-	9%	59%	50%
24	Nagaland	3	1	33%	13%	39%	26%
25	Orissa	5	1	20%	17%	74%	57%
26	Puduchery	2	-	-	9%	41%	32%
27	Punjab	6	1	17%	15%	55%	40%
28	Rajasthan	13	4	31%	25%	70%	45%
29	Sikkim	2	-	-	9%	59%	50%
30	Tamil Nadu	48	15	31%	60%	86%	25%
31	Tripura	2	-	-	15%	74%	59%
32	Uttar Pradesh	33	4	12%	15%	87%	72%
33	Uttarakhand	14	-	-	10%	55%	45%
34	West Bengal	69	17	25%	45%	75%	30%
	Total	**551**	**172**	**31%**	**21%**	**65%**	**43%**

Source: JNNURM, http://jnnurm.nic.in/wp-content/uploads/2013/02/Final.pdf (Retrieved April 27, 2013).

3.3.4 Issues Relating to Capacity and Government Interventions

During its implementation, the JNNURM has been challenged by issues relating to the lack of capacity. There are many reports raising capacity issues under the JNNURM. The Mid-Term Appraisal of the 11th Five Year Plan is one of these reports. It notes that "many states and ULBs are facing significant shortages in financial, social, and governance capacity that limit their ability to steer urban development and create self-sustaining administrative units at the local level" (Planning Commission, 2011a, p.390). In particular, the report stresses empowering the states and ULBs and helping them to build their capacity for long-term sustainability. The McKinsey Global Institute (MGI, 2010) also argues that while the JNNURM has achieved some success in terms of physical capacity of urban infrastructure, the lack of financial and human capacity is considered as a constraint of the program. It notes that "many states and cities have been unable to leverage available funds or implement reforms because of a lack of local capacity and technical expertise" (MGI, 2010, p.39).

Sivaramakrishnan (2011) described the ground realities of JNNURM activities, and identified the lack of local capacity in various stages of project delivery. For example, the City Development Plan (CDP) and Detail Project Report (DPR) were pre-requites to propose a project in the mission cities. The purpose was to promote a holistic approach to urban development under a clear vision and strategy for the city in accordance with the local context. Therefore, the preparation of the plan and project reports was supposed to be led and owned by ULBs. However, most functions in the urban sector including urban planning have been the responsibility of state governments (for details, see Section 3.4.1), and the lack of planning practice of ULBs led to an over-dependence on external consultancies, which usually locate their offices in other mega cities, such as Delhi or Mumbai. In addition, state governments and parastatals that are usually a state-owned public corporation, were closely involved in the process of preparing the CDP and DPR, which meant that the ULBs were disconnected from the process.

As mentioned earlier, the lack of capacity was recognized as a potential impediment to the program from the beginning, which is why CD was included as one of the main components of the program. The GOI earmarked 5 percent of the program budget to support CD. However, even though the lack of capacity was specially targeted, a large portion of the budget for CD remained unspent at the mid-point of the program. The Planning Commission describes the unused budget in its reports as follows:

- "With the launch of the JNNURM, capacity building [1] efforts received a significant boost in terms of scale as well as scope. Though the scheme guidelines permitted utilization of an amount up to 5 % of the total outlay of the Mission for capacity building (approximately, Rs. 5,400 crore), the actual allocation was only Rs. 1,619 crore [approximately 30% of the allocated funds]. The entire expenditure is met out of the plan budget" (Planning Commission, 2011b, p.18).
- "While lack of capacity building was felt at almost all the levels of governance, ironically, the fund earmarked for capacity building remained unspent" (Planning Commission, 2012a, p.14).

[1] The GOI uses "capacity building" instead of "capacity development" in its reports. As they are generally used interchangeably in practice, two terms are adopted without specific differentiations in the JNNURM.

There are many reasons why the allocated budget for CD was not spent. One reason was that the process was not clear and that guidelines for using the funds were absent (MOUD, 2012). However, after the Mid-Term Appraisal of the 11th Five Year Plan highlighted the shortage of capacity at state and local governments to facilitate urban projects, some initiatives for CD such as the program of Capacity Building for Urban Local Bodies were implemented under the JNNURM. The Planning Commission (2011b) reviewed the capacity interventions undertaken by the GOI by 2011, and an analysis of this review provides some insight into the GOI's approach to CD. Table 3-3 summarizes the CD initiatives that have been undertaken through the JNNURM.

The review of capacity-related activities under the JNNURM by the Planning Commission (2011b) highlights the lack of capacity of ULBs and elected representatives. Moreover, most initiatives focus on supporting technical capacity and transferring knowledge at the organizational and individual level by using the approach of Institutional Building and Strengthening. Although governance, as a capacity factor at the enabling environment level, influences the other levels of capacity, the initiatives rarely include governance issues. This may be because governance issues are dealt with as state reform agendas separately from CD.

Table 3-3 Government Interventions for Capacity Development under the JNNURM

Initiatives	Focus	Results/Outcomes	Approach
CDP & DPR Preparation	Individual and organization; knowledge; providing toolkits, guidelines, and financial supports	Disconnected to other local plans and ULBs	Technical Cooperation; Financial Supports
Independent Review and Monitoring Agency	Organization; accountability; providing effective project monitoring	Appointed in 27 states, not clear impacts	Institution Strengthening
Reform Appraisal and Monitoring Agencies	Organization; accountability; providing effective reform monitoring	Appointed with a mandate, not impacts mentioned	Institutional Strengthening
Program Monitoring and Evaluation System	Organization; knowledge and accountability; providing management information system	Operational problems, objective not achieved	System Building
Program Management Unit (PMU) & Project Implementation Unit (PIU)	Organization; institutional arrangement; providing financial support	36 PIUs and 13 PMU; inadequate staffing; insufficient expertise	Financial Supports, Institution Strengthening
Rapid Training Program	Individual; knowledge and leadership; upgrading skills	1800 ULB officials and 2000 elected representatives trained	Human Resource Development

Initiatives	Focus	Results/Outcomes	Approach
Credit Rating of Urban Local Bodies & Regional Workshops	Organization; accountability; facilitating leveraging of debt for urban projects	Credit rating of 62 ULBs but further action not taken	Technical Cooperation, System Building
Peer Experience and Reflective Learning	Individual; knowledge; providing an information sharing system	Positive impacts (e.g., peer-to-peer learning, replication of best practices)	System Building, Human Resource Development
JNNURM Awards	Organization; knowledge and motivation; providing an information sharing system	Positive impacts (e.g., innovative initiatives undertaken)	System Building, Institution Strengthening
National Mission Mode E-Governance in Municipalities	Environment and organization; Knowledge; providing an E- Governance system	10 ULB level DPRs, PMU constituted, half of approved budget committed	System Building, Institution Strengthening
Regional Capacity Building Hubs	Environment and individual; knowledge and leadership; upgrading skills	Appointed in 6 regions out of plan funds	Institution Building
Capacity Building for Urban Local Bodies	Organization and Individual; providing a package that includes Centres of Excellence	10 regional institutions enabling cities to access high quality manpower	Institution Strengthening, Technical Cooperation, Human Resource Development

The initiatives undertaken by the GOI reveal its approach to capacity and CD. It can be argued that the GOI's approach to CD focuses on enhancing capacity as a means to achieve development results. The role of CD as a means to an end is reflected in the following remarks by the Planning Commission (2011b, p.33):

- "Capacity Building should precede project/program implementation so that there is a marked improvement in implementation of the projects on the ground;
- Capacity Building should result in measurable outcomes (results based approach);
- Capacity Building should be an integral part of urban infrastructure development".

In other words, the main purpose of the CD interventions is to improve project outcomes. The Planning Commission (2011b) also argues that the ecosystem around the CD interventions has not been sufficiently formed to support a holistic approach to addressing the various dimensions of capacity at each level. This perspective is captured by the following conclusions related to CD:

- "It might be preferable that Capacity Building interventions precede the implementation of programmes for infrastructure development and governance reform, rather than the present situation where they may be implemented either simultaneously or separately.

- While the reach of capacity building interventions have been country wide and on unprecedented scale, the uptake has been limited due to the supply driven approach, provision of support on a 'first come-first serve' basis, limited and unpredictable modalities of funding.
- The interventions have had a limited impact on organization wide intervention and human resource development due to emphasis on specific components, rather than facilitating a conducive environment for capacity building.
- The interventions have had limited success in engaging political leaders and elected representatives.
- Absence of capacity building strategy at the programme administrations level and state level/city level has resulted in ad hoc and stand-alone programmes with no measurable process and outcome indicators, save utilization of funding.
- Ongoing capacity interventions have not adequately engaged supply side agencies which are essential partners in any comprehensive capacity building programme for the urban sector" (Planning Commission, 2011b, pp.31-2).

In summary, the GOI's interventions for CD can be described as ad hoc. The insufficient identification of ULBs' needs resulted in a significant gap emerging between the demand and supply of skills, and those CD initiatives that were undertaken were biased towards technical skills and knowledge. In addition, the supply-side institutions were found to be insufficiently equipped to provide good quality training and education, and the actions that were taken were externally driven by the central government.

3.3.5 The Twelfth Five Year Plan and JNNURM II

In the 12th Five Year Plan for 2012-2017 (Planning Commission, 2012c), the GOI aims to promote faster, more inclusive and more sustainable growth. To achieve these goals, the Planning Commission focuses on 1) inclusive cities, 2) urban governance, 3) financing, 4) planning, 5) local capacity building, and 6) affordable housing. In the 12th Five Year Plan (Planning Commission, n.d.), the Planning Commission highlights CD as one of the most important needs. It argues that there has been a lack of capacity at the municipal and state level, and without adequate capacity, devolution and improvement of service delivery will not be achieved. Therefore, it emphasizes the development of professional managers and innovative approaches to CD as a main action item. Table 3-4 and 3-5 summarize the recommendations for the 12th Five Year Plan by the Working Group on Capacity Building and the Working Group on Urban Governance, respectively.

Table 3-4 Summary of Recommendations by the Working Group on Capacity Building

Classification	Working Group on Capacity Building for the 12th Five Year Plan (2012-2017)
Central level [Short-term]	• Development of Comprehensive Capacity Building Framework • Reorientation of the functioning of the Regional Centres of Urban and Environmental Studies and the National Institute of Urban Affairs and active coordination • Ramping up and extending E-Governance to all the 700 class I cities • A dedicated division at the GOI for capacity building, the Town and Country Planning Organisation, and the Central Public Health and Environmental Engineering Organisation
Central level [Medium-term]	• Training programs for political executive at ULB level • Establishing one or more institutions catered to the higher level and ULBs' capacity building for specialized areas • Exposure visits (both national and international) and experiential learning • A system of training and certifying trainers by the Department of Personnel & Training, GOI • Standardized training modules for classroom training • Theme-specific IT based knowledge sharing platforms • Channelizing professional networks and institutions of professional and peer groups • Encouragement for long term courses of study • Including a Capacity Building component for projects under the direct funding of the Ministry • PPP arrangements for Capacity Building (with the National Skill Development Corporation) • A Steering Committee under the Planning Commission in charge of the urban sector • A separate cell at the state level to encourage and support ULBs to take up PPP projects • Outsourcing for activities such as development of plans, pilot projects in water and energy audits, and Utility Mapping • Setting up of a State Finance Commission cell, operationalization of Metropolitan Planning Committee, and establishment of Municipal Service Regulators • Developing a database on various issues related to urban areas
Central level [Long-term]	• Creation of Municipal Cadre professional at ULBs • A web-enabled platform covering all the capacity building initiatives in the urban sector • Fostering an Ecosystem for Innovation
State Level	• A human resource development strategy for ULBs comprising staffing norms • Preparing state specific capacity building strategies • Establishing separate training institutions exclusively catering to the requirements of the urban sector • Establishment of City Managers Associations • A dedicated unit for urban management at state level • Introduction of Induction training and Refresher courses for ULB personnel at the ATIs • State Level Nodal Agency (SLNA) responsible for the overall E-Governance program execution. • Outsourcing for capacity building activities.
ULB level	• A capacity building action plan taking into account its local circumstances and challenges

Table 3-5 Summary of Recommendations by the Working Group on Urban Governance

Working Group on Urban Governance for the 12th Five Year Plan (2012-2017)
• JnNURM Phase II for infrastructure development in urban areas, particularly small and medium towns • Devolution of funds, functions and functionaries to Local Bodies • Funds to ULBs to be predictable, regular and follow a clear devolution principle concomitant with responsibilities • Having Ombudsman/Audit of accounts of Local Bodies • Standardizing the classification of Urban Local Bodies and revisiting the concept of Nagar Panchayat • Political executive to be accountable and to have tenure and powers commensurate with it • Convergence of functions of parastatals/ state bodies with Local Bodies • Activity Mapping of 18 Functions under 12th Schedule • ULBs to be empowered to deliver core functions • Creation of professional municipal cadre/ Funding of personnel from funds of 12th Five Year Plan • Setting up of an Urban Service Regulator • Development of PPP models • Strengthening public disclosure law/ Time frame for delivery of public services • Use of IT and e-governance tools

In accordance with the 12th Five Year Plan, the second phase of the JNNURM (JNNURM II) is considered as being a part of the overall urban development Plan (Planning Commission, 2012a). Based on learning from the JNNURM, the JNNURM II identifies the lack of capacity as a main constraint on the successful implementation of projects and reforms. The recommendations for filling capacity gaps identified by the Planning Commission (2012a, p.12) are as follows:

> "JNNURM-II should be a Mission mode programme of 10 years. In the light of limited capacity, adequate time would be required for preparing the development and financial plan of the ULBs. In addition, for implementation of the programme, all round up-scaling of institutional capacity is necessary. Accordingly, the Committee recommends that beginning 2012-13, there shall be a transition period for two years".
>
> "10% of the overall JNNURM fund should be earmarked for capacity building. The ministries should prepare a road map for operationalizing the recommendations: 1) creation of Municipal Cadre; 2) Identifying the gap in capacity at different levels to establish the demand; 3) Strengthening the supply side of capacity building; and 4) Opening of suitable institutions in case the existing ones are unable to provide the required input. A separate Mission Directorate for Capacity Building and Reform Management (CBRM) should be established".

In particular, the JNNURM II focuses on ULBs of small and medium towns, and will provide financing of the cadres[2] from plan funds in the 12th Five Year Plan.

[2] A cadre is defined as a small group of municipal staff with relevant skills such as accounting and IT skills. For more information, see MOUD (2014).

3.4 IDENTIFYING CAPACITY FACTORS

As explained above, capacity issues have been a main concern under the JNNURM, and the GOI has attempted to address the issue in the JNNURM II. As one of the attempts, the MOUD has implemented a Capacity Building Scheme for Urban Local Bodies (CBULB) including a USD 60 million World Bank assisted Capacity Building for Urban Development (CBUD) project (World Bank, 2011a). The CBULB, under which 100% financial support is provided to the selected institutions and local governments, aimed to "address capacity needs which cannot be covered under existing schemes of the Ministry" (MOUD, 2011a). To initiate the scheme, MOUD (2011a) identified capacity needs in four categories as follows: 1) a lack of personnel with appropriate skill sets; 2) inadequate skill sets of personnel already deployed; 3) a lack of an appropriate institutional framework; and 4) capacity deficits in key leadership positions such as elected representatives. The capacity needs identified by MOUD (2011a) are not only limited in their scope, but also vague in what needs to be done to improve capacity in the urban infrastructure sector in India. In addition, the issues that MOUD (2011a) attempts to address in the CBULB are highly focused on technical skills and trainings, which continues the government's focus on these issues (Section 3.3.4).

As explained in Section 2.4.2, CD is a multi-dimensional concept and requires a holistic approach that targets the multiple levels of capacity. In order to investigate capacity in the urban sector in India, the capacity factors studied should be identified from a holistic model of capacity. In addition, critical capacity factors are likely to vary in relation to the context in which CD is implemented. The CD literature highlights the assessment of context as the first step in designing capacity interventions. Thus, once the capacity factors that relate to the urban sector in India have been identified, the theoretical framework for CD will need to be modified so that it is tailored to the unique characteristics of the sector.

This research developed the capacity factors for the urban sector in India by carefully reviewing the JNNURM literature and undertaking expert interviews during the preliminary phase of the research. These interviews were conducted over a two week period in October, 2012, in India (VT IRB12-790: Preliminary Study on Capacity Building for Urban Infrastructure Development in India).

To identify the capacity issues relating to infrastructure development in India, twenty interviews with professionals from various agencies were undertaken. The interview participants in this preliminary research consisted of: 1) five experts in international organizations, 2) two professors in academia, 3) three experts in national-level research institute, 4) four experts in NGOs or consulting firms, and 5) five officials in state and local governments. Purposive and snowball sampling were used for the recruitment of participants. The interviews were a semi-structured, open-ended, and face-to-face, and the questions focused on the participant's experience, opinion, and knowledge on the following subjects (for details, see Appendix A):

1) The identification of capacity gaps for infrastructure development in India;
2) The status of the current infrastructure development program;
3) The respondent's perspective on sustainable infrastructure development in India;
4) An evaluation of the capacity of the GOI and local governments to advance sustainable infrastructure development; and
5) The need for an alternative capacity development program.

The information from the preliminary research was only utilized for verifying the capacity factors that were primarily identified from the JNNURM literature review. The data were not included in the main analysis.

The capacity factors identified based on the JNNURM literature and the expert interviews were used to develop a CD framework that can be applied to the urban sector in India. This framework, presented in Section 3.5, is used to guide this research. The identified capacity factors are described at the enabling environment, organization/network, and individual/project levels in the following sections. Since the hierarchical classification of capacity dimensions aligns with the historical and theoretical evolution of CD, this research adopted a hierarchical CD framework, which enables the interaction between each level of capacity to be studied. By considering how capacity factors interconnect across each level, this research is able to study capacity in a holistic and integrated way. For each capacity factor, one or more variables of interest (indicators or constructs) have been developed for use in the case studies and QCA in the following chapters. The identified variables of interest (indicators or constructs) are included in the case studies and/or QCA (for details, see Section 4.4), and they are described in the following sections to provide additional depth to the description of the capacity factor under consideration.

3.4.1 Enabling Environment

The enabling environment level includes factors related to national and sub-national systems. These factors can encourage (or discourage) individuals and organizations to demonstrate their capacity. Their capacity cannot be developed independently from the context in which organizations and individuals are embedded and with which they interact through formal and informal mechanisms (ADB, 2011). This enabling environment level includes policies, laws, politics, social norms, cultures, etc. Since the JNNURM is a national program, its policies and laws are fixed, but some environmental factors vary among states, creating a different context for the JNNURM projects. Thus, even though some environmental factors are beyond the influence or direct control of a state, this study identified and included environmental factors given their potential impact on project performance and outcomes.

Governance and Institutional Structure

In existing literature on CD, governance is one of the critical capacity factors. Thus, although the GOI has approached governance as a separate theme in its reports (Planning Commission, 2011b), the governance issues related to the JNNURM can be considered as a capacity factor at the enabling environment level. Urban governance in India is described as muddled, ineffective, and nowhere near ready to face rapid urbanization (MGI, 2010). Ineffective governance is closely related to the lack of capacity of local governments. CEPT University (2012) states that, “the challenge of urban capacity building is high, not only due to the number of staff [that] needs to be trained, but also due to the complexity of institutional mechanism in city governance”. Concerning the complexity of urban governance, many studies have referred to nonfulfillment of the 74th Constitutional Amendment Act (CAA).

Municipal institutions—municipal corporations, municipalities, and Nagar Panchayats (town councils)—in India, so-called ULBs, have a 300-year history (Vaidya, 2009). Despite this history, the lack of legal frameworks for Local Self Government has created a weak structure for decentralization. In June 1993, the 74th CAA came into force to facilitate decentralization in India. The 74th CAA has accorded constitutional status to the ULBs to manage urban governance. However, because devolution is a voluntary option, no state has fully devolved urban governance to cities, and in some states, although the transfer has happened on paper, most decision-making power remains with the states (MGI, 2010).

The status of urban governance is closely connected to institutional structure and the capacity of the ULBs. In the current institutional structure under the JNNURM, there is considerable overlap in responsibility for the functions of policy making, regulation, and service provision (World Bank, 2011a), and fragmentation of responsibilities may exist without any platform for coordination (MOUEPA & MOUD, 2006). The capacity of local governments is reflected by their ability to implement projects and deliver services. Sivaramakrishnan (2011, p.81) argues that project implementation was entrusted to parastatal agencies thereby "marginalizing the municipalities further". He continues:

> The "disconnect between city governments and projects has been amplified and deepened in many cases as a consequence of the JNNURM. An analysis of 205 sanctioned projects indicates that in as many as 74 projects, the municipalities or city corporations did not have implementation responsibilities. Of the remaining 131, as many as 108 relate to Maharashtra, Gujarat and Andhra Pradesh where water supply, sewerage, and drainage schemes were handled even in the past by city governments. But here again development authorities, state Public Health Engineering (PHE) Departments and Water Supply Boards were entrusted with 68 projects in the relevant sectors".

In other words, due to the lack of capacity, the ULBs are not fully engaged in implementation of projects, yet the service delivery should be provided by the ULBs, "which often are not financially independent, client-oriented or professionally specialized" (World Bank, 2011a). This ineffective institutional structure often creates a vicious cycle and weakens the capacity of the ULBs.

In the context of the JNNURM, the governance and institutional structure can be measured/analyzed using the following variables of interest:

- The number of agencies (single or multiple) involved in the JNNURM; and
- The stakeholder's knowledge of whether a coherent and consistent state government policy exists for advancing the JNNURM.

Supply of Human Resource

The lack of a supply of qualified human resources can be a hindrance to CD. As the pool of human resources increases, local governments have more opportunities to employ qualified persons. However, in general, the urban sector in India is struggling with a shortage of skilled manpower. For example, MGI (2010, p.87) notes that, "The Ministry of Urban Development (MOUD) estimated that India needs around 40,000 planners across its cities, while the number of registered planners is closer to 3,000". According to Gupta et al. (2009, p.31), in the construction industry "70-80 percent of the existing workforce is untrained, which impacts the pace and quality of project implementation, and the situation is expected to worsen with infrastructure investments driving high growth in demand for skilled

manpower". Hence, indicators measuring the level of human development are important to capturing the supply of human resources.

In the context of the JNNURM, the supply of human resources can be measured/analyzed using the following variables of interest:

- The number of higher education institutes per million;
- The mean number of years of schooling for the labor force;
- The literacy rate; and
- The availability of qualified contractors/consultants.

Accountability

Accountability is one of the critical capacity factors identified by many studies, and most literature on the JNNURM puts an emphasis on accountability for better project implementation and service delivery. From a CD perspective, the focus is on the interface between public service providers and their clients (UNDP, 2009). In the case of the JNNURM, accountability between state governments as oversight bodies and ULBs as responsible bodies, and between the ULBs as service providers and the public as a client, can be critical to improving project delivery.

In the context of the JNNURM, accountability can be measured/analyzed using the following variables of interest:

- Whether a public disclosure law has been enacted;
- Whether a community participation law has been enacted; and
- The stakeholder's knowledge of the public consultation/public participation/accountability process.

Other Environmental Factors (Economic Condition, Anticorruption, and Politics)

Understanding the local context can involve learning about politics, the economy, religion, ethnicity, class, natural environment, culture, shared beliefs, values, and history (Boyd, 2009). These contextual factors are closely connected with each other. Among these factors, the economy, corruption, and politics are included as contextual factors based on the preliminary research. Many interviewees in the preliminary study indicated that economic (e.g., state economic growth), socio-cultural (e.g., corruption), and political conditions (e.g., political party alignment between levels of government) can influence the context for JNNURM projects. These three factors are also distinguishable among states in India and create a different enabling environment for the JNNURM projects in each state.

The size of the CD industry correlates with the size of the development sector in an economy, and the capacity of the development sector varies depending on economic conditions of other sectors or a nation (Ubels, 2010). The states in India demonstrate a wide range of economic conditions and levels of development, so the state economy is an important factor that can influence JNNURM projects. In addition, political and administrative corruption in core government organizations is one of the conditions that make public sector capacity difficult to develop (OECD, 2006a). In line with CD literature that indicates resistance to corruption contributes to CD (Otoo et al., 2009; World Bank, 2011b), some experts in the preliminary research regarded corruption as a critical factor impacting infrastructure development in India. Lastly, some experts emphasized the negative impact that poor

intergovernmental alignment among political parties has on project delivery. MGI (2010, pp.154-155) also notes that "unless there is a general agreement among the political parties and key policy makers", India cannot put the reforms related to devolution of powers into motion, and achieving progress in the reforms will "require political alignment starting from the very top of government".

Given the above discussion, the economic condition of a state, its anticorruption status, and political situation were selected as the capacity factors that operate at the enabling environment level.

In the context of the JNNURM, the economic condition can be measured/analyzed using the following variables of interest:

- Gross state domestic product per capita;
- Average growth rate; and
- The stakeholder's knowledge of the supply of materials.

Anticorruption can be measured/analyzed using the following variables of interest:

- An state-level index on anti-corruption;
- The stakeholder's knowledge of corruption in local politics.

Politics can be measured/analyzed using the following variables of interest:

- Political party alignment (Central –State – Local); and
- The stakeholder's knowledge of political pressures/issues.

3.4.2 Organization/ Network

In this research, capacity factors related to one organization or network of several organizations are included in the organizational level. Internal policies, arrangements, procedures, and frameworks are commonly included in the organizational level and these factors enable an organization to deliver its mandate and enable individuals to work together to achieve an organization's goals (UNDP, 2008). Since one of the main JNNURM objectives is the empowerment of the ULBs, this research focuses on measuring ULB capacity as the main factor at the organizational level. Even though projects are implemented by other agencies, the capacity of the ULBs are considered to have a critical influence on project delivery under the JNNURM. The following text identifies the capacity factors relating to ULBs.

Devolution of Power to Cities

With regards to governance, it is difficult to develop a clear distinction between the enabling environment and the organization level. The complexity of urban governance can be considered as one of the issues related to the expanded organizational network. At the organizational level, governance can be measured by the degree of devolution of urban affairs to the ULBs.

In order to facilitate the implementation of the 74th CAA, the GOI took two main steps. First, the GOI introduced the Model Municipal Law (MML) in 2003. The MML aims "not only to enhance the capacities of ULBs to leverage public funds for development of [the] urban sector but will also help in creating an environment in which ULBs can play their role more effectively and ensure better service delivery"

(Vaidya & Vaidya, 2004). In addition to the MML, the reforms under the JNNURM can be regarded as the second step for the 74th CAA. In spite of the 74th CAA, urban affairs remain in the realm of state governments, and they have historically been reluctant to give up powers to cities (MGI, 2010). Recognizing the need to facilitate the implementation of the 74th CAA, the central government included the fulfillment of the 74th CAA as a mandatory state reform agenda, and has provided incentives to those states achieving the reforms.

Most literature on the JNNURM (MGI, 2010; Planning Commission, 2011b, 2012a; Sivaramakrishnan, 2011; Vaidya, 2009) argues that empowering ULBs through the devolution of functions, functionaries, and funds is critical to developing their capacity. In the mandatory state level reforms under the JNNURM, there are five agendas related to empowering ULBs—the constitution of a District Planning Committee (DPC) and Metropolitan Planning Committee (MPC), the transfer of 18 functions listed in the 12th schedule, the transfer of city planning, and the transfer of management of water supply and sanitation systems from the state to the ULB. The achievement rates of the reforms related to the functions transferred vary depending on the cities, and together they can be considered as an organizational capacity factor.

In the context of the JNNURM, the devolution of power to cities can be measured/analyzed using the following variables of interest:

- The devolution status of the scheduled reforms to implement the 74th CAA;
- The absence/presence of the constitution of the Metropolitan Planning Committee (MPC)/District Planning Committee (DPC);
- The devolution status of functions relating to city planning and management of water supply and sanitation systems.

Organizational Development

In India, there are limited strategies to promote organizational development at the local government level (Planning Commission, 2011b). This deficit leads to an absence of formal structures, comprehensive rules, staffing norms, procedures, job descriptions, pay scales, and the introduction of new technologies. In addition, the absence of organizational development strategies results in a lack of shared values amongst staff and commitment to an organizational vision that can have a negative influence on capacities at the individual level.

In the context of the JNNURM, the organizational development of the ULBs can be measured/analyzed using the following variables of interest:

- The absence/presence of a human resource development (HRD) strategy;
- The shortage of staff;
- The absence/presence of autonomous recruiting system;
- The absence/presence of a training system within the organization; and
- The absence/presence of an incentive and reward system within the organization.

Financial Condition

One of the main objectives of the JNNURM is to attract investment in urban infrastructure services. Hence, the JNNURM emphasizes local government's financial capacity. As of September 2010, 36 ULBs

were awarded an investment grade credit rating, but none of the 36 credit-rate-awarded cities have borrowed from the market (Sivaramakrishnan, 2011). As a result, state governments and ULBs fell short of their required contribution to JNNURM projects. Thus, the financial condition of the ULBs can be an organizational capacity factor that can be measured by a ULB's creditworthiness.

In the context of the JNNURM, the financial condition can be measured/analyzed using the following variables of interest:

- The credit rating of cities;
- The coverage of the property tax;
- The tax collection rate; and
- The efficiency (i.e., cost recovery) of the water sector.

Partnership and Communication

In the JNNURM, communication channels with the private sector and civil society are not very effective (Planning Commission, 2011b). The success of projects in cities like Ahmedabad, Rajkot, and Surat, which have clearly reaped the benefits of partnerships at the city level to close the critical information or knowledge gap, highlight the need for "Urban Partnerships" between the city administration and various other stakeholders including civil society, academia, research institutions, media, and private sector (CEPT University, 2012). Thus, the existence of an urban partnership can indicate that a certain level of capacity exists at the organizational level.

In the context of the JNNURM, partnership and communication can be measured/analyzed using the following variables of interest:

- The stakeholder's knowledge of collaboration with NGOs/academia/experts; and
- The stakeholder's knowledge of an organization's public relations.

Other Organizational Factors (Leadership)

The organizational level includes internal structure, internal policies, procedures, behavioral norms, partnership, etc. One of the key capacity factors identified by existing studies is leadership. In India, the recruitment, deployment, and retention system of government officials is not flexible and is centralized. India's cities at the metropolitan and municipal levels do not have a single-point empowered leader with tenure to deliver against explicit mandates (MGI, 2010). Concerning the lack of empowered leaderships, MGI (2010, p.86) describes it as follows:

> "While many cities have mayors, their tenures are short and they rarely have the power to drive new investments, hire key personnel, fund projects, or reorganize departments—all critical to revamp a city's performance. The commissioners have no long-term stake in the city and invariably shy away from making the big decisions important for the city's long-term health".

Hence, the organizations without leadership have less autonomy to pursue suitable policies. For this reason, whether a local government has empowered its mayor or not needs to be considered as a capacity factor at the organizational level.

In the context of the JNNURM, leadership can be measured/analyzed using the following variables of interest:

- The tenure of the mayor/the type of the election system; and
- The stakeholder's knowledge of an organization's leadership relating to its projects.

3.4.3 Individual/ Project

The individual level includes a person's competencies, skills and knowledge, motivations, attitude, etc. An urban knowledge needs assessment study by CEPT University (2012, p.xiii) identified the knowledge gaps and barriers—such as a lack of good engineering skills and technical know-how, language barriers, poor computer literacy, and an over dependence on consultants—that can be connected with capacity at the individual level. This section identifies capacity factors at the individual level that reflect the context of the JNNURM.

Hard Capacities (Skills and Knowledge)

In the current context of rapid urbanization in India, there are many challenges in the urban sector, and the ULBs will require specialized knowledge and experiential learning to confront these challenges (Planning Commission, 2011b). "Unless the ULBs have skilled manpower to undertake the various additional tasks entrusted to them" (Vaidya, 2009), the actual empowerment and reforms will not be achieved, and the projects under the JNNURM will face long-term sustainability challenges. Therefore, the skill and knowledge level of the officials in charge is considered a main capacity factor at the individual level.

In the context of the JNNURM, hard capacities can be measured/analyzed using the following variables of interest:

- The number of individuals who participated in a relevant training program;
- The stakeholder's knowledge of the computer, writing, and language skills of project staff;
- The stakeholder's knowledge of technical knowledge; and
- The stakeholder's knowledge of the capability and availability of local contractors.

Soft Capabilities (Attitude and Ownership)/ Dependence on Consultants and Outsourcing

CD involves second-order changes that alter mindsets, patterns of behavior, degree of legitimacy, and the relationship between the formal and informal system (Baser & Morgan, 2008). The soft capacities related to the second-order changes play a critical role in the CD process. For example, major CD studies regarded ownership as the foundation of any endogenous CD process and highlight the importance of ownership connected to commitment, motivation, and self-determination (Hosono, Honda, Sato, & Ono, 2011). In relation to this, the toolkit for capacity building prepared by the GOI (MOUD, 2012) includes these soft capacities in a training module, which will used as a proxy to measure this capacity factor.

Furthermore, in the preliminary research, many experts identified problems that were thought to be caused by a dependence on consultants and outsourcing. The lack of capacity of local governments in some states was thought to have caused an over-dependency on consultants. When the JNNURM was launched, the ULBs were expected to lead the preparation of City Development Plans (CDPs) and

Detailed Project Reports (DPRs). However, there were few states in which the ULBs could play a major role as a planning authority. Regarding this, Sivaramakrishnan (2011, pp.79-80) notes that "in most cases, the municipalities did not understand or discuss the CDPs in the municipal councils but they were prevailed upon to adopt resolutions endorsing the CDP prepared so that projects could be submitted to the Centre and funds obtained" and "consultants were used in preparing or updating or just polishing up previously prepared project reports". The consultants from mega cities were more equipped with the methodology and techniques of CDP than ULBs, and there were sufficient funds to hire the outside consultants. The availability of funds might have led to an over-dependence on outside consultants, which meant that ULBs were excluded from the planning process. Through the case of Patna Municipal Corporation, CEPT University (2012) notes that an "over-dependence on [a] consultant is blocking the city officials from engaging in [an] information and knowledge hunting mode". This capacity factor, dependence on consultants and outsourcing, influences both soft capabilities as well as skills and knowledge in the context of the JNNURM. Thus, the dependence on consultants can be considered as a capacity factor at the individual level.

In the context of the JNNURM, soft capabilities can be measured/analyzed using the following variables of interest:

- The stakeholder's knowledge of the alignment between the implementation and service authorities;
- The stakeholder's knowledge of the level of motivation and responsibility of project staff; and
- Whether a local consultancy prepared the CDP/DPR.

Other Project Factors

Some of the individual factors, such as soft skills, are difficult to measure and evaluate. However, characteristics of a project may have an influence on how individuals handle the project. For example, when projects are comparatively large, use new technology, and involve many stakeholders, the soft skills that manage the process and engage stakeholders are more critical than for small projects. Thus, the features of a project can be considered as an indirect capacity factor at the individual level.

In the context of the JNNURM, project factors can be captured using the following variables of interest:

- Implementing agency (IA) type (ULBs or parastatal agency);
- The approved project cost (which relates to the IA's skill and knowledge);
- The central assistance rate for project funds (which relates to the ULB's attitude and ownership of the project);
- The sector in which a project is implemented (which relates to the IA's skill and knowledge); and
- The modality of the project (e.g., PPP or procurement/new or upgrade) (which relates to the IA's skill and knowledge).

3.5 CONCEPTUAL RESEARCH FRAMEWORK

This section presents a CD framework that is informed by the capacity factors explained in Section 3.4 (see Figure 3-3). The framework is informed by 1) the general dimensions of capacity that were identified in the CD literature; 2) the capacity factors identified from the GOI's documents and JNNURM-

related literature; 3) the CD strategy developed for JNNURM-II; and 4) the factors identified from the expert interviews in the preliminary research.

The existing CD frameworks (for details, see Section 2.4.1) usually adopt the "input-output-outcome-impact" model. This model allows capacity to be measured both as a means to an end and as an end in itself. In Chapter 6, this model is used to investigate the relationship between capacity and project outcomes. The ultimate goals of the JNNURM are regarded as the impacts, and the projects under the JNNURM are considered as the outcomes. Like the UNDP model that includes performance and stability as components of outcomes, project implementation and service delivery that are main components of the JNNURM are included in the outcomes in this model.

The outputs are the capacity factors at the organizational and individual levels. An output can be changed or influenced by CD support and the contextual factors. An output subsequently impacts an outcome such as the timing of a project's implementation and the quality of service delivery. These outcomes relate to the main goals of the JNNURM.

The inputs for the JNNURM (such as financial resources) and CD support (such as training programs) are provided by the GOI. The input and CD support directly affect the project and capacity factors at the organizational and individual level. Along with the input and CD support, the contextual factors at the enabling environmental level influence not only capacity factors at those levels but also the outcomes indirectly. As with the CD frameworks developed by ADB (2011) and Ubels et al. (2010), the contextual factors can be situated beyond the influence or control of a state.

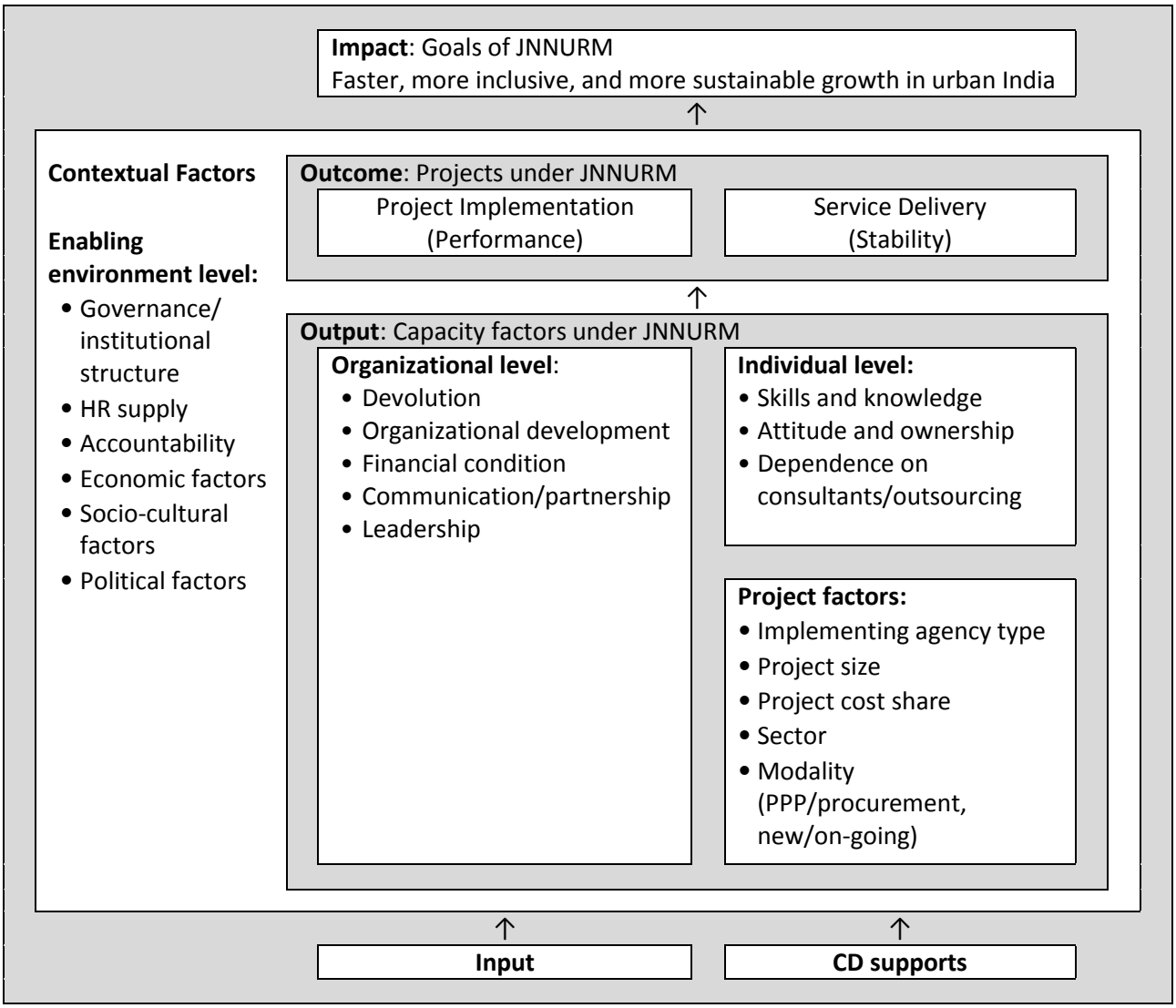

Figure 3-3 Conceptual Framework for Capacity Development in the Context of Indian Urban Sector

This conceptual framework combines key factors of existing CD frameworks with the unique context of the JNNURM. It identifies components that are part of an "inputs–outputs–outcomes–impacts" model and positions these within three specific levels of capacity. Thus, the framework enables the theory of CD to be applied to the urban sector in India. This conceptual framework has been utilized throughout this research, from the research design (Chapter 4) to the interpretation of the results (Chapter 8). The development of the framework also demonstrates how existing CD frameworks can be revised and applied to a specific context, in this case the urban sector in India.

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CHAPTER 4 RESEARCH METHDOLOGY

4.1 INTRODUCTION

As discussed in Chapter 2, the inherent characteristics of CD limit how CD can be measured. These constraints lead to limitations in the research methods used to evaluate CD. Most empirical studies on CD use case studies as their research method focusing on a single project, and rely on qualitative analysis techniques. For example, eight studies (Behnam, 2000; George, 2000; Mengers, 2000; Nientied & Racoviceanu, 2000; Ogu, 2000; Peltenburg, Wit, & Davidson, 2000; Tjahjono, 2000) in an issue of the 'Habitat International' journal, which focused on capacity building, used a case study method, and none of them used quantitative research methods. In order to review a project, the studies described their tools and outcomes in a narrative and drew implications in accordance with their own context. It appears that this approach has continued in recent studies—e.g., Rumi (2010).

In spite of the methodological constraints described in Chapter 2, quantitative research can be utilized to seek meaningful aspects of CD. A study by Gazley (2010) provides an example of how to approach a specific type of capacity with quantitative research methods. In terms of collaborative capacity, the study uses "the context of local government–nonprofit partnerships to test the potential influence of various partnership and organizational factors on collaborative outcomes" (Gazley, 2010). In Gazley's (2010) study, some aspects of capacity and performance reveal the process as linear and cumulative, and its findings reinforce the importance of understanding the experiential, interpersonal factors that support collaborative success. In sum, a quantitative approach to CD can contribute to understanding certain effects of CD.

There are some studies that recommend both qualitative and quantitative approaches to the study of CD. The OECD (2006a) argues that "quantitative indicators may be needed but some form of qualitative assessment may be more appropriate, depending on how the desired outcomes have been defined". Combining methods that generate both quantitative and qualitative data leads to a more comprehensive understanding and contributes to the broad goals of the systems involved (Ubels et al., 2010). What matters is that researchers rigorously assemble quantitative and/or qualitative evidence to track progress (Collins, 2005; Ortiz & Taylor, 2009).

Considering the benefits of combining methods, this research uses case studies and Qualitative Comparative Analysis (QCA) to answer the research questions posed in Chapter 1. Figure 4-1 provides an overview of the approach taken to the research. A literature review was undertaken to develop a conceptual framework for CD in Chapters 2 and 3, which was then used to select the mixed research methods. Section 4.2 explains the design of the case study part of this research including case selection, data collection, data analysis, and validity and reliability. Section 4.3 provides an overview of QCA and describes the design of the QCA part of this research.

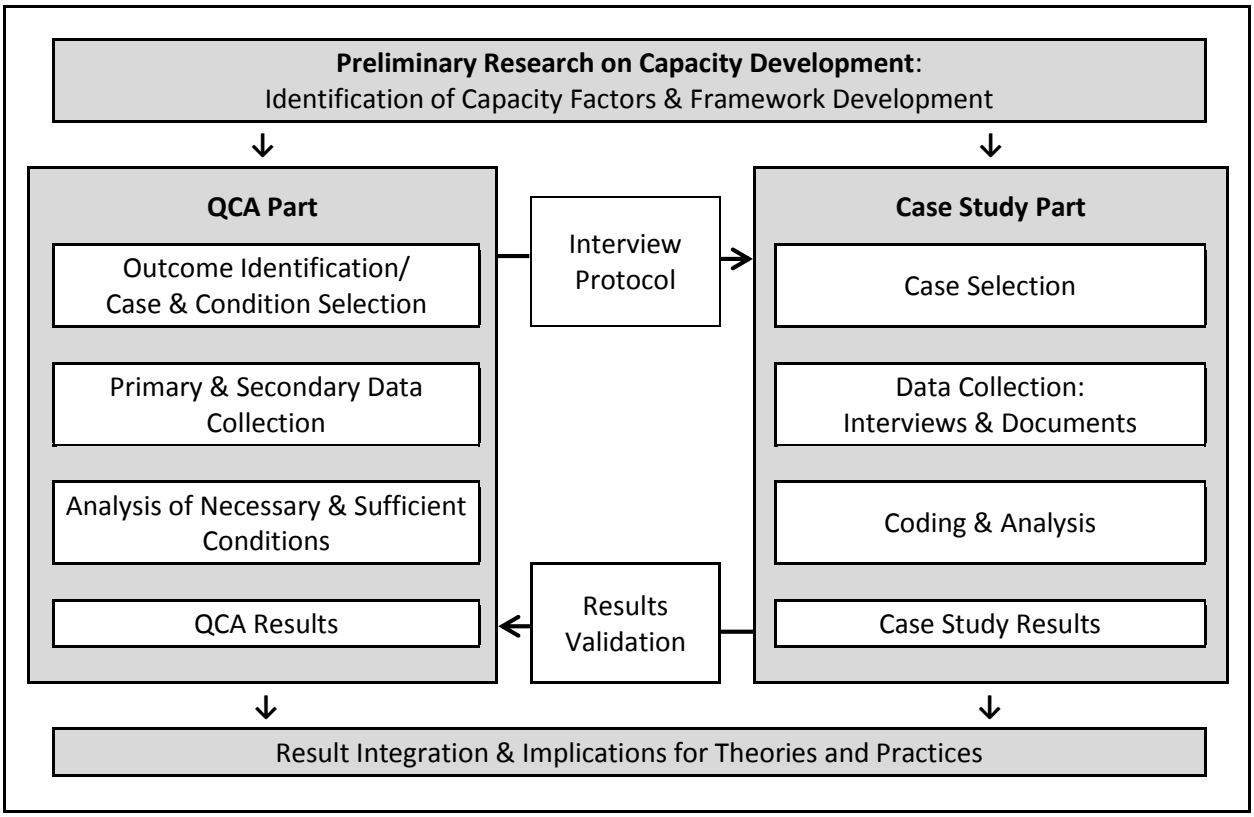


Figure 4-1 Diagram of Research Methods

4.2 CASE STUDY

4.2.1 Overview of Case studies

Case studies are the most used method in research on CD. There are multiple definitions of a case study. Some define a case study by "describing the characteristics of [a] case study compared with other research strategies" (Simons, 2009b). As one of the most used definitions, Yin (2009, p.18) provides a twofold, technical definition of case study as follows:

1. "A case study is an empirical inquiry that 1) investigates a contemporary phenomenon in depth and within its real-life context, especially when, 2) the boundaries between phenomenon and context are not clearly evident.
2. The case study inquiry 1) copes with the technically distinctive situation in which there will be many more variables of interest than data points, and as one result, 2) relies on multiple sources of evidence, with data needing to converge in a triangulating fashion, and as another result 3) benefits from the prior development theoretical propositions to guide data collection and analysis".

In other words, it can be said that case studies aim to explore a complex phenomenon in a specific context, from multiple perspectives, based on theory regardless of methodological preferences. Regarding this explanation, Simons (2009a, p.21) indicates that "the primary purpose for undertaking a case study is to explore the particularity, the uniqueness, of the single case", and Yin (2009, p.2) argues that "case studies are the preferred method when 1) "how" or "why" questions are being posed 2) the investigator has little control over events, and 3) the focus is on a contemporary phenomenon with in a real-life context".

4.2.2 The Value of Case studies

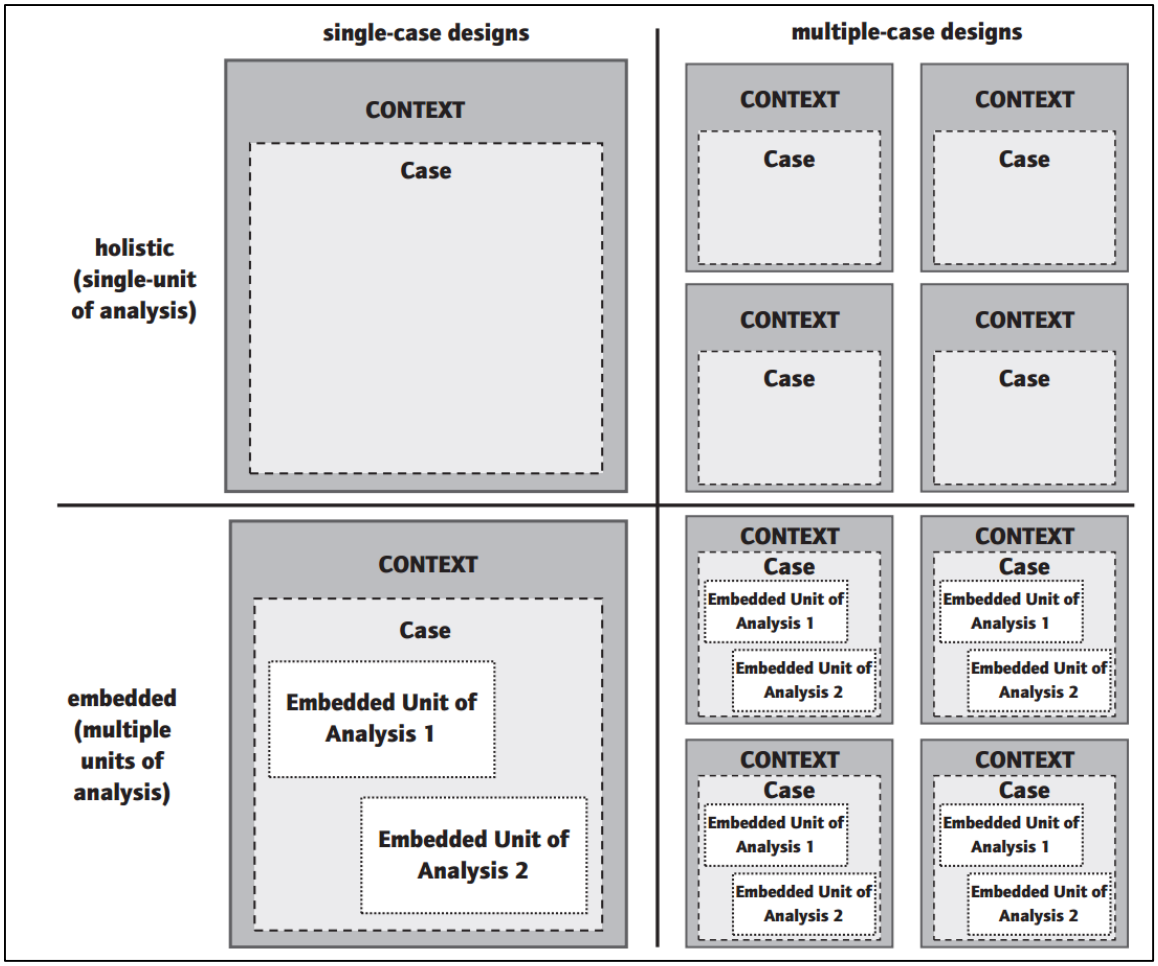
As a research method, a case study approach has its advantages. Since CD needs to take the local situation into account, the method can examine differences that vary depending on the local context. Moreover, case studies can provide in-depth descriptions about a specific case and explain sequences in a narrative. Thus, case studies provide an ideal approach to capturing the complexity of the subject of CD. Using Simons (2009a) as a guide, the value of case studies can be summarized as follows:

- **Complexity of programmes**: CD is inherently complex, and using qualitative methods allows researchers to investigate CD in depth and to interpret the complexity in relation to the context.
- **Multiple perspectives**: Capacity and CD under the JNNURM do not have a concrete definition, and people from different organizations interpret the terms differently. Case studies enable various viewpoints to be documented and capture the multiple perspectives on CD.
- **Dynamics of change**: CD is a process of, and a means for, development. Case studies are useful for understating and describing the process of an event in a "real life" setting.
- **Flexibility in time and method**: Case studies are open to timescales and methods. Since this research changed its focus and incounted unexpected situations during the field work, the case study approach provided more flexibility in time and methods.
- **Audiences and participants**: The researcher can be assisted by audiences of a case study to understand its context and interact with participants to create joint understanding. As described above, this research focuses on the local context to understand the CD process. The case study approach requires the researcher to collaborate/engage with participants, and contribute to a more informed analysis through this collaboration.

Furthermore, case studies can complement the QCA method that will also be used in this research. "Since QCA cannot be applied mechanically, but rather requires familiarity with the nuances of the data" (Rihoux & Ragin, 2009b), the QCA method needs case-based knowledge. Thus, case-based knowledge is essential to advancing many stages of the QCA method.

4.2.3 Developing the Case studies

Case studies can be sorted into four types of design by using a 2X2 matrix of contextual conditions against the number of units of analysis (see Figure 4-2). The axes for this matrix consist of a single-case or multiple-cases versus holistic or embedded designs. This research uses a multiple-case embedded design with diverse groups of interviewees per case in 12 different cities.



Source: Yin (2009).

Figure 4-2 Basic Types of Designs for Case Studies

4.2.3.1 Selection of the Cases

For case studies, five components of research design are especially important: 1) a study's questions; 2) its propositions, if any; 3) its units of analysis; 4) the logic linking the data to the propositions; and 5) the criteria for interpreting the findings (Yin, 2009, p.27). In the case study phase of this research, two main research questions and two propositions relevant to the questions are investigated (for details, see Section 5.1 and Section 6.1). The main research questions and propositions are as follows:

- **Research question for Chapter 5:** How do urban infrastructure practitioners in India conceptualize CD?
- **Proposition:** Gaps exist between the theory of CD and practitioners' perceptions of CD.
- **Research question for Chapter 6:** How are capacity factors related to project delivery?
- **Proposition:** Capacity factors affect the JNNURM project delivery, and the JNNURM projects affect the capacity factors.

The units of analysis in this research are the entities related to a JNNURM project. In selecting cases, there are a number of factors to take into account such as the type of case, its location, the type of available information, and travel costs and time (Simons, 2009c). After considering these factors, twelve cities in five states were selected for the case studies. Although the availability of data in the public domain was a critical determinant of case selection, the diversity of conditions of the cases was also considered in the selection of the states. The five states selected have 1) different governance structures (for details, see Section 5.2.1), 2) diverse levels of development, and 3) different levels of JNNURM project implementation. Figure 4-3 shows the states selected for this research – Gujarat, Karnataka, Maharashtra, Uttar Pradesh, and West Bengal.

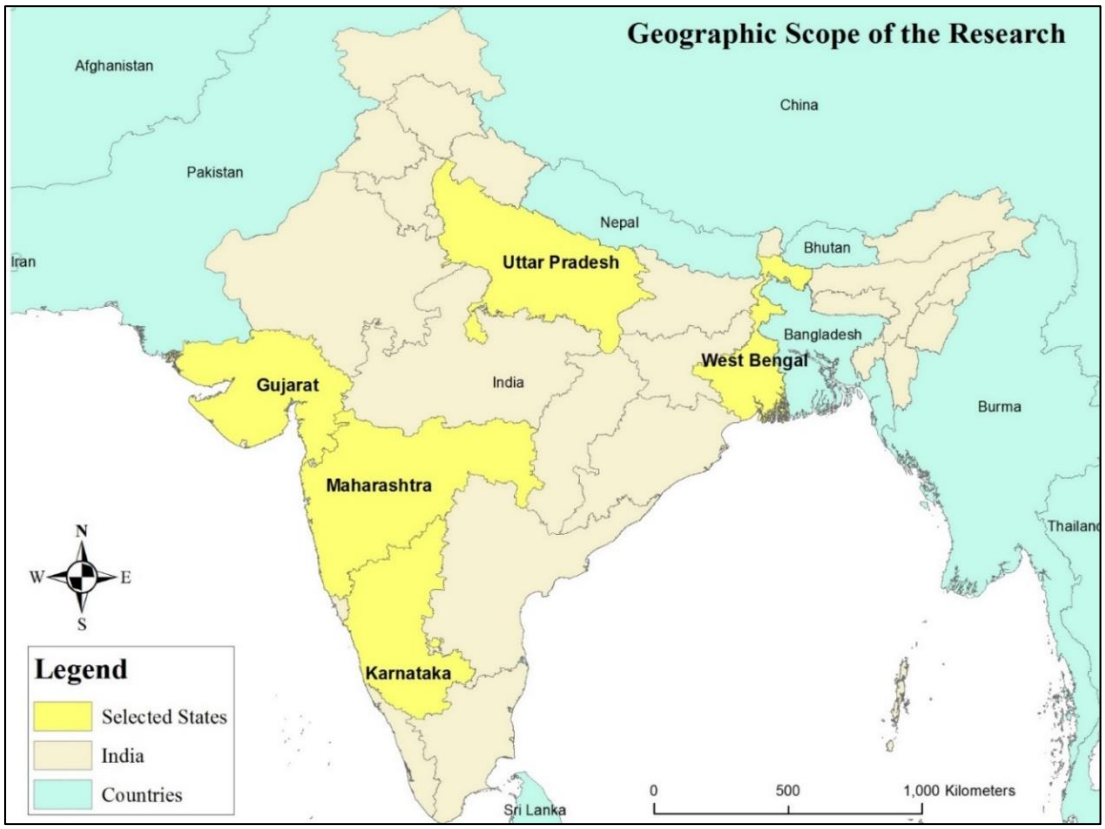


Figure 4-3 Geographic Scope: Five Selected States

4.2.3.2 Data Collection

Data for the case study phase were collected through interviews and extracted from documents. Table 4-1 provides a summary of data sources according to the level of CD.

Table 4-1 Case Study Data Source

Level	**Data source**	
	Interview participants	**Documents**
Enabling Environment	▪ State government officials in charge ▪ State Level Nodal Agency officials in charge ▪ Training experts (state level institutes)	▪ JNNURM policy and project documents ▪ State policy and project documents
Organization/ Networks	▪ High-level officer in charge (city engineer, municipal commissioner, chief engineer, etc.)	▪ City Development Plan (CDP) ▪ Organizational development strategy/HRD plan (if available)
Individual/ Project	▪ Working-level officers in charge (project managers, project engineers) ▪ Partners in private sector (Project Management Consultants, Third Party Inspectors, PPP partners, contractors, etc.)	▪ Detailed Project Report (DPR) ▪ Quarterly Progress Report (QPR) ▪ Training materials (if available)

Using the conceptual framework developed in Chapter 3, an interview protocol was designed that built on CD theories and the research design for the QCA phase (for details, see Appendix B). The interview consisted of three main categories focused on project delivery (Category 1), capacity evaluation (Categories 2 to 5), and CD suggestions (Category 6) to verify the capacity gaps identified in the existing JNNURM literature and to investigate the relationship between capacity factors and project delivery. The interview focused on four areas: 1) experience, 2) opinion, 3) knowledge, and 4) background/demographic characteristics.

While the interviews were semi-structured, the respondents were encouraged to tell their stories. Specific questions were asked as necessary to obtain the targeted information. At the end of each interview, a series of short closed questions were asked to obtain information about the organization. These questions could be answered with “Yes” or “No”. The questions focused on information relating to whether the organization had: 1) a Human Resource Development (HRD) strategy; 2) any form of project-related incentive system; 3) a shortage of staff; 4) an autonomous recruiting system; 5) its own training system; 6) external/foreign assistance; 7) a good financial condition; 8) any partnerships with civil society; 9) used public consultation processes; and 10) a single entity responsible for all the project delivery process. In most interviews, note-taking and recording were conducted with the consent of interview participants. Table 4-2 provides a summary of the interview participants.

Table 4-2 Summary of Interview Participants

State	City	Number of Interview participant's organization			Number of Interview participants			Number of Interviews including focus group interviews		
		Total	Public	Private	Total	Public	Private	Total	Excluded	Used for analysis
Karnataka	KA1	4	4	0	10	10	0	7	3	4
	KA2	3	3	0	7	7	0	7	3	4
Maharashtra	MA1	4	3	1	7	6	1	7	0	7
	MA2	2	2	0	8	8	0	7	2	5
	MA3	2	1	1	7	5	2	6	2	4
Gujarat	GT1	3	1	2	9	6	3	6	0	6
	GT2	4	2	2	8	6	2	6	1	5
Uttar Pradesh	UP1	3	2	1	5	4	1	5	1	4
	UP2	2	2	0	5	5	0	4	0	4
	UP3	4	4	0	5	5	0	4	0	4
West Bengal	WB1	2	1	1	3	2	1	3	0	3
	WB2	7	6	1	10	9	1	9	1	8
5 states	**12**	**40**	**31**	**9**	**84**	**73**	**11**	**71**	**13**	**58**

The number of interview participants in this table does not include the 20 participants from the expert interviews undertaken as part of the preliminary research (for details, see Section 3.4).

A total of 71 interviews including 11 focus-group interviews were conducted over two months and ten days from September 11, 2013 to November 20, 2013. The interview participants consisted of 84 engineers, managers, and administrators who were involved in the JNNURM projects from 40 different organizations. Purposive and snowball sampling were mainly used for recruiting the participants. Before visiting a participant's organization in each city, the contact information on the officials in charge of the JNNURM projects was collected from the public domain, and additional interview participants were recruited based on recommendations from existing participants. Out of 71 interviews, 58 interviews were utilized for data analysis. Seven interviews were excluded because interview recording was not permitted during interview and five interviews were excluded due to the low quality of the interview content. To complement the interview data, secondary data was collected from documents such as Detailed Project Reports and Quarterly Progress Reports.

4.2.3.3 Data Analysis

To analyze the data collected from interviews, the case studies utilize coding. Coding is the process of organizing the material into chunks or segments of text before brining meaning to the information (Creswell, 2009; Rossman & Rallis, 1998). In the first cycle of the case studies, structural coding and descriptive coding were utilized to comprehend the context, and attribute coding was used to identify the similarities and differences between groups. The segments were categorized into themes and labeled with a term concerning CD. The software package NVivo 10 was used to code and analyze the data. Appendix C provides information on the structure of the coding.

In the second cycle, hypothesis coding was mainly used (Chapter 5). Hypothesis coding is an application of a researcher-generated, predetermined list of codes to qualitative data specifically to assess a researcher-generated hypothesis (Saldaña, 2013). The identified themes were reviewed, interrelated, and interpreted based on the posed hypothesis.

To answer to the research questions posed in Chapter 6, pattern coding and theoretical coding were used. Pattern coding is a way of grouping meaningful units of analysis into a smaller number of themes or constructs, and theoretical coding systemically links all categories and subcategories with the central category that has explanatory relevance or captures the phenomenon of interest (Saldaña, 2013). In order to explain the relationship between the constructs of the case studies, the codes related to project delivery were grouped and connected with the relevant capacity factors.

In addition to the coding, the case studies in this research adopted general analytic strategies to advance the analysis. Yin (2009, p.126) suggests four strategies to overcome the inherent difficulty of analyzing case study evidence. They are 1) theoretical propositions, 2) developing case descriptions, 3) using both quantitative and qualitative data, and 4) examining rival explanations. In this research, the case study phase focused on explaining the relationship between capacity factors and project delivery based on CD theory, and telling actual stories related to the research questions. In addition, the case studies used both quantitative and qualitative data, and demonstrated different perspectives on a situation. By adopting this approach, the case studies followed the four strategies suggested by Yin (2009). Furthermore, Yin (2009) suggests five specific techniques for analyzing case studies as follows: 1) pattern matching; 2) explanation building; 3) time-series analysis; 4) logic models; and 5) cross-case synthesis. The case studies in this research mainly used explanation building.

4.2.3.4 Validity and Reliability

This research encountered the general challenges that face case studies. The greatest concern associated is the lack of rigor (Yin, 2009). In relation to this, the following challenges need careful attention: 1) subjectivity of the researcher and readers; 2) little basis for scientific generalization; 3) massive, unreadable documents; 4) non-experimental causal relationships; 6) limited usefulness of findings for policy determination (Simons, 2009a; Yin, 2009).

The four tests in Table 4-3 can be used to limit concerns relating to validity and reliability in case study research. For case studies, “an important revelation is that the several tactics to be used in dealing with these tests should be applied throughout the subsequent conduct of the case study” (Yin, 2009).

Table 4-3 Case Study Tactics for Four Design Tests

Tests	Purpose	Case study tactic	Research phase
Construct validity	Identifying correct operational measures for the concepts being studied	▪ Use multiple sources of evidence ▪ Establish chain of evidence ▪ Have key informants review draft case study report	Data collection Data collection Composition
Internal validity (explanatory or causal studies)	Seeking to establish a causal relationship, as distinguished from spurious relationships	▪ Do pattern matching ▪ Do explanation building ▪ Address rival explanations ▪ Use logic models	Data analysis Data analysis Data analysis Data analysis
External validity	Defining the domain to which a study's findings can be generalized	▪ Use theory in single-case studies ▪ Use replication logic in multiple-case studies	Research design Research design
Reliability	Demonstrating that the operation of a study can be repeated with the same results	▪ Use case study protocol ▪ Develop case study database	Data collection Data collection

Source: Yin (2009).

This research followed attempted to follow the tactics presented in Table 4-3 during data collection and analysis, with the objective of reporting "all evidence fairly" (Yin, 2009). In order to ensure validity and reliability, this research: 1) triangulated different data sources of information; 2) hired local transcribers for interview transcriptions that were double-checked by third persons to enhance the accuracy; 3) clarified the bias the researcher brings to the study; and 4) presented negative or discrepant information.

For the triangulation, data was collected by multiple methods such as interviews of various participants and supporting documents. The case studies attempted to reduce errors by verifying informants' information with official documents. If official documents were not available to verify a statement, the information provided by an informant was labeled as unconfirmed—e.g., see footnote 10 in Section 5.2.1.2. Moreover, when the case studies were integrated with the QCA findings, the researcher's bias could intervene, so this research disclosed the process of data collection and analysis to maintain the transparency of the process (see Appendix A to F). All of the processes of this research, including potential errors and bias, were described systematically and thoroughly (for details, see Section 8.3.1).

4.3 QUALITATIVE COMPARATIVE ANALYSIS (QCA)

4.3.1 Overview of QCA

Qualitative Comparative Analysis (QCA) provides a middle ground between in-depth studies of small-N cases and statistical large-N studies, but positions slightly more towards qualitative methods because of its contextual sensitivity to individual cases and frequent reliance on qualitative data as the basis of investigations (Jordan, Gross, Javernick-Will, & Garvin, 2011). Due to its position, QCA techniques strive to meet advantages of both the "qualitative" (case-oriented) and "quantitative" (variable-oriented)

techniques (Rihoux & Ragin, 2009b). Table 4-4 presents the general characteristics of each technique. The QCA technique deals with the characteristics from both quantitative and qualitative methods. Hence, by using QCA, researchers can analyze both types of data, and determine the combinations of factors that lead to certain outcomes of interest.

Table 4-4 General Characteristics of Research Methods

Research Methods	**Quantitative research methods**	**Qualitative Comparative Analysis**	**Qualitative research methods**
Population	Large N	Small and intermediate N	Small N
Knowledge	Variable-based/theory-based	Variable-based + case-based	Case-based
Characteristics	More replicable/transparent	Modest Replicable/transparent	Less replicable/transparent
	More generalizable	Modest generalizable	Less generalizable
	Causality	Complexity and causality	Complexity
Focus	Narrow-angle lens/a specific hypotheses	Multiple pathways to outcomes	Wide-angle lens/breadth & depth of phenomena

Source: Developed using Johnson and Christensen (2008) and Gross (2010).

There are many differences between QCA and quantitative methods. First, the QCA techniques can be effective in the small- and intermediate-N analysis (10 to 100 cases) contrary to quantitative methods that require large-N data, and calculate "the net effects of independent variables in properly specified linear models" (Chan, 2010). Second, whereas traditional statistical methods test each independent variable's relationship to the dependent variable, QCA analyzes the combinations of conditions leading to an outcome (Jordan et al., 2011). In other words, QCA and quantitative techniques have different approaches to causality. The necessary and sufficient approach to causality that QCA adopts is mostly bivariate, so the approach can be free from issues of multicollinearity and degrees of freedom that regression techniques may have (Yamasaki & Rihoux, 2009). Lastly, QCA requires case-based knowledge. Researchers are involved in the iterative process more actively, and the case-based knowledge of the researcher is more critical to making decisions and interpreting the results.

QCA does have some advantages over qualitative research methods. Qualitative research with small-N cases requires extensive data collection to produce meaningful results, and the process may vary depending on the cases. Thus, the data and analysis in case studies may be unclear and difficult to replicate (Jordan et al., 2011). However, the QCA techniques allow the researcher to assess and replicate the study by using formalized tools and processes. In addition, the main limitation of case studies is that it is difficult to engage in any form of generalization, as the key findings and conclusions are mostly limited to that single case (Rihoux & Ragin, 2009b). Meanwhile, QCA blends in-depth case-based knowledge with inferential power, and allows researchers to generalize their findings from a relatively limited number of cases (McAdam et al., 2010).

Based on the differences of QCA from quantitative and qualitative research methods described in many studies (Chan, 2010; Jordan et al., 2011; McAdam et al., 2010; Rihoux & Ragin, 2009b), the characteristics of QCA are summarized as follows:

- The interplay between theoretical and case-oriented knowledge;
- A specific understanding of causality and complexity;
- A modest potential to generalize findings; and
- Replicability and transparency.

Concerning the characteristics of QCA, the relevant research questions to QCA are "Which conditions (or combinations thereof) are necessary or sufficient (or possibly both necessary and sufficient) to produce the outcome?" (Rihoux & Ragin, 2009a, p. xviiii). In particular, Jordan et al. (2011, p. 1160) recommend QCA for research "in which (1) the number of available cases is limited; (2) a comparison between an intermediate-N number of cases is desired; (3) conditions can vary both qualitatively and quantitatively; and (4) the research question probes the combinations of factors and multiple pathways that can lead to a given outcome". The following section discusses QCA in the context of CD-related research.

4.3.2 Relevancy of QCA to Capacity Development

Many studies have identified the dimensions of capacity to clarify its operational meanings. As an umbrella concept, the concept of capacity emerged from a multi-dimensional approach covering various levels (e.g., environmental, organizational, and individual) and the existing CD frameworks have been developed based on this multi-dimensionality (for details, see Chapter 2). Therefore, researchers using CD frameworks need to adopt relevant research methods that enable them to capture the multi-dimensional nature of CD. The most important point is that each level is interrelated, and an intervention targeted at any one level may not bring the intended results.

This research poses the overarching question of "under which conditions were the stated development goals achieved?" However, since this research focuses on the JNNURM, a more accurate question is "which capacity factors were necessary and sufficient to deliver projects successfully?" Concerning the complexity of CD described above (and in Chapter 2), the QCA method is suited to this research for following reasons:

- **Number of cases**: This research focuses on urban projects under the JNNURM sanctioned at a certain point in time. Due to the limited number of cases and numerous sources of data, this research may not be relevant to large-N research methods.
- **Comparison**: The most popular technique for CD research has been the single case study, but CD interventions are usually implemented in diverse local contexts and focus on specific subjects in various types of actors, tasks, and sectors. This characteristic puts limitations on the ability to generalize the results from their CD studies. The QCA techniques allow systemic cross-case comparisons and are more generalizable than a single-case study. The comparisons made by the QCA method provide evidence that points to generalizable characteristics of CD.
- **Characteristics of variables**: The features of CD are comprehensive and abstract, so some elements of capacity interventions are hard to measure quantitatively. The conditions

(independent variables) for the outcome (dependent variables) in this research included both qualitative and quantitative information that are difficult to apply to statistical analysis methods.

- **Research questions**: The concept of CD is derived from the perspective that the whole is different than the sum of the parts. Some researchers argue that measuring one aspect of capacity does not have any significant meaning to the whole, and even insist that scrutinizing one aspect of capacity runs counter to the holistic view of the concept—e.g., see Baser and Morgan (2008). Therefore, in order to see impacts of capacity interventions, research on CD should consider how capacity factors and/or combinations of the capacity factors create similar outcomes. In this regard, this research considers how capacity factors combine to impact the delivery of a project. In particular, it asks under which 1) environmental, 2) organizational, and 3) individual conditions was the project successfully implemented? It is not to estimate "average effects for a given causal condition over a large set of cases" (Boudet, Jayasundera, & Davis, 2011, p.510), but to determine the pathways to the outcome. In other words, the QCA method was more relevant to answer the research questions based on the multi-dimensionality of CD.

4.3.3 Application of Fuzzy-set QCA

4.3.3.1 Selection of a QCA Variant

There are three variants of the current QCA method: 1) crisp-set QCA (csQCA), multi-value QCA (mvQCA), and fuzzy-set QCA (fsQCA). The relevant variant should be selected based on the research questions and characteristics of a data set, and the selection "should be postponed until a reasonable overview is possible of the breadth and depth of data available, the number of conditions likely to be necessary, the scoring metrics appropriate for the dataset, and the intended application of the QCA findings" (Jordan et al., 2011, p.1172).

csQCA is based on Boolean algebra and simple logical operations using binary data. Whereas, fsQCA uses variables in a continuous range and mvQCA uses variables having one of several discrete values. csQCA is useful when all causal and outcome variables can be reasonably assigned to binary categories as either 0 (absent) or 1 (present). In cases where more gradients in the variables are present, either fsQCA or mvQCA should be used (Gross, 2010; Rihoux & De Meur, 2009).

csQCA and mvQCA use truth tables to analyze a data set. The truth tables are useful for investigating "limited diversity" and the consequences of different "simplifying assumptions" (Ragin, 2009, p.88). However, a truth table has its limitations in "that it is designed for conditions that are simple presence/absence dichotomies or multichotomies" (Ragin, 2009, p.87), which may cause a loss of data and information. Meanwhile, fsQCA moves beyond simple dichotomous or multichotomous scoring, and enables relevant conditions to be analyzed with a more nuanced coding (McAdam et al., 2010). In other words, fsQCA uses a fuzzy set which is "a continuous variable that has been purposefully calibrated to indicate degree of membership in a well-defined set" (Ragin, 2009, p.90). Thus, the fuzzy set prevents the conditions from loss of information caused by csQCA and mvQCA. In addition, Ragin (2009, p.89) explains the advantages of fsQCA: "in many respects fuzzy sets are simultaneously qualitative and quantitative, for they incorporate both kinds of distinctions in the calibration of degree of set

membership. Thus, fuzzy sets have many of the virtues of conventional interval-scale variables, especially their ability to make fine-grained distinctions, but at the same time they permit set theoretic operations".

In this research, outcomes were generated by considering many variables in a continuous range such as time and cost overruns. In addition to the outcome, many conditions in this research had qualitative and/or quantitative characteristics. For example, Gross State Development Product (GSDP) as an economic status indicator was not suitable to dichotomize or multichotomize. However, some factors such as the type of implementing agency and reform status, which is more qualitative, were easily dichotomized or multichotomized. For this reason, this research employed fsQCA.

4.3.3.2 Selection of the Cases

In QCA, it is beneficial to select cases that exhibit the greatest possible variety of each case's set of condition and outcome values (Jordan et al., 2011). Out of 538 sanctioned projects shown in Table 4-5, this study selected 126 projects sanctioned in the twelve cities that were included in the cases studies. The total number of approved projects in the twelve cities was 194 projects. Out of 194 projects, 62 projects that were under 70 percent completed or had not had the fourth and final installment of central government funds released were excluded from the QCA. The exclusion of these projects minimized the errors in estimating the project cost at completion. For the 40 projects that were more than 70 percent complete and included in the QCA, the estimated cost at completion needed to be calculated in order to estimate the percentage of the cost overrun (for details, Section 7.2.1). Additionally, six projects were excluded based on an approved cost that was under 500 lakhs (USD 830,000; 1 USD = 60 INR) or over 40000 lacks (USD 67,000,000) to eliminate these extraordinary cases in the context of the JNNURM. In summary, the case selection process focused on maximizing the variance of outcomes and conditions, which resulted in 126 projects being systematically selected. The list of selected projects is shown in Appendix D.

Table 4-5 State-wise Status of Sanctioned JNNURM Projects

Data as on March 21, 2014 (Amount Rs. In Lakhs)

No.	Name of State	Total Original Allocation	Total Allocation (Original + Additional)	Number of projects approved	Number of Projects completed	Cost of sanctioned projects	ACA Committed	ACA released
1	Andhra Pradesh	171845	211845	52	25	483243	205265	168097
2	Arunachal Pradesh	740	10740	3	2	18048	16243	12565
3	Assam	17320	27320	2	0	31611	28450	24813
4	Bihar	44241	59241	8	0	71181	39476	15513
5	Chandigarh	17087	27087	2	2	5699	2685	2685
6	Chattisgarh	14803	24803	1	1	30364	24291	21862
7	Delhi	272318	282318	23	9	664955	232734	112981
8	Goa	2094	12094	2	0	7484	5987	1497
9	Gujarat	207881	257881	71	52	556948	246060	212591
10	Haryana	22332	32332	4	3	69909	34955	31459
11	Himachal Pradesh	3066	13066	3	0	3664	2931	3473
12	Jammu & Kashmir	33836	48836	5	0	55184	48775	28065
13	Jharkhand	64120	94120	5	0	79486	49937	29646
14	Karnataka	137459	152459	47	26	363531	142439	118721
15	Kerala	47476	67476	10	0	96973	62964	24338
16	Madhya Pradesh	97850	132850	22	11	230401	116794	95584
17	Maharashtra	505555	550555	80	42	1143711	509402	436943
18	Manipur	5287	15287	3	0	15396	13856	9006
19	Meghalaya	5668	15668	2	0	21796	19616	13301
20	Mizoram	4822	14822	4	0	12771	11494	4554
21	Nagaland	1628	11628	3	1	11594	10435	6216
22	Orissa	17235	32235	4	1	74016	59213	33026
23	Punjab	50775	70775	4	2	45384	22692	17098
24	Puducherry	10680	20680	1	0	20340	16272	10502
25	Rajasthan	59869	74869	12	4	108373	69355	51903
26	Sikkim	613	10613	2	1	9654	8688	7819
27	Tamil Nadu	195066	225066	48	23	513417	208403	182362
28	Tripura	4018	14018	2	0	18047	16043	14439
29	Uttar Pradesh	211941	276941	33	4	555406	269661	223132
30	Uttarakhand	20534	40534	14	1	39485	31192	25606
31	West Bengal	301840	321840	66	17	662009	239215	145707
	Total	**2549999**	**3149999**	**538**	**227**	**6020079**	**2765523**	**2085505**

Projects sanctioned during the transition period (2012-2014) were not included.

4.3.3.3 Data Collection

Data for the QCA process was collected from multiple data sources: 1) the official Planning Commission website, 2) the official JNNURM website run by the Ministry of Urban Development (MOUD), 3) the

JNNURM documents produced by State Level Nodal Agencies (SLNAs) and ULBs, 4) interviews during the main field research, and 5) literature in the public domain.

For data related to human resources and the economy in a state, a database[3] developed by the Planning Commission was mainly used to collect state-wise information. An additional source of data at the state level were existing literature. For example, the data for the indicator of anti-corruption in a state was collected from Debroy and Bhandari (2012).

Many documents from the Ministry of Urban Development (MOUD)—such as Memorandum of Agreement (MOA) documents[4], credit rating[5], quarterly reports of project implementation status[6]—were utilized to collect data for various indicators at the state and city level. Data related to state and ULB reforms were collected from the MOA documents. The MOA between ULBs, state governments, and the GOI spelled out specific milestones for each item of reforms under the JNNURM (MOUD, 2011b), and the funds from the GOI were released in accordance with the payment schedule that formed a part of the MOA. For this reason, when an MOA was written for each mission city, the local and state governments were asked to assess the existing state of the city to establish milestones. The MOUD provided a reform checklist to authorized agencies, and collected the information on the condition of each city at the time when the MOA was prepared. In addition to the checklist, the MOUD regularly evaluated the achievement of reforms and created a reform score card[7]. These sources were utilized to comprehend each city's condition and to generate fuzzy scores of reform-related indicators such as accountability, devolution, and taxation status. A city's credit rating was also collected from a MOUD document to measure the ULB's financial condition. In order for ULBs to leverage funds from the open market, the MOUD determined the credit rating of mission cities (Sivaramakrishnan, 2011). In addition, the MOUD created a summary of the Quarterly Progress Reports (QPRs) that include the implementation status of each project, and posted the summary on the JNNURM website. Data on the implementation status of each project were collected from the MOUD documents.

The JNNURM documents produced by SLNAs and ULBs, such as CDPs[8] and QPRs[9], became a data source for the indicators at the organizational and project level. In order to apply for grant assistance under JNNURM, the GOI requires mission cities to formulate a CDP and to prepare project proposals (MOUEPA & MOUD, 2006). The CDP was used to review the governance structure and other conditions of each city. In addition to the CDPs, as a part of the monitoring system, the authorized agencies were required to submit QPRs to the MOUD to provide an update on the progress of reforms and project implementation. The QPRs include various detailed information related to reforms, projects, and the implementing agency's conditions (see the footnote 7). The QPRs became the main data source at the project level. In addition to CDPs and QPRs, other available documents of SLNAs and ULBs were collected to double-check the indicators of interest. These documents were first collected from the

[3] http://planningcommission.gov.in/data/datatable/index.php?data=datatab (retrieved on Feb 5, 2015).
[4] http://jnnurm.nic.in/city-wise-moa.html (retrieved on Feb 5, 2015).
[5] http://jnnurm.nic.in/wp-content/uploads/2012/12/Current-credit-rating-v-final-.pdf (retrieved on Feb 5, 2015).
[6] http://jnnurm.nic.in/state.html (retrieved on Feb 5, 2015).
[7] http://jnnurm.nic.in/scoring.html (retrieved on Feb 5, 2015).
[8] http://jnnurm.nic.in/citywise-cdp.html (retrieved on Feb 5, 2015).
[9] http://jnnurm.nic.in/wp-content/uploads/2012/08/Master-Revised-QPR-template-for-UIG-290709-Final.pdf (retrieved on Feb 5, 2015).

official website of the ULBs, SLNAs, and para-statals. If the documents were not available in the public domain, they were collected during the main field research.

During the main field research, each participant was asked ten short answer questions related to organizational information (for details, see Section 4.3.2.2). Out of the ten questions, three "Yes" or "No" questions on whether there was an HRD strategy, a shortage of staff, and a training system were used to create a measure of the ULB's organizational development. Other questions had only partial information or no difference between the organizations interviewed, which meant they could not be converted into a useful indicator.

A summary of the variables and data sources is presented in Table 4-6.

4.3.3.4 Data Analysis

The selection of cases, outcomes, and conditions and the data collection were conducted in an iterative process, following the theoretical framework and best practice from case-based research. For example, after collecting project information on a dataset of 194 projects, the data were combined with the type of implementing agency and the subsector in which the project was based, to develop a context for each city and to select cases and conditions (Appendix D.1 presents data on the implementing agency and project sector for all 194 projects). After investigating the tables, five types of implementing agency were dichotomized as either ULB (ULB and ULB-involved) or non-ULB (state-level public corporations, city-level public corporations, and special purpose vehicles).

Prior to developing the QCA dataset, the project sector was to be used as a control variable. However, it was included as an independent variable because a sector-wise dataset would lose some sample cities and limit the variance of some conditions. Thus, the selection of cases, identification of variables, and data collection was a back-and-forth process that was also combined with the data analysis.

In QCA, the data collection is followed by the calibration of fuzzy membership values, a necessity analysis, a truth-table analysis, and a subset analysis. The process is a highly iterative and retroactive reasoning must be used throughout the study to justify the calibration, inclusion of the conditions, and QCA results (Jordan, 2012). In this research, the data for each indicator was calibrated and combined to generate fuzzy-scores for each condition (for details on the calibration process, see Section 7.2 and Appendix E), and the calibrated values were used for the multiple analyses undertaken as part of QCA. After conducting an analysis, the calibration was readjusted to elaborate a model that reflects the theoretical framework and accounts for the case study findings. For example, by varying the calibration criteria, ten different sets of outcomes were created, and more than 300 models with different configurations were examined. These readjustments should not be considered opportunistic manipulations of data, but necessary steps (Berg-Schlosser, De Meur, Rihoux, & Ragin, 2009). The operationalization and calibration of all variables must be clearly defined for the replicability and validity of the research process as well as to ensure the results are interpreted properly (Jordan, 2012).

4.3.3.5 Validity and Reliability

De Meur, Rihoux, and Yamasaki (2009) and Jordan et al. (2011) summarized the limitations of applying the QCA technique as follows: 1) Dichotomization of Data; 2) Case Sensitivity/Difficulty in Selecting Conditions and Cases; 3) Use of Non-Observed Cases (Logical Remainders); 4) Black Box Problem/Lack of Causality; and 5) Temporality Problem/Lack of Temporal Dimensions. This research encountered these challenges in the QCA process. To overcome the challenges, this research used four strategies: 1) transparency; 2) theory-based design; 3) case-based knowledge; and 4) internal validity process. Each of these strategies is discussed below.

- **Transparency**: Transparency throughout the QCA process is critical in producing a valid and replicable study, and this means that information must be provided about key decisions taken in the research (Jordan et al., 2011). This research documented all processes and decisions to articulate perspective-reflected inputs and provided details in a transparent way (De Meur et al., 2009). Appendix D to Appendix E provide full details on the raw data, QCA procedure, and the decisions related to data manipulation.
- **Theoretical knowledge**: The choice of the variables (conditions and outcome) for the analysis must be theoretically informed (Berg-Schlosser et al., 2009). This research revisited the theoretical framework at key steps of the analysis, and verified the selection of the conditions in accordance with theoretical knowledge.
- **Case-based knowledge**: The generalizations may be limited when case-based knowledge is lost during the data acquisition process (Jordan et al., 2011). While the QCA research analyzed the impacts of capacity factors at a certain point in time, in-depth case-based knowledge developed from the case studies was utilized to understand the broader circumstances within which the projects were being implemented.
- **Internal validity process**: This research conducted the analysis through an iterative process between the QCA and case studies as a process of triangulation. The QCA results were carefully articulated and integrated with the in-depth case studies. When the QCA results were different from the case studies, this research stated the rival explanations—e.g., Path 5 in Section 7.3.3.1.

In applying QCA to this research, this research collected official data for most indicators to reduce errors. Furthermore, in order to ensure the validity of the indicators and to maximize the replicability of the analysis, this research collected data that were mostly quantitative or quantifiable without being subject to the researcher's perspective.

4.4 METHOD INTEGRATION

The complete set of capacity factors is shown in Table 4-6, which also shows the indicator(s) for each capacity factor, their data sources, the research methods that utilized each indicator, and the reason why an indicator may have been excluded from a particular analysis.

Table 4-6 Capacity Factors, Indicators, and Data Sources

Level	Possible Factor	Variable of Interest/Indicator/Construct	Data Source	Case Study	QCA	Reason of QCA exclusion
Enabling Environment	Supply of human resources	Higher education institutes per million	Planning Commission	Δ	O	
		Labor force's mean number of years of schooling	Planning Commission		O	
		Literacy rate	Planning Commission		O	
		Qualified contractor/consultant availability	Interviews	O	X	data unavailability
	Economic condition	Gross state domestic product per capita	Planning Commission	Δ	O	
		Average growth rate	Planning Commission		O	
		Supply of materials	Interviews	O	X	data unavailability
	Politics	Political party alignment (Central-State-Local)	Literature/ interviews	O	Δ	partial information
		Political pressures	Interviews		X	data unavailability
	Anticorruption	Local politics	Interviews	O	X	data unavailability
		Index for the state's anti-corruption effort	Literature/interviews	X	O	
	Accountability	Enactment of public disclosure law (Y/N)	MOA	Δ	O	
		Enactment of community participation law (Y/N)	MOA		O	
		Public consultation/public participation process (Y/N)	Interviews	O	X	no difference
	Governance structure	Number of involved agencies (single or multiple)	CDP/QPR/interviews	O	Δ	overlap of data
		Coherent and consistent state government policy	Interviews		X	data unavailability
Organization/ Networks	Devolution of powers	Devolution status of 12th Schedule functions (Y/N)	MOA	O	O	
		Constitution of Metropolitan Planning Committee (Y/N)	MOA	X	O	
		Constitution of District Planning Committee (Y/N)	MOA	X	O	
		Devolution status of functions in city planning (Y/N)	MOA	O	O	
		Devolution status of functions in water & sanitation (Y/N)	MOA	O	O	
	Financial condition (ULB)	Credit rating of cities (From AAA to D)	MOUD	Δ	O	
		Financial status items in MOA checklist (rate of property tax coverage, rate of collection efficiency, rate of water sector cost recovery)	MOA	O	O	
	Organizational development (ULB)	Presence of HRD strategy (Y/N)	CDP/MOA/interviews	O	O	
		Sufficient staff (Y/N)	CDP/MOA/interviews		O	
		Presence of autonomous recruiting system (Y/N)	CDP/MOA/interviews		Δ	partial information
		Presence of own training systems (Y/N)	CDP/MOA/interviews		O	
		Presence of incentive and reward system (Y/N)	CDP/MOA/interviews		X	no difference

Level	Possible Factor	Variable of Interest/Indicator/Construct	Data Source	Case Study	QCA	Reason of QCA exclusion
	Partnership & communication	Collaboration of NGOs/academia/experts	Literature/ interviews	O	△	partial information
		Public relations	Interviews	O	X	data unavailability
	Leadership	Tenure of mayor/type of the election system	Literature/ interviews	△	X	data unavailability
		Strong leadership/willingness of decision-maker	Interviews	O	X	data unavailability
Individual/ Project (individual factor related: from case studies)	Attitude & ownership	Alignment of implementation and service authorities	QPR/interviews	O	△	partial information
		Level of motivation, responsibility of project staff	Interviews		X	data unavailability
		Local consultancy for preparation of CDP/DPR	CDP/interview		X	data unavailability
	Skill & knowledge	Participation in relevant training program	QPR/interviews	O	△	partial information
		Computer, writing, language skills of project staff	Literature/interviews		X	data unavailability
		Technical knowledge	Interview		X	data unavailability
		Local knowledge/Local capable contractor availability	Interviews		X	data unavailability
	Implementing agency (IA) type	ULBs or parastatal agency	QPR/interviews	O	O	
	Project size	Approved project cost (IA's skill & knowledge related)	QPR		O	
	Project cost share	Central assistance rate for project funds (ULB's attitude & ownership related)	QPR		O	
	Project Sector	Sector (IA's skill & knowledge related)	QPR		O	
	Project modality	PPP or Procurement/new or upgrade (IA's skill & knowledge related)	QPR	△	X	partial information
Outcomes	cost overruns	Gap between approved cost and actual expenditure	QPR	O	O	
	time overruns	Gap between scheduled completion date and actual date	QPR	O	△	partial information

O: Included in the indicated research method.
X: Excluded from the indicated research method.
△: Data related to the factors were mentioned by some interviewees or collected from certain data sources, but this study did not include the factors in the final analysis due to its partial information.

During the completion of the QCA and case studies, the results were integrated in an iterative way based on the conceptual framework developed in Chpater 3. Each method has its pros and cons in terms of justifyng the research findings. As explained above, the QCA and case study method complement each other. Case studies allow a researcher to find intermediate causes lying between some cause and its purported effect, through the collection of in-depth data on a single case over time (Gerring, 2004; Jordan et al., 2011). The case studies provided a broader understanding of the real situation in the selected cases, and offered an enriched explanation of the capacity factors and their impacts on project delivery. The challenges related to the QCA method, such as contradictory configuration, logical remainders, and lack of temporality, could be resolved with the findings from the case studies.

QCA can be used "to gain leverage in the process of unraveling thick case narratives both for individual cases and for comparisons across cases" (De Meur et al., 2009, p.170). The findings from the case studies were reinforced by the QCA results, and the QCA results enhanced the generalizability of the cast study findings. The QCA results helped simplify the complexity of relationships between capacity factors and project outcomes, and showed the conjunctural pathways to the outcome. Thus, the QCA helped facilitate a deeper understanding of the case studies.

Throughout this research, the case studies and QCA were conducted in an iterative process. While most results in both phases enhanced the findings from each method, some results were contradictory. This research clearly describes any contradictory results and attempts to provide an explanation for each finding. In summary, this research demonstrates how QCA and case study research relating to CD can be effectively integrated to leverage the strength of each methodology and develop new insights that each method alone could not provide.

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CHAPTER 5 PERCEPTION OF CAPACITY DEVELOPMENT IN THE URBAN SECTOR IN INDIA

5.1 INTRODUCTION

This chapter investigates four propositions that are emphasized in existing research on capacity and capacity development (CD) in order to identify gaps that might exist between the theory of capacity and CD and perceptions of these concepts in India's urban development sector. Specifically, this chapter focuses on the dimensions of capacity, contextual factors, the roles of actors, and capacity interventions.

CD has been overused as a "buzzword" across different sectors (Kenny & Clarke, 2010). The ambiguity of the concept and a failure to rigorously apply the theoretical frameworks allow researchers and practitioners to interpret the term as needed to support a desired intervention. The budget earmarked for CD under the JNNURM provides a case in point. While there are many reasons why the budget remained unspent, perhaps one of the most important reasons was a limited understanding of which forms of CD were actually needed. Understanding perceptions of CD is critical for developing an effective CD program. This research therefore examines the perceived meanings and processes of CD in order to articulate the gaps that exist between CD in theory and practice. In particular, this chapter focuses on the following three objectives:

1) to provide knowledge about how CD is applied in India's urban infrastructure sector;
2) to understand how CD is perceived by practitioners in the urban infrastructure sector; and
3) to identify the gaps that exist between CD in theory and practice and to make recommendations about how to address these gaps.

To address these objectives, this chapter answers the following research questions:

- RQ1: How do urban infrastructure practitioners in India conceptualize CD? What gaps exist between the theory of CD and practitioners' perceptions of CD?
- RQ2: How do different entities within the urban infrastructure sector in India view CD? If there are differences in the perceptions of CD across these entities, what explains these differences?
- RQ3: How can the theory of CD be improved and what should be done in practice to bridge the gaps?

Practitioners' perceptions can reflect ground realities and play a critical role in determining which types of CD interventions are adopted. Conversely, actual interventions can shape the perceptions of CD. By identifying practitioners' perceptions of CD, this chapter aims to articulate the similarities and differences between the current theoretical approach to CD and the perceptions of CD held by key actors. The chapter also uses the perceptions of CD as a guide to formulate recommendations for the application of CD theory, with the objective of enhancing the effectiveness of CD programs. Figure 5-1 provides a visual schematic for the overall research design.

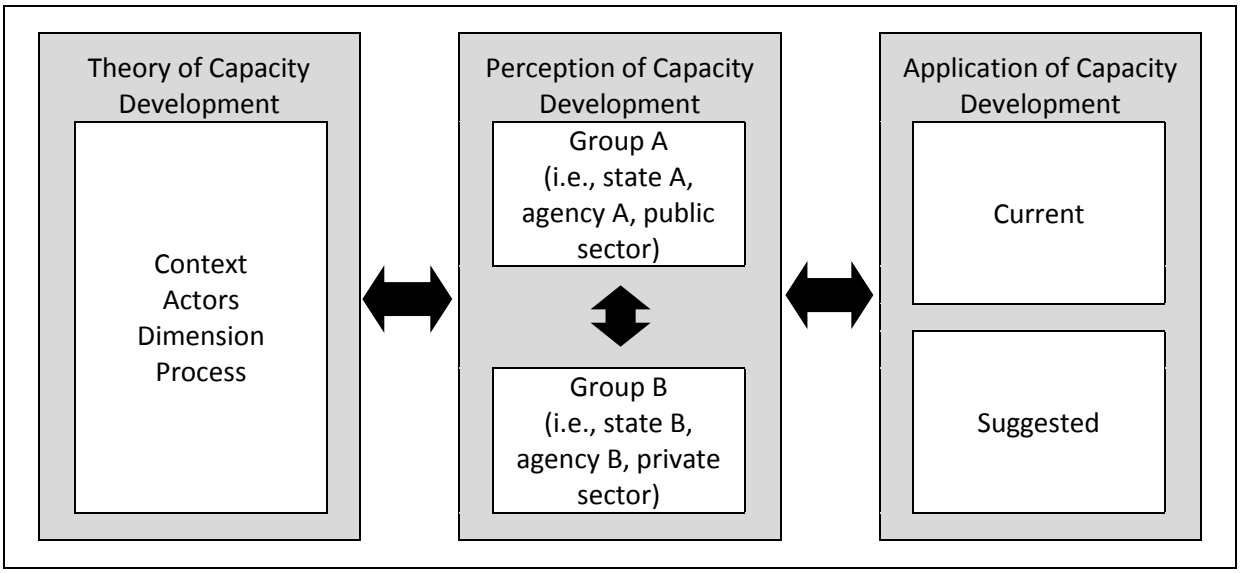

Figure 5-1 Relationship between CD Theory, Perception, and Application

To investigate the possible gaps between the theory and perceptions of capacity and CD, this research categorized common arguments related to capacity and CD into five major groups: context, actor, dimension, process, and purpose. This categorization is essential for answering the following questions about these concepts: When and where is capacity developed? Whose capacity is developed? Which capacity is developed? How is capacity developed? Why should capacity be developed? In relation to these questions, this research developed the following five propositions (see Section 2.5) that the existing literature on CD uses to conceptualize capacity and CD.

- Proposition 1: Capacity development is largely determined by the local context.
- Proposition 2: Capacity development is based on the transformation of endogenous capacity.
- Proposition 3: Capacity development is an approach focused on various dimensions at multiple levels.
- Proposition 4: Capacity development is not a linear process and relies on both formal and informal interventions.
- Proposition 5: Capacity development is a goal in itself as well as a means for other development goals.

This chapter focuses on Proposition 1 to 4 to investigate the four aspects of CD in Figure 5-1 and answer the research questions above (Proposition 5 is discussed in Chapter 6). For the present chapter, data concerning respondents' answers to two main questions were extracted from interview transcripts: 1) "How do you evaluate your (institution's) capacity to perform the JNNURM project?" and 2) "What do you suggest to develop capacity and to perform the JNNURM project better?" When necessary, some of the interview participants were asked more specific questions such as "What do you think of the ULBs' capacity?" and "What do you think of the argument that ULBs are overdependent on consultants?" The data were analyzed for themes related to the four propositions.

The four subsections of Section 5.2 review the four propositions, with each subsection posing answers to Research Questions 1 and 2. Section 5.3 summarizes the gaps between theory and perceptions of capacity and CD and, in answer to Research Question 3, suggests better forms of CD that can reduce the gaps between theory and practice in the case of India's urban infrastructure sector.

5.2 RESULTS

5.2.1 Proposition 1: Capacity Development is Largely Determined by the Local Context

Most literature emphasizes the importance of local context for the design and application of interventions for CD. This is because "the dynamics and outcomes of particular interventions are significantly affected by contextual factors" (Baser and Morgan 2008). The influence of context is the reason why it is difficult to provide a uniform approach for CD.

As with many of the definitions related to capacity, "context" is likely to be interpreted in different ways. For the present research, formal and informal institutional structure, the politics between the involved institutions, and decision-making systems were the main focus areas relating to context.

The five selected states have a diverse range of governance and politics (see Table 5-1) that can influence how people approach CD. The analysis that follows shows how different perspectives on CD can be differentiated by context.

Table 5-1 Institutional Structure and Roles of Government Agencies

State	Municipal corporations	Parastatal agencies
Maharashtra	Single authorized implementing and operation & maintenance (O&M) agency	n/a
Gujarat	Single authorized implementing and O&M agency	n/a
Karnataka	One of the implementing and O&M agencies, assigned based on the sector by the state government	Multiple implementing agencies, assigned based on the sector by the state government
West Bengal	One of the implementing and O&M agencies, assigned based on the sector and jurisdiction by the state government	Multiple implementing agencies, assigned based on the sector and jurisdiction by the state government
Uttar Pradesh	Limited roles in JNNURM (fund transfers, securing land)	Actual implementing agencies, designated by state government

Cities in Maharashtra and Gujarat have one implementing agency, and the municipal corporations in these cities are the authorized agency for JNNURM projects. Cities in Karnataka and West Bengal have many implementing agencies, so the municipal corporation is one of many implementing authorities for

JNNURM projects. The JNNURM projects were assigned by the state government in these cases, based on the project sector and the agency's jurisdiction. In Uttar Pradesh, actual implementations were led by parastatal agencies, mostly by Uttar Pradesh Jal Nigam (UPJN; UP water corporation), which was created by the state government. In West Bengal and Uttar Pradesh, after a project is completed, the project outcomes are handed over to the local governments who take charge of operation and maintenance responsibilities.

The institutional structure surrounding JNNURM projects was closely related to the degree of devolution in each state. In Maharashtra and Gujarat, the devolution had substantially been achieved before the JNNURM, and local governments were dealing with most urban sector functions. These states did not have many contextual constraints on the local government's role as the single implementing authority for the JNNURM. In the three other states, in contrast, some functions in the urban sector had not been transferred to local governments except in a few metropolitan cities. In many cities in these states, parastatal agencies—public corporations specialized in certain sectors—were playing lead roles as implementing agencies. The roles of local governments for the JNNURM were very limited. Since multiple agencies were involved in the implementation of projects, institutional overlaps and disconnects between the various stages of the project delivery process were common.

5.2.1.1 Context with a Single Implementing Agency

In India's urban sector, governance structure and local politics determine the extent of the autonomy of local governments. Evaluations of capacity varied based on whether the institutions recognized themselves as autonomous bodies. In the case of Maharashtra and Gujarat, where the municipal corporation is a single authority for all functions in the urban sector, opinions about the capacity of the local governments were consistent, with most believing that there was no capacity deficit at the local government level. Furthermore, the respondents emphasized the institutional structure that grants autonomy to the authority. A respondent in Gujarat stressed that the institutional structure was the reason for project success:

> In Gujarat state, all powers are vested within the municipal corporation, and in the municipal corporation … all executive powers are under [the] municipal commissioner … everything has to be done by the municipal corporation. … In other states ... there are different authorities, and … always problems between them. That is the basic difference between a municipal corporation in Gujarat state and [the] Urban Local Bodies of other states. This is the basic difference [explaining] why we are successful and others are not. (Interview 3212)

Another respondent also highlighted the relationship between autonomy and project implementation:

> Because so many cooks spoil the food, if a state [government] department is working, [the] Urban Local Body is working, [and the] GOI representative is also working, [this] will not lead to a better implementation or [on-time completion] of the project. … [The] Urban Local Body [is] responsible for this project, [so] we are directly working [with them]. … We have to resolve [the issues] and implement [the project] on time. So always, power … [leads to] fast development. Otherwise, interference always creates a conflict. (Interview 3211)

More specifically, some respondents in Maharashtra and Gujarat emphasized the importance of financial independence for an organization's autonomy. They insisted that their municipal organizations were technically and financially sound, and they regarded this as one of the biggest differences between their governments and the local governments in other states. For example, a respondent in Maharashtra (Interview 2111) explained: "[If the] financial status of the organization and the capacity building are strong at the local level, automatically the delegation [of urban functions] comes through … for instance, this municipal corporation is a financially very strong body and [has a] very capable organizational base, so that [its condition] actually supports the delegation".

Moreover, another respondent in Maharashtra argued for a correlation between financial status, in-house technical manpower, and the quality of project outcomes:

> Basically, ULBs which are financially strong [and have] … better technical manpower are in [a] position to conceptualize ambitious and difficult projects to implement. Smaller towns do not have this capacity; therefore they are facing bigger problems … the financial strength and the technical manpower [are related to] the project's implementation outcomes. (Interview 2411)

Compared to some states where local governments rely heavily on the state government, the local governments in Maharashtra and Gujarat were in a better condition in terms of having financial and technical capacities that were closely related to the context, with a single delegated authority. These contextual factors were also closely related to the ownership of project outcomes. In one city in Gujarat, the extent of project ownership was considered as being at the heart of a project's success. A project manager for this city (Interview 3212) stated: "There should be somebody who owns [the] project. … [The] BRTS is successful because … city government owned [it]. This is our project, so we have to implement it". Similarly, project managers and consultants stated that ownership was critical not only for project implementation, but also for project operation. In the project delivery process, ownership was perceived as a factor that needed to be strategically approached.

Like the perceptions of autonomy and ownership, perceptions relating to politics varied depending on the context. In the previously mentioned city in Gujarat, most respondents recognized politics as one of the most critical components for project delivery. For example, the project manager above emphasized the role of political will along with ownership for the project's success, and offered the example of adoption of a 24/7 water supply:

> For any project to be successful, there … should be … political will. That is the first thing. Suppose today I want to implement [a 24/7] water supply in the city … they [the elected bodies] must know [that] if you supply [water 24/7], people [have] to pay more. And because of that, there will be … resistance and … a problem for their election. But if there is a will, we can implement [24/7]. So … there should be … political will. (Interview 3212)

This respondent also cited the establishment of subsidiary companies under a municipal commissioner. The establishment of subsidiaries was perceived to reduce political interference, gain political support, and enhance professional management. Here the respondent emphasized the political will:

> We have constructed these [subsidiaries] to run our company very professionally … in these companies, the chairman is a municipal commissioner [administrative head] and the mayor [political head] is a director. … It is completely different. … To make such things [happen] here in

> Gujarat, this is a culture where political people say "Run in a professional way, [and] make it separate". [Similar things are] not happening in other states. … They [political leaders] are ready to sacrifice their powers. (Interview 3212)

Another respondent also regarded the creation of subsidiaries as a tool for reducing political interventions and speeding up the process of decision-making:

> It [takes] a three-month process for approval of any projects [and] there are day-to-day … changes [caused by] political interference. … [Therefore] we are creating a company [that is] like a private company. … [I]ts curtailed … [the] time of the process … [and] the decision is very fast. ... [Any] suggestion will be easily approved and implemented [in] the field. … [This is] to minimize the cost … [and] time. (Interview 3211)

In addition, many interviewees highlighted the importance of political stability and spoke positively about having the same political party at the state and local government levels. One respondent explained this as a success factor for projects:

> We seek … grants from them [the state government], and they give us [the grants]. Here, BJP [the political party] is ruling, and in the state government also BJP [is ruling]. When there are two separate political parties working … [that] can be [a] problem. But here it is [not a] problem. There is no conflict between [the] state government and local government. (Interview 3111)

5.2.1.2 Context with Multiple Implementing Agencies

Unlike Maharashtra and Gujarat, which only have one implementing agency, the other states have a more complicated structure for project implementation. The perceptions of capacity in these states were different from those in Maharashtra and Gujarat. Most respondents in Uttar Pradesh assessed the capacity of the local governments as being insufficient for executing project planning and implementation by both internal and external actors. Due to this perceived insufficiency, most respondents did not oppose the existing role of the local governments in fund transfers and land acquisition. They perceived the context of Uttar Pradesh to be suitable for its current institutional structure, in which specialized parastatal agencies take responsibility for project implementation. Furthermore, many respondents stated that there was a lack of capacity for operation and maintenance and felt that local governments were reluctant to take over project operation and maintenance. One respondent explained the situation in Uttar Pradesh as follows:

> [The] water supply project … [will] be handed over to Jal Kal, the concerned department. … Initially it was a separate [institution], but now it has been merged in Nagar Nigam [Municipal Corporation]. But still, [Jal Kal] has [its] own office … [and staff]. For [the] water supply, there is another [state government] department named "Jal Sansthan". … If there is a … water supply [project] … it will get handed over to Jal Sansthan. Why [should] it get handed over to Nagar Nigam? (Interview 4211)

Regarding the roles of the local governments, transfer of their functions was one of the mandatory reforms in the JNNURM, but only nominal changes were made. A respondent in a state level training institute explained the situation as follows:

> There is no convergence. It is on paper, but … there is no coordination between them. Because they feel it [the project] [is] a responsibility of [the parastatal] agency, the municipal body doesn't involve itself [in the project]. Though [the] project later … has to be transferred to [the] municipal local body, since operation and maintenance is their task … they feel that the Jal Nigam [parastatal agency], or whatever agency has designed it, has not designed as per their requirement. [An] operation and maintenance fund is given to them [local governments], so they are not very happy with the situation. … If I am preparing the project for you and if I don't involve you in it … and give it to you, later on will you be able to implement the project? Will you be able to understand [it]? That is the situation. (Interview 4431)

Concerning financial capacity in the case of Uttar Pradesh, where ULBs play limited roles in project implementation and service delivery, it was said that the local government should become involved in service delivery to be financially self-sufficient; that is, the involvement in service delivery would provide an opportunity to increase financial capacity. A respondent explained:

> Nagar Nigam [Municipal Corporation] can handle all the projects, but first provide … [the] proper resources [and] proper persons who can handle these projects. When we don't have resources or persons, how we can maintain [them]? … If you assign more power, more funds, [and] more resources to Nagar Nigam, why cannot Nagar Nigam handle it? … If you provide the basic services [and] … enhance the basic services, definitely we can increase our revenue. … If we focus on the basic services, we [can] become very strong. (Interview 4211)

Although the governance structure in West Bengal was more complex than in Uttar Pradesh, the situation was somewhat similar. While most external actors perceived that the capacity of local governments was insufficient to perform project implementation, some of the local government officers considered their own capacity to be good enough not only to operate and maintain projects but also to implement projects. Regardless of whether they considered themselves as having sufficient capacity, many respondents were not willing to take over projects that they did not implement. Like Uttar Pradesh, they had negative views about taking on such a responsibility.

As discussed above, the ownership of a project was thought to be one of the most important components of project delivery. Regardless of which agency ultimately owns the project, being involved in decision making from the beginning of the project has a significant influence on the degree or sense of ownership. The agency that actually initiates and implements the project is closely connected to the extent of autonomy, and the sense of ownership varied depending on the context of each state. Hence, in Uttar Pradesh and West Bengal, the degree of ownership was affected by the governance structure. One consultant (Interview 5231) explained the situation as follows: "If there is a small ULB and they have one water supply project, they don't have any ownership in the project. From conceptualization to execution … they are not involved in the process. … To get the project, they [only] sign what [the] consultant asks them to sign". Another respondent who was a trainer in a state-level training institution also emphasized the involvement of local government from the beginning of the projects:

> They [local governments] don't want to involve themselves [in their project]. … [W]e tell them "You have to involve yourself, you are the owner of the city, they [parastatals] are just an agency to provide technical inputs and are not going to run it for you, and you have to run it" … to own it, you need to involve yourself from [the] beginning. (Interview 4431)

Regarding politics as a contextual factor, many respondents in Uttar Pradesh and West Bengal had a negative perception of political interventions in project delivery and regarded politics as one of the major interruptions. One respondent gave an example of political interference that was caused by different political parties running the state and local governments. In this case, the state government granted all authority to a municipal commissioner who was the administrative head, but under the control of the state government, not to the mayor who can be an elected representative from a different party from the state government party. The respondent explained the situation as follows:

> Every corporation has political interference. At the state level, the state political party will not want [a local government's] mayor from a different party to hold all the power. … [The] state political party will ban [this]. … [The power] has to be devolved by the state government to all [municipal] corporations, [but] … [it is a] hard-core political decision. If you talk about other states, you will see all the municipal commissioners are IAS [Indian Administrative Service; deployed by the GOI] officers. In Uttar Pradesh, no commissioners of the municipal corporation are IAS officers. They are all state cadre. (Interview 4131)[[10]]

Regardless of whether or not the prevailing political situation was stable, most respondents perceived political influence as an impediment to project delivery. As described above, the local governments in Gujarat took steps by establishing a subsidiary company to prevent political influence. However, in Uttar Pradesh and West Bengal, there were limits on the actions that could be taken by local governments to avoid project disputes and manage conflicts, since most decisions were made by the state governments. The local governments were passive and had a low degree of project ownership. The scope of their authority seemed insufficient to deal with contextual factors such as financial constraints and politics.

5.2.1.3 JNNURM and the Local Context

The roles of institutions, the relationships among the institutions, and the politics between the institutions together create the "context" within which JNNURM projects are developed. Even though the GOI applied the same program to all mission cities and enforced the same mandatory reforms to transfer functions to the cities, the substantive authority for decision making varied depending on the local situation. Different institutional structures and governance systems needed to be developed to implement the JNNURM program in each region. For a project's success, local institutional and power structures must be understood. Only then can the existing capacity be determined and appropriate capacity interventions devised for each context. The distinct perceptions in the different states demonstrate that contextual factors have a significant influence on perceptions of CD.

[10] Due to lack of information, the information provided by this respondent was not verified. However, it should be emphasized that there were respondents who perceived that the state government deployed state cadres for the political reason regardless of whether or not it is a fact.

5.2.2 Proposition 2: Capacity Development is Based on the Transformation of Endogenous Capacity

The main transition toward CD was accelerated by a focus on the importance of endogenous capacity. It is generally accepted that development should not replace existing capacity, but rather transform capacity. From this perspective, identifying the existing capacity of internal actors becomes more important than the provision of external assistance by outsiders.

This section primarily analyzes the respondents' answers to the two main questions concerning the actors involved in the respondent's project. When relevant, an additional question specifically about dependence on consultants was asked. The interviews revealed a perspective that sees the existing relationships with consultants as one of "overdependence" where the dependence on consultants prevents government officers from acquiring knowledge and information (CEPT University, 2012). In order to identify the influence of external actors from outside of an organization, this section also analyzes the respondents' answers to the additional question about dependence.

5.2.2.1 Positive Perceptions of Dependence on Consultants

As the first flagship program at the national level, one of the main focuses of the JNNURM is decentralization. The reform components of the program are intended to empower local governments by transferring functions, funds, and functionaries to them. After the reform, the local governments should then be able to work on new projects that might be unfamiliar in terms of their type, size, and sectors. Since the JNNURM was launched, the roles of local governments have been expanded to cover a range of sectors as well as different stages of the project delivery process, and the necessary work for developing a City Development Plan (CDP) and Detailed Project Report (DPR) were new to many local governments. Due to their lack of knowledge about the components of the CDP and DPR, local governments needed the assistance of experts to learn the new techniques.

Given this context, a common perception was that dependence on consultants was necessary for delivering the projects. That is, unlike the parastatal agencies that could readily implement the JNNURM projects similarly to their regular work, the local governments could not easily do the new, additional work without external assistance. For this reason, the GOI provided financial and procedural support to actively encourage local governments to address any lack of capacity by hiring consultants. A respondent in a state level training institute in Maharashtra explained the situation and highlighted the need for consultants as follows:

> Capacity building is more important … than funds. … Funds are always available with these kinds of projects. It [capacity building] is a methodology [that] the government [of India] has defined. … They identified the consultants, and those consultants were available to the municipal corporations. We've got a consultant who is qualified at [the] national level. … People do say [that] we are overdependent on the consultants. … [But] to the people who have never

> undertake[n] these kinds of projects, this dependence was necessary. … In the government setup, people don't like to rely on consultants too much. Whether it is good or bad depends on the kind of phase we are going through. If I have a very good capacity, I don't like to depend on the consultant, because that capacity is already available. But, if I don't have that [capacity], and especially when government is looking for the implementation of the projects, we need to have these kind of people who can bring in fresh ideas and ways of executing the project. … From preparing their DPR … [to] project management, consultants … have helped … the ULBs [very much]. … The outcome of JNNURM is much better in spite of [the fact that the] capacity of the people [the ULBs] to execute the project is not [adequate]. Their output is much better because this kind of arrangement worked out. (Interview 2421)

In particular, most respondents who were local government officials in Karnataka, Maharashtra, and Gujarat disagreed with the view of their current situation as overdependence. They believed that their organizations did not have enough employees who were capable of performing the required work and that recruiting new employees was not as economically, structurally, and technically efficient as hiring consultants. For example, one respondent (Interview 2311) shared the following positive view of hiring consultants: "We want to give payment based on performance. We always find [a] consultant more appropriate than hiring any staff". Another (Interview 3212) said: "Instead [of recruiting permanent employees], if I can pay a nominal amount for a consultant, I can get the good services [of] that consultant. It's better".

Respondents cited the complicated procedures and costs related to recruiting a regular officer. Most department staff are dedicated to routine work, and when recruiting employees for a new project, local governments must follow state government norms and procedures that usually take years. Moreover, the JNNURM is a mission for certain periods of time, so the work done under the JNNURM is different from their regular work. Hiring consultants was therefore considered as a better alternative for specific missions that did not have staffing. One respondent (Interview 2312) explained the efficiency as follows: "We don't have that much expertise [or] that much time to build on [it]. We have … routine [work] to do. They [consultants] are definitely useful for us". Another respondent (Interview 2313) said, "A certain set of conditions is assigned by the [state] government … and meeting the conditions is difficult. … [The] best solution is to employ [a] consultant or agencies to get experts … If they are not satisfactory, we can kick out the consultants and hire [others]".

Another cited benefit of hiring consultants was that consultants can apply up-to-date technologies as well as more specialized knowledge to projects. Respondents stated that private consultants can more easily adopt up-to-date technologies and tend to have better technical expertise. The lack of knowledge about and experience using new technologies were generally expressed as a lack of capacity by the respondents, who looked to consultants to address this inadequacy. For example, one respondent in Gujarat (Interview 3113) said: "[The] consultant is [a] person who is continuously engaged in … research … [and] development work. … When and where it requires, we [ask a consultant with] some expertise to advise us or [we use the] services of that person or that institution".

Most respondents with a positive view of hiring consultants considered JNNURM projects not as regular work, but rather as additional work for the duration of the program. Contrary to the GOI's intention, they rarely perceived hiring consultants as a learning opportunity. One respondent did not feel a need to

improve the local governments' own capacity for cutting-edge project design and implementation and stated:

> As the times change, better technology [comes along]. … The domain … is created by the … private … [or] public institution … engaged in that particular field. But the local bodies … [who are engaged] in so many activities related to basic [service] delivery … [it is not] appropriate [for a local body] to generate its own capacity [for] designing and implementing the high-end projects, which require a lot of technical expertise. (Interview 2111)

One consultant pointed out that, in addition to project design and implementation, it was essential to hire consultants for project management, given the existing structure of the governments:

> They [local governments] are not doing projects related to the JNNURM. They are doing projects of their own. … We [consultants] have done … [work amounting to] 500 crore [83 million USD (1 USD = 60 INR)] in the last 7 years. … 500 crore is a big sum in a very short duration, so … they were not mentally prepared [to take responsibility for project management] with their … engineers. That is why they need a PMC [Project Management Consultant] to help them out so that the work goes smoother than their previous projects. (Interview 3132)

5.2.2.2 Negative Perceptions of Dependence on Consultants

Unlike most government officers, who had positive perceptions of local governments' dependence on consultants, consultants themselves expressed varying opinions. When they were asked for their evaluations of the local government's capacity, some consultants answered that there were not many differences between government officers and consultants in terms of the technical knowledge and skills required for project management. They regarded the current tendency to hire consultants as a matter of attitude and argued that the main reason for hiring consultants was to shift the responsibility for project-related work to the private sector. They criticized government officers' lack of self-motivation, their unwillingness to learn, and their low level of interest in projects, all of which were reinforced by a government policy that encourages the use of consultants.

One consultant stated:

> [Local government officers] do not learn the methods, skills, or strategy [that] the consultants are doing or … introducing. They [exclude] themselves from learning, and the capacity building of the in-house officials does not take place … if [the] consultants go away … the next … day, there will be no one to manage the unit or the ongoing [activities]. (Interview 2333)

Another consultant similarly pointed to government officers' lack of willingness:

> [Local government officers] should have to understand … themselves that these people [consultants] are not going to stay with us for [a] lifetime. … They should teach them the techniques and skills and … empower … the in-house officials. … The most important thing is [that] the corporation officials must have the willingness to learn by themselves. (Interview 2332)

In addition, a respondent in Gujarat indicated that the system that reinforces dependence on consultants is a basic reason for the low interest in CD at the local government level:

> They can work on their own capacity building so that they don't need a Project Management Consultant to help them out. … If you increase your expertise, you may not need a PMC. ... But since they have somebody to help them out, they may not work on that. … If you have somebody to feed you, you won't use your hands … because you can sit and relax and somebody is there to feed you. That's … basic human nature. If you have someone to help, you won't yourself [become strong] enough to help yourself. (Interview 3132)

This negative perception of dependence on consultants varied significantly, depending on the state. A parastatal agency in Uttar Pradesh has a unique institutional context where the need for hiring consultants was seen as unnecessary. As discussed above, in Uttar Pradesh, a state-level public agency—UPJN—is the actual implementing agency for the JNNURM projects. Most stages of project delivery were handled by internal actors in UPJN, and the vacant positions were also filled internally. A respondent who was working for UPJN (Interview 4221) explained: "[Dependence on consultants] is not applicable in UP … [the] UP government has a huge department [UPJN]. We have 4000 engineers [and] … all kind[s] of experience. We [hire] some experts because [of] day-to-day changes [and] … innovation only". This situation arose because the work for JNNURM is the same as the regular work of the UPJN and is therefore not considered to be additional work.

Furthermore, one respondent perceived hiring consultants as a way to provide time-limited work to retired senior engineers as a special benefit:

> We also have some experts and consultants, but [they are] very limited … [the consultants are] our own people who retired from this organization [UPJN] … [and] have expertise … associated with our department, so we [use] their capability…. Otherwise, we are self-sufficient … we don't require any kind of outsourced support from other organization[s]. (Interview 4421)

In this state, collaboration with external actors was not considered as a CD intervention.

As described above, West Bengal has a complex governance structure. Since the mission cities had an agglomeration of multiple local governments and the JNNURM projects were led by a state government agency (KMDA), the local governments had limited roles in identifying and planning projects. The private consultants hired by the authorized implementing agencies under the state government conducted the project planning, and there was no active collaboration with the local governments. This lack of collaboration led to problems during the project implementation stage.

Many respondents described gaps between the consultant's plan and the reality on the ground, and this caused many problems in project implementation (for details, see Section 6.2.1). They argued that had they been involved in the project design, many of these problems could have been avoided. In the given institutional structure, the external assistance resulted in faulty project plans in addition to dependence on the private sector and actors' evasion of responsibility. One respondent explained the situation as follows:

> [This] is a very big problem [for] the JNNURM in West Bengal. When the projects are being prepared by the consultants, they don't go through the documents with the Urban Local Bodies. … I know that there is a problem [with the] land, but I have written that there is no problem

> [with] the land [in the plan], and the chairman [of municipal corporations] also signs on that [plan]. When the implementation time comes, problems arise, and then nobody takes responsibility. They blame consultants, and consultants blame [the] Urban Local Bodies. I think this is a major problem, that when DPRs are prepared the realities are not taken care of. … The consultants want to wrap it up, and somehow they want to get it sanctioned by the central government. … [The] consultants are appointed by authorized bodies, and are answerable to them. [The] DPR is … checked by parastatals, [and] everything is done by parastatals. (Interview 5231)

5.2.2.3 JNNURM and Dependence on Consultants

Many respondents insisted that the assistance from the outside was essential for project delivery and disagreed that there was an overdependence on the private sector. They focused on the positive influences of external experts, the efficiency of the recruitments, and the results-oriented procedure. However, most of those who held this view assumed that there was an internal capacity gap and external actors can fill the gap. This finding implies that although current discussions of CD focus on capacity "within", it is not sufficiently employed in practice. It is therefore critical to clarify roles in the relations between multiple actors and to provide a supportive context in order to develop the capacities of the actors.

External assistance can be more critical at certain points in organizational changes. Actors go through a series of stages or cycles that both shape and reflect the state of their capacity (Baser & Morgan, 2008). Without considering the dynamics of organizational changes, discussions of endogenous capacity stand far from actual perceptions in practice and so can be impractical. Therefore, strategic positioning of actors based on the history of organizational changes and contextual factors is required in the Indian urban sector.

A municipal corporation in Maharashtra provided a good illustration of the development of in-house capacity in accordance with the dynamics of organizational changes. In the beginning, the corporation initiated a new project under JNNURM, with the project ideas coming from inside the corporation. The project team and decision makers, including the commissioner, viewed the support provided by JNNURM as an opportunity for trying the innovative project. The city engineer looked for external experts to design the specific project, not only in India but also outside of India. He could collaborate with experts in Singapore to adopt new systems. At the same time, he involved his staff in the project from the beginning. After a few years, in addition to the project, the municipal corporation was able to deliver most projects, including project design, by in-house staff. The city engineer emphasized the in-house capacity and described how well-equipped his organization was with the necessary skills and knowledge. He provided an example of a new project to support this:

> Last week … the GOI wanted to [call for proposals to] give 10,000 buses [to ULBs] … [they gave us a] list of 14 consultants and said, "You can take one person for [the] project and ask for the price, and we will pay [it]". To submit the DPR, now any engineer in this country … will call the consultant, give him the term[s] of reference, ask him to quote his price, finalize his bid, give him the work, and ask him to prepare the document. After the document is prepared, [the

> municipal commissioner] will take it to the [state] government [and the] … central government, … make [a] presentation, and get down to work. That will take months, so this is a normal process. When we got a call, we [decided] that we [would] prepare [the] DPR in house within 7 days. … This [was] a 400-bus proposal prepared in 7 days …, approved by the corporation, [and] approved by [the] chief minister. And [this] morning, [the] municipal corporator is in Delhi attending the CSMC meeting for the approval [from the central government]. So … it has taken 7 days … [to prepare the proposal for the] 200-crores project of 400 buses for this city, because we did not … go outside. … I'm saving time … [and] cost. … If you have people in house, you [can] motivate [them] … and keep these people on the panel. … In-house departments don't come to know what consultants are doing. But here in our organization, if you meet any engineer, he is so versed with what [the engineers in his department] are doing, [and] … aware of his department. … Everyone is so motivated [with] "It is my city". … So, you need to bring the capacity in house [and] … create the experts within the organization. … Every engineer … and officer should be equipped with all the policies, … know all the technologies, be ready to take [on] challenges, [and] be motivated all the time. (Interview 2211)

In this case, the previous experiences in project delivery had enhanced the organizational and individual capacities to perform project planning and to respond quickly to a new project opportunity. In addition, involvement with the project was linked with soft capacities such as motivation and ownership. This shows the relationship between the development of endogenous capacity and project delivery. Moreover, the importance of endogenous capacity is not limited to technical skills and knowledge, but is also related to motivation and ownership.

Unlike this case, many cases in Uttar Pradesh and West Bengal demonstrated the opposite. Although external assistance could be useful for the technical aspects of project delivery, it was harmful to other aspects of capacity, which is a multi-dimensional concept. For example, a respondent in a state level training institute in Uttar Pradesh described a lack of project involvement and dependence on consultants as follows:

> The consultant was an outside person, obviously. … [Since] Urban Local Bodies officials … didn't have [the] technical capability, they were not able to involve themselves in the process of preparation of [the] City Development Plan as well as [the] DPR. … They gave it to another [private consulting] agency and forgot it. … They submit[ted] it [the final report] to the government of India, and [received the] funds. They are not interested in what we [consultants] are doing. … They are not involved in [it], [and] that is the reason why [the] project fails. … The private consultant is not going to implement it. Even though he [a government officer] is a technical person, he won't be able to understand … certain things which [the] implementing agency [needs to] understand, and then they realize [this] when it comes to [the] stage of implementation. (Interview 4431)

As described above, the urban sector in India has a complicated governance structure with multiple actors. Furthermore, the new setting created by the JNNURM has affected the roles of various institutions and has been responsible for organizational changes within the institutions. Depending on the context, different groups expressed different opinions about dependence on external actors, which has implications concerning the importance of endogenous capacity. This finding of different

perceptions shows the importance of identifying the context–actor relationship in addition to identifying endogenous capacity.

5.2.3 Proposition 3: Capacity Development is an Approach That Considers Various Dimensions at Multiple Levels

While CD has evolved from diverse concepts to a comprehensive approach, capacity interventions tend to target a specific issue within a single level without consideration for how the issue may be impacted by the capacity within other levels. This section illustrates this tendency of CD interventions.

5.2.3.1 Perceptions of Capacity at the Individual and Organizational Levels

As described in Chapter 2, the dimensions of capacity can be divided into various categories. When asked to evaluate their capacity to implement JNNURM projects, most respondents referred to capacity at the individual and organizational levels. Of the 57 respondents, 18 evaluated the technical skills of engineers and managers, and 24 mentioned staffing conditions at the organizational level. The results of a word frequency analysis show that the words “technical,” “engineers,” and “staff” were among the 10 most frequently used words across the respondents (see Table 5-2). There were only a few respondents who assessed institutional issues within the enabling environment level.

Table 5-2 Word Frequency in Evaluation of ULB Capacity

Rank	All evaluations			Evaluations by internal actors			Evaluations by external actors		
	Word	Count	Weighted %	Word	Count	Weighted %	Word	Count	Weighted %
1	project	183	3.26	project	64	3.12	project	94	3.10
2	capacity	92	1.64	engineers	44	2.15	capacity	61	2.01
3	engineers	74	1.32	work	36	1.76	implement	47	1.55
4	implementing	74	1.32	staff	25	1.22	technical	42	1.39
5	work	73	1.30	capacity	22	1.07	municipal	34	1.12
6	technical	72	1.28	implementing	21	1.02	work	34	1.12
7	staff	60	1.07	nigam*	21	1.02	corporation	33	1.09
8	nigam*	58	1.03	people	21	1.02	engineers	29	0.96
9	municipal	57	1.02	technical	21	1.02	nigam*	28	0.92
10	corporation	53	0.95	experts	19	0.93	staff	28	0.92

*Hindi for “corporation”

Eight respondents from local governments insisted that project engineers in their organization were well equipped with sufficient basic skills and knowledge to implement projects effectively. They emphasized that a good ability to understand and collaborate with experts can fill gaps in technical skills and knowledge. For example, one respondent in Maharashtra emphasized the changing roles of local governments and stated that consultants could provide expertise in areas such as project planning and design that were absent from local government agencies:

> They [local governments] [have been] doing the same kind of work the last 20 to 25 years, but specific … JNNURM activities started [only] 4 to 5 years [ago]. And their staff is not [so] up to date … [on] how to do these kinds of works. But they have the basic knowledge … so … they hire[d] … external consultants … [who] have … broad idea[s] … and experience. They [the consultants] sat with [the government] engineers … [who] have the basic knowledge. They appl[ied] this basic knowledge, and [had] a bridge between the latest trends and their knowledge. Their capacity … [went] up and … [they are] now able to do [these] … works also. (Interview 2131)

However, 19 respondents pointed out insufficient staff and supporting infrastructure, and these shortages could be the major obstacle to filling gaps in technical skills and knowledge. For example, one respondent in Maharashtra (interview 2214) stated: "Skilled officers are there, but the number is very [small]. They have [to also perform] other things … [such as] day-to-day maintenance [and] overall supervision".

In addition to the hierarchical dimensions dividing capacity into different levels, one of the most common classifications distinguishes *hard capacity* (technical and functional capacity) and *soft capacity* (political, operational, and adaptive capacity). Most discussions of CD consider soft capacity to be essential for achieving development goals. However, as discussed above, respondents' suggestions about which capacity should be developed demonstrated perceptions skewed towards hard capacity, such as the technical skills of individuals.

Unlike the perceptions of the government officials who focused on hard capacity, some consultants in the private sector raised issues relating to attitudes and mindsets. They insisted that government officials were not willing to learn the CD process but rather simply handed their responsibility over to the private sector by hiring consultants. These consultants believed that because of the attitudes and mindsets of government officials, CD related to project delivery did not work properly. One consultant in Maharashtra explained:

> After completion of this project, there will be … other projects … [and] they should employ those skills. … They have [a] very good understanding of the project and the finance[s], but again, the question [is] … whether they have the willingness or morality for the benefit of the mass. (Interview 2332)

Another consultant in Gujarat considered the government officials' technical capabilities to be on a par with theirs and believed that the issue was a matter of their attitude toward their responsibility:

> I am an engineer; there is an engineer in [the] corporation. [We] both studied [at] the same level, so it doesn't mean that [there is a gap in technical capability]. I am an expert maybe because I am in a PMC, and she is not an expert because she is in a local government. It is just

> the level of responsibility. … If you have somebody to help you out, you will not put your brains into it. (Interview 3132)

Similar to the consultants, there was a city engineer who perceived CD as motivation. He provided an example of adopting new techniques in a road project and performing pilot projects, and he viewed CD as a tool for taking on challenges and keeping motivated. His perception about capacity focused more on the attitude and mindset that are rarely learned in formal training:

> In the major cities, you should have to go for the modern technologies. … They [other people] don't want to take any risk … and they are fixed in that [old] mode. Now, we want to bring people [out of] that mode, [and have them] start taking challenges. … Capacity building means we have to motivate … to take [a] challenge [and] … to try [new] techniques whenever we come across [them]. … We have changed all that. We are going for the latest technologies available. (Interview 2211)

5.2.3.2 Perceptions of Capacity at the Enabling Environment Level

Some consultants and high-level government officers evaluated the working environment in the public sector when they were asked to evaluate capacity. For example, one respondent in West Bengal perceived a distrustful environment and complicated procedures in the public sector as a capacity issue. The respondent stressed that complicated procedures aggravate current problems in the JNNURM projects:

> In [the] public sector … you have to do so much in [the] procedure[s] that brings down your capability and motivation … because [the] public sector operates in [an] environment of mutual distrust … in the name of clarity, we have complicated things beyond [what is necessary] … if you happen to have a pothole [in] the road … [and] if you … follow the procedure, the pothole become[s] a ditch. … In [the] public sector, we are all very hypersensitive [about] the procedures, not [about] the delivery of the service. (Interview 5212)

In addition, some respondents approached CD from the perspective of system building. They referred to the influence of the environment on individuals, taking a different stance than the approach that emphasizes change in individuals more than changes in the environment. A respondent in Karnataka explained the need for system building as follows:

> [For] infrastructure, we have a lot of elements to support it, [but] we didn't have everything in place. When you talk about capacity building, we need to have everything in place. … A situation that [a] person comes to … start influencing … should never happen. … [The person] is supposed to get trained, and … not supposed to influence … the system. So we need to build a system [first]. (Interview 1421)

5.2.3.3 JNNURM and the Dimensions of Capacity

Even though the levels and dimensions of capacity are varied, training was the most frequent suggestion for how to implement CD (31 out of 51 participants). Most participants were positive about training programs that focused on individuals' skills and knowledge. However, the respondents had various opinions about the impacts of the training programs on project delivery. For example, some respondents raised issues related to the timing of the training programs and the transfer of employees to other departments once they have received training:

> Since it's a government, there are transfers. After every three years, a person gets transferred, so all that he has for the project … goes away. And the new person comes, and he doesn't know anything, but that's how the system in government is. … Even if there is … particular training taken by a certain engineer, at the moment he is transferred, all that learning goes with him. [That is what happens with] capacity building. (Interview 2114)

This excerpt provides an example of interrelationships between the dimensions of capacity. Each level of capacity is interconnected with other levels of capacity, and the intended results may not be achieved by a narrow intervention such as providing training without considering other dimensions of capacity, such as job rotations in government. In this regard, some respondents demonstrated different perceptions of how CD should operate, other than through training programs. For example, a respondent in a parastatal agency in Karnataka explained:

> After the capacity building [training] is done, if they are transferred to [another] organization, that is of no use [to us]. So rather than a training [program], it is better [that] the Urban Local Body should have a permanent transport planner and urban planner. … Because we [the parastatal agency] are permanent employees of the organization, all the capacity building is happening … [when] I sit here, try to emulate, and … implement [the project]. (Interview 1121)

Another respondent in Maharashtra also discussed CD at the environmental level, highlighting the notion of system building:

> Capacity development is not just training them to operate the contract, but providing a kind of system or a process which helps them to produce a better outcome. … People who respond to you … are not aware of this kind of environment, and … give … responses like "I am transferred" or "I didn't get the training in the area," but [being transferred after training] can happen anywhere in the world. (Interview 2114)

While current theoretical discussions highlight CD as a comprehensive approach, the findings in this section demonstrate skewed perceptions of the current approach to CD. In the urban sector in India, CD is understood as mainly training to improve skills and knowledge or additional staffing to fill a shortage of appropriately skilled workers. These perceptions reflect the existing widespread practices for CD, such as training programs and field visits. Although the GOI's CD initiative was open to any type of proposal, the main components of the initiative were institution building and support for training programs, which likely influenced the respondents' perceptions of CD.

5.2.4 Proposition 4: Capacity Development is Not a Linear Process and Relies on Both Formal and Informal Interventions

In some instances, CD can be scheduled and targeted, but in the majority of cases, the CD process needs to be shaped by adaptation, experimentation, learning, and adjustment (Baser & Morgan, 2008). Although conventional capacity interventions tend to be formal and overt, the existing literature generally emphasizes that informal and hidden interventions are more likely to shape the process of adaptation and learning.

5.2.4.1 Perceptions of Formal Interventions

While the existing literature highlights the hidden processes of CD (for details, see Section 2.3.3), as explained above, most interview participants proposed mainly formal interventions such as training (31 respondents) and field visits (17 respondents). Even if diverse types of training other than classroom training—such as on-the-job training—had been suggested, the preference for formal interventions as a main tool for CD prevailed. This prevailing tendency showed that project participants perceived CD narrowly in terms of levels and dimensions of capacity, which led their project proposals for CD to take more conventional forms, such as training programs.

The preference for training was related to high demand for learning new technologies and skills. Eleven respondents referred to technological advancements when they made suggestions for CD, with four respondents emphasizing that CD should be regular and continuous because new technologies constantly emerge. One respondent in Maharashtra (Interview 2111) explained: "[Capacity building] has to be a constant journey, and we need to enhance … capacities as the demand of the times … is changing … [for example,] we should be able to understand … various types of financial models for projects. So to that extent, capacity building has to … [be] a constant process of change". Another respondent in West Bengal (Interview 5212) elaborated a similar perception: "[Capacity building] has to be continually exercised to enhance their [Urban Local Bodies'] capacity and to catch up with the state of the art. That exercise is very conspicuously absent [from] Urban Local Bodies, which means proper training [is absent]".

In addition to training at the individual level, some respondents suggested other approaches at the network level for adopting new technologies and knowledge, including peer-learning systems (6 respondents) and cooperation with external experts (16 respondents). A respondent in Maharashtra (Interview 2211) explained the peer-learning process: "Now, as there is advancement in science and technology … many municipal corporations … have done better work in different fields. We are identifying the best practices from other municipal corporations [and] … visiting the municipal corporations. … We are sharing our experiences with other corporations in whatever field they have excelled and see if we are able to succeed in implementing all [of] those best practices".

Another respondent in Maharashtra suggested collaboration with external experts as a formal intervention:

> The government of India and … higher authorities should make [a] recommendation … that the consultant should train at least 5 or 10 … in-house officials, and the training should start from the very first day. So when [the] consultant leaves, there will be 5 or 10 in-house officials to look after the project … the government should not be dependent [on consultants]. [The] consultants should empower the client [and] should not paralyze the client. (Interview 2333)

Formal training was perceived as an intervention not only for gaining new skills and knowledge, but also for refreshing what they had already learned. The interview participants most preferred formal training for these reasons, and this preference showed that the respondents' perceptions of the best approach were weighted toward formal and direct interventions. This suggests that the narrow perceptions of capacity interventions and the lack of interest in various interventions were likely to lead to limited applications of CD.

5.2.4.2 Perceptions of Informal Interventions

When asked about project delivery, some respondents showed different perceptions concerning CD interventions than the common preference for training and field visits. Thirteen respondents said that the project participation itself became a process of learning-by-doing. In particular, eight respondents stated that the involved agency's capacity had been improved during project implementation. They indicated that by being involved in the projects, they could gain a better understanding of the general project procedures and requirements and of particular techniques and terms of project delivery. One respondent in Maharashtra described the project as a learning experience as follows:

> It had not been done before, so we really did not know how [it would] turn out until we really did this project. Now it is on the final verge of [being finished], and we are seeing good results. … It was a new experience, and the construction methodology used [for the project] was all ecofriendly techniques that the consultant had proposed … we didn't really have any experience [with] this, and … for us, it was also a learning experience. (Interview 2114)

Another respondent from the private sector highlighted collaboration with external consultants and described the consequent changes in local governments:

> When the JNNURM started, … their [the local governments'] vision was not so … broad, but we [consultants] could do such … multi-billion projects … we transferred the expertise to them … now they are doing [projects involving] BRT, water supply, sewer system distribution, flyover[s], drainage-related [work], and storm-water-related [work]. So they are now [quite] capable [of handling] these kinds of [projects]. They are learning by doing. (Interview 2131)

Such change through project participation supports the argument that substantial parts of CD are affected by informal processes such as self-adaptation and adjustment.

Perceptions about informal interventions varied according to the respondents' governance structure and context. For example, in Uttar Pradesh, where local governments had not played a critical role in most functions in the urban sector before the program, most respondents emphasized having opportunities to be involved in projects. A respondent in a parastatal agency in Uttar Pradesh said:

> If they [ULBs] are doing [the] operation and maintenance work [for a project], they should be in touch with the [state] corporation for local [support], because if [there is] any problem, it can be solved by … expert organization[s] like UP Jal Nigam which … implemented [the project]. Because we know … how it was planned [and] … executed, … [this] knowledge can be transferred to them. … When we are executing it, during the execution … certain selected people [from] local bodies [should be] associated with [the] team [and] should learn every aspect of the execution part. (Interview 4421)

However, in other states where the local governments continue their existing roles, some respondents focused more on pilot projects or financial support, and made specific suggestions about institutional reforms such as streamlining administrative procedures, creating a unit to deal with all permits, establishing a subsidiary for project management, and procurement system reform. The following excerpts provide two examples of the suggestions other than involvement in projects:

> Capacity building [happened] not just [with some] types of training, but also we [adopted] the e-tendering system. So all our procurements have [been] done on the basis of e-governance, which means that there is less of a human interface in selecting the contractor. (Interview 2111)

> Make certain … changes in the procedures, which are one of the focuses of [the] JNNURM. All of us in the government sector are working based on certain procurement norms … to produce results that mission works require. … A good procurement process … [has] evolved not at the local level, but at the central level. Provide [the] good system … [and] the outcome will be very [good]. (Interview 2113)

The suggestions for interventions for CD varied based on the context–actor relationship. For different relationships, different interventions were required to overcome contextual constraints.

5.2.4.3 The JNNURM and Capacity Interventions

In general, the GOI's program can be regarded as a major step toward CD. The program aims to empower local governments by formalizing the delegation of functions and assigning mandatory reform agendas. In addition, the GOI included components of CD in the program, called for proposals for CD projects, and earmarked a budget for CD. However, the GOI's approach to CD was criticized by many respondents, for many reasons. One of the many criticisms was its lack of guidance. The local governments were not sufficiently aware of the CD part of the program. Some respondents indicated that they became aware of the earmarked budget only in the middle or at the end of the program. For example, one consultant in Maharashtra (Interview 2313) stated: "The government had earmarked JNNURM funds for this [capacity building]. That step was taken, but … it was at the end of the mission period when the government asked the organizations to submit the DPR for capacity building". He also explained that the organization was not in proper shape for planning and adopting CD when they were asked to submit a proposal for it, and stressed: "That has happened with numerous JNNURM projects".

In addition to the lack of guidance, another consultant in Maharashtra (Interview 2331) described the lack of communication between governments and improper timing for CD:

> In 2009, when modified guidelines [for] JNNURM were launched, … there was a certain fund available for capacity building, but communications was not there. That communication became clear at the far end of the JNNURM when the corporations were already busy with the implementation of the project. It was not [the] proper time to actually invest government money in capacity building. [This] should ideally be done at the start.

A respondent in a state level training institute in Uttar Pradesh evaluated the GOI's initiative for CD as lacking a systemic approach, highlighting the absence of a preparatory phase:

> You should have [a] preparatory phase of one or two years, before launching the scheme, so that they understand what the scheme is about … One or one and a half year[s] should be dedicated to capacity building and … technical skills that [are] required for the scheme … [the] mission mode scheme was launched without assessing the capacity and the requirement[s] … It involves [a] huge amount of funds. Municipal bodies never got [such a large] amount of funds, so they were not able to implement [it] … If the project is launched and you start giving training, by the time you cover all the officials it will be almost two to three years [into the] project period. So some of the officials got training in the third or fourth years …There should be a preparatory phase for every project. So JNNURM's weakness … was [that] there was no preparatory phase. … That is why the capacity couldn't be built as per the requirement that was needed for the implementation. (Interview 4431)

In addition, the GOI's approach was criticized for its absence of a monitoring and evaluation system to assess the effects of capacity interventions. One respondent in a State Level Nodal Agency who was in charge of overall CD under the JNNURM expressed a skeptical view and said that although the GOI had already spent huge amounts of funding for CD, there had not been much improvement in local governments' performance. She emphasized that she could not track which interventions actually had effects and how the interventions worked. So although the GOI had focused on CD as a component of the program and had attempted a few interventions, it was not possible to assess the formal process of the interventions, and their effects were unclear.

Many guidelines have introduced diverse tools for CD. Depending on local conditions, these diverse tools can be applied in different ways. In addition, existing literature emphasizes that the shadow processes of CD should be considered as much as the designed interventions, and that CD should be understood as a spiraling process of trial and error. In the case of India's urban sector, many respondents agreed that capacity had been improved during project involvement. Being given new roles in project delivery became an opportunity for learning and adapting to them, so the case of the urban sector in India supports the direction of the current discussions in the literature. However, the respondents' general suggestions for capacity interventions were skewed toward formal interventions, and these limited perceptions about CD tended to shape the approach to CD that was taken in practice.

The case of India's urban sector shows that CD depends on both formal and informal processes. According to the theory on capacity, targeted capacity intervention may not bring about the intended effects, and even a rigid structure for performance can block opportunities for an informal process of CD. From this perspective, the GOI's formal interventions can be regarded as one of many approaches to CD. In addition to formal interventions, informal and hidden processes through participation in project delivery should be considered as an important aspect for CD. CD requires not only formal processes focusing on technical capacity at the individual level but also supportive environments in which

individuals participating in new projects can adapt to their environment and have sufficient time to incrementally adjust their capacity over the long term. Hence, the GOI must pay more attention to the intangible aspects of CD and devise a system for monitoring and evaluation. One respondent in a state level training institute in Maharashtra expressed the importance of the incremental process and supporting environment as follows:

> The answer [to what needs to be done] is very simple. Provide the same environment wherein this kind of success has taken place to all the local bodies. … You can't make a person … just change [overnight] and prepare a project for a flyover [when] his day-to-day work is only maintenance of [the] road. [He] will not be able to come up with the flyover. So provide him the support [and] …the environment. He will adjust to that, and he will execute the project. (Interview 2421)

5.3 DISCUSSION AND CONCLUSION

This chapter focused on why the CD budget earmarked by GOI for urban projects was unused by local governments. To find the answer, the chapter sought to identify the gaps between CD in theory and in practice, and posed three research questions in Section 5.1: How do urban infrastructure practitioners in India conceptualize CD?; What gaps exist between the theory of CD and practitioners' perceptions of CD?; and How do different entities within the urban infrastructure sector in India view CD? If there were differences in the perceptions of CD across these entities, the following two research questions were posed: What explains these differences?; and How can the theory of CD be improved and what should be done in practice to bridge the gaps?

This chapter answered the research questions by analyzing the content of 58 interviews focused on understanding capacity and CD relating to JNNRUM projects. In Section 5.2, this research reviewed perceptions of capacity in India's urban sector based on the theoretical propositions that the existing CD literature mainly discuss. The core issues found in the theory of CD, such as context, actors, dimensions, and process were also found to be critical in practice. The suggestions for how CD could be used to address problems in practice are closely related to the principles of CD in theory.

A summary of the answers to each research question addressed in this chapter follows.

- RQ1: How do urban infrastructure practitioners in India conceptualize CD? What gaps exist between the theory of CD and practitioners' perceptions of CD?

Table 5-3 summarizes the gaps between theory and general perceptions of CD in the case of India's urban sector.

Table 5-3 Perceptions of Capacity Issues

Topic	Theory	Urban Sector in India
Context/ Governance	Capacity development is largely determined by local context.	Governance and politics create different contexts around capacity issues, and perceptions about capacity development vary depending on the context.
Actor/ Entity	Capacity development is based on the transformation of endogenous capacity.	External assistance is regarded as an essential component for capacity development.
Level/ Dimension	Capacity development is an approach to various dimensions at multiple levels.	Capacity development tends to be understood as training at the individual level and staffing at the organizational level.
Process/ Interventions	Capacity development is not a linear process and relies on both formal and informal interventions.	Mainly formal interventions are perceived and suggested as tools for capacity development.

The existing CD literature has suggested a number of underlying principles related to CD. This research uncovered opinions about these principles in practice and explored how they are differentiated according to the characteristics of the interview participants, such as the type of their organization. Although a few respondents had perceptions similar to views expressed in the literature, this study confirmed that there are clear gaps between the theoretical principles and actual perceptions. These gaps likely reflect ground reality, where tangible processes such as training and staffing prevail. In this research, the narrow approach to CD and lack of a shared understanding of CD principles have made it more difficult and complicated to assess capacity issues and design interventions. The application of the concept of CD has been led by perceptions that are skewed toward formal interventions for tangible outcomes. The perceptions exhibit a limited diversity of approaches to CD, exclude the possibility of trial and error, and produce a narrow range of CD proposals in practice.

- RQ2: How do different entities within the urban infrastructure sector in India view CD? If there are differences in the perceptions of CD across these entities, what explains these differences?

Most discussions about capacity lose coherence as the participants involved in the discussions bring forward their different understandings (Baser & Morgan, 2008). This study found there was no coherent understanding of capacity and CD among the stakeholders, and the GOI's approach to CD did not consider this lack of a coherent understanding among the stakeholders in practice. The GOI's approach has been ad hoc and sporadic, and has focused on overt interventions such as an earmarked budget for CD. Many respondents criticized the GOI approach for not reflecting ground realities, so that in spite of large amounts of assistance, the GOI was not able to track, monitor, and evaluate the impact of CD interventions.

- RQ3: How can the theory of CD be improved and what should be done in practice to bridge the gaps?

The case of India's urban sector verifies that capacity issues cannot be solved by financial support alone. Although there is financial assistance, it cannot be effective without institutional assistance. And although an institutional setup has been created, without consideration of the context and endogenous

capacity, the setup can lead to creating conflict and problems. In addition to formal and external interventions, informal and hidden processes have a significant influence on CD, and the shadow processes are likely to be driven by various trials of fitting autonomous entities into local conditions. This is because the shadow processes of learning and adaptation require motivation and ownership on the part of the main entities, but the absence of autonomy limits the actors with respect to motivation and ownership.

The core of CD involves restructuring power, authority, and access to resources (Baser & Morgan, 2008). The redistribution of power and authority requires various actions at multiple levels. Technical and logistical interventions such as reforms in governance and organization restructuring can provide enabling environments for CD, but informal processes can induce and unleash potentials and the endogenous capacity of participants through the commitment, attachment, and personal interests that are generated by project participation. The levels of commitment and interest can be determined by governance and politics, and the contexts can be altered by individual participation and motivation. In other words, CD is a constant process of interactions between environments and individuals that are not linear but spiral in form. During learning and adaptation, certain amounts of trial and error should be considered as unavoidable parts of the process, and the transformation of capacity should be evaluated with a long-term view.

Collaborations with external experts should consider the history of organizational changes and the roles of the organizations in the extended networks. Identification of best practices of external actors in the actual setting for project delivery can be more critical for learning and adaptation than the establishment of training institutions or earmarked budgets for CD. New approaches to CD should be considered that provide more opportunities for JNNURM projects to develop capacity via multiple pathways, including learning in the working environment, leaving room for the possibility of errors, providing sufficient timeframes for adaptation, providing systems for self-reflection and self-renewal, leaving room for trial and error such as through simplifying the administrative procedure for DPR, and designing individual strategies based on contextual factors.

5.4 REFERENCES

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CHAPTER 6 UNVEILING COMPLEXITY AND CAUSALITY AMONG CAPACITY, PERFORMANCE, AND PROJECT OUTCOMES

6.1 INTRODUCTION

Chapter 5 explored the differences between the theory of capacity and the perception of capacity in the urban sector in India and focused on various topics related to capacity development (CD), such as context, actors, dimensions, and interventions. This chapter turns to the purpose of CD. One of the theoretical discussions about CD concerns why capacity should be developed. One approach to this question regards CD as a goal in itself, while the other approach views CD as a means for other development goals (for details, see Section 2.4). In practice, CD tends to be utilized to achieve specific development goals. This approach is based on the assumption that "the more capacity, the better the performance, the more results" (Baser & Morgan, 2008, p.86). However, the causal relationships between capacity, performance, and results are not always clear, and it is difficult to prove that the causal relationships are linear and unidirectional. In addition, since CD is mostly studied "out of operational experience" (Baser & Morgan, 2008), there are not many studies that demonstrate the relationships empirically. Due to the constraints and lack of empirical studies, the relationships between capacity, performance, and project outcomes have not been sufficiently understood.

This chapter investigates the perceived reasons for time and cost overruns associated with the actual urban projects in India that the interview participants were involved in. As described in Section 3.3, the government of India (GOI) has emphasized the need for capacity to implement the projects under the JNNURM. The GOI has initiated various CD interventions and has earmarked a budget for CD. Unlike the GOI's aim, however, the GOI has indicated in its appraisal report (Planning Commission, 2011b) that a lack of capacity is one of the major problems in project delivery. The aim of the GOI's interventions is therefore to generate better project outcomes.

However, few studies have been conducted to understand the relationships between capacity, performance, and project outcome in the JNNURM. This means that various CD interventions in the program have been adopted without a clear understanding of their likely impact. Therefore, this chapter aims to understand the relationships between capacity, performance, and project outcomes in the urban sector in India. To meet this objective, this study answers the following questions:

- RQ4: What project implementation hurdles exist in the urban sector in India?
- RQ5: How are capacity factors related to the hurdles? How do capacity factors affect different stages of JNNURM projects? How do the JNNURM projects affect the capacity factors?
- RQ6: What kinds of measures related to capacity development should be adopted to improve performance and project outcomes?

This chapter takes the position that the components of interest—capacity, performance, and project outcomes—are not located in a linear progression, but rather in a spiral process in which they influence and reinforce one another. This chapter regards CD as an end in itself as well as a means for

development goals. As shown in Figure 6-1, capacity and project can affect each other, and this chapter focuses on the two-way interactions between them. To answer Research Question 4, Section 6.2.1 reviews the project hurdles that project managers and engineers face, in order to understand current conditions in the ground reality. The next two sections answer Research Question 5. Section 6.2.2 analyzes the hurdles based on the capacity factors identified in Chapter 3 and investigates the influences of the capacity factors. Section 6.2.3 examines the influences of project performance on the capacity factors, that is, the reverse direction to the influences reviewed in Section 6.2.2. Section 6.3 summarizes the relationships between capacity, performance, and project outcome in urban infrastructure projects in India and answers Research Question 6.

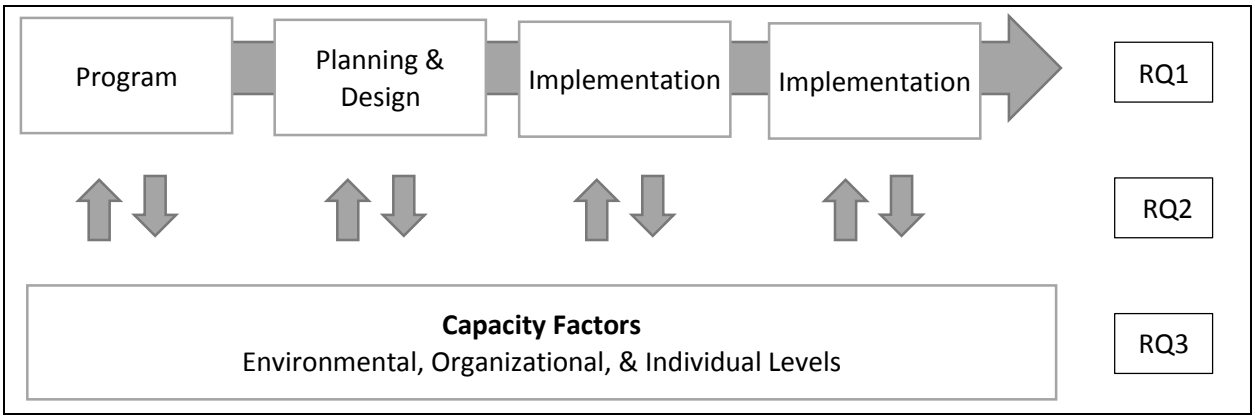

Figure 6-1 Capacity Factors and Project Phases

6.2 RESULTS

6.2.1 Hurdles in JNNURM Project Implementation

This section reviews the perceived reasons for time and cost overruns during project implementation. The hurdles at the stage of project implementation were closely connected with problems at other stages of the project. Hence, this section identifies the problems at each stage and their influences on the project implementation.

6.2.1.1 Program

When there is an urgent national issue, the GOI uses a mission that focuses on centralized actions in a specific sector, or an agenda for a certain time period. Therefore, most missions are top-down approaches to an issue, led by the GOI.

In the case of the JNNURM, it was likely that the inherent characteristics of being a “mission” would be the fundamental reason for project implementation hurdles. To cope with rapid urbanization, the

JNNURM was initiated as one of the GOI missions, and the program has been substantially supported by the GOI. The JNNURM shared the critical characteristics of a mission: it is a result-oriented, time-limited program. The JNNURM projects were given seven years for the entire process, from the initial establishment of a City Development Plan (CDP)—a prerequisite for project sanctions and fund releases—through project implementation. Of the 54 respondents who mentioned problems in their projects, 17 respondents shared the opinion that the limited time was the root cause of time and cost overruns. It took a few years to establish the CDP and Detailed Project Report (DPR) and to undergo the bureaucratic procedures for project sanctions, and this left insufficient time for the project implementation itself.

One respondent in Maharashtra (Interview 2212) emphasized the time-bound characteristic of JNNURM projects as a problem in their projects: "If it had not been a time-bound project or had been a [10-year] project, we could have considered all these difficulties [in the DPRs] and solved them". The respondent also explained that the DPR sanction required appraisals by multiple authorities from the State Level Nodal Agency (SLNA) to the Central Sanction and Monitoring Committee (CSMC), and the lengthy procedure was time-consuming and only left three years for the project implementation.

Another characteristic of the JNNURM program was a competitive atmosphere. In the beginning of the program, the GOI had called for proposals—DPRs—from any infrastructure sector. After reviewing a proposal, the GOI accepted or rejected it. The landscape of proposal preparation drove the participating agencies to focus on the sanctioning of their proposals. The competition for project sanctions rushed the participating agencies into submitting proposals that were not well prepared and reviewed. The respondents who raised this issue indicated that they were only given seven days to one month to prepare the DPRs, which did not leave sufficient time to review the plans based on ground realities. One respondent in West Bengal (Interview 5211) stated: "It needs rigorous planning and [a] survey, but we don't have time to go through all the document[s] and [a] survey". Another respondent in Uttar Pradesh (Interview 4431) admitted: "Because initially there was a rush to acquire fund[s] … they prepared [the] CDP [and DPR] in a very hurried manner … so that was the major problem … about project cost overrun and project delay".

Furthermore, in order to be sanctioned, some proposals tended not to articulate anticipated challenges or problems. Regardless of their feasibility, the proposals assumed conditions that would be advantageous for project implementation (for details, see Interview 5231 in Section 5.2.2). The conditions included in many proposals were far from the ground realities, and project delays and cost increases were unavoidable due to the gaps between the plan and reality. Some project participants anticipated the hurdles that could cause time and cost overruns, but they ignored these anticipated hurdles in the project proposals. Hence, the hurdles responsible for time and cost overruns were essentially caused by the inherent program characteristics of time limits and a sanction-oriented project landscape.

6.2.1.2 Planning and Design

The short timeframe and competition for project sanctions increased dependence on external consultants and exacerbated disconnections between the plans and the local contexts. As discussed in

Chapters 3 and 5, the authorized agencies hired private consultants in many cases to prepare the CDP and DPR, and the local government played minor roles such as providing data to the consultants. Another problem, in addition to the time limit for preparing a DPR, was that some plans were formulated based on many assumed conditions without field research and a survey. One respondent in Maharashtra (Interview 2332) said: "There should be a survey at the grassroots level ... before the preparation of the DPR, and the facts should be mentioned within the DPR, but that hasn't been done". In addition, the respondents emphasized prevailing practices in DRP preparation: the same consultant would be hired by different municipal corporations to prepare their project DPRs, which tended to produce similar project DPRs in different cities due to the absence of surveys at the grassroots level.

Another respondent in West Bengal (Interview 5112) regarded the infeasible DPRs to be due to a "defect of the government policy" and emphasized the limitations of the program: "The consultant ... prepared the DPR within seven or ten days without any ground reality, and this is the main cause of this problem [time and cost overruns]. ... If you don't give them sufficient time to have the actual work ... done and to survey the field, this type of problem will occur [again]".

The gaps between the plans and ground realities created diverse problems for the implementing organizations. Land acquisition was the most frequently cited problem (31 participants). Generally, the availability of land is critical in large-scale infrastructure projects. In many of the JNNURM projects, however, there was not sufficient time during the project planning and design period to secure land, or even to confirm the availability of the land. Therefore, the project proposals did not include accurate information about the land, and problems involving the land arose in the project implementation stage. There were many cases where the proposed land was found to be owned by a private entity or another organization during project implementation. Regardless of which organization was in charge of land acquisition, it was a widespread problem. For example, a respondent in Uttar Pradesh (Interview 4211) admitted that they had not checked the land availability during project planning: "During DPR preparation, we didn't check [whether] land [was] available there or not. First, we prepared only [the] DPR as a part of [the] project, [and] after we started implementing the project, we found out that there [was no] available land". He highlighted that this happened in many cases in other states as well as Uttar Pradesh.

Furthermore, the land acquisition sometimes created conflicts, and many of the conflicts ended with a lawsuit. One respondent in Maharashtra (Interview 2113) said that they had more than 30 court cases involving land acquisition within a project, and he indicated the difficulty of resolving the conflicts: "There was so much resistance from the public ... [and] nothing was in our control. ... So these people have … created a hurdle". Another respondent in Uttar Pradesh (Interview 4411) also considered land disputes as the main reason for time and cost overruns and said: "Litigation goes on. ... Sometimes it is resolved, and sometimes it remains unresolved. ... So many projects [run out of] time ... due to mainly land disputes". When a lawsuit was filed, the parts of a project related to the lawsuit had to halt because of the possibility of a design change, and the lawsuit caused project delays and cost increases due to land compensation.

In addition to the land acquisition problem, many unrealistic plans prepared by the consultants did not reflect the opinions of locals, and this led to further conflicts over the project between the implementing agency and the locals. In general, a project for an infrastructure system requires a long process of achieving consensus among the stakeholders. However, in many JNNURM projects, the

authorities involved in DPR preparation placed a priority on securing funds and getting the project sanctioned, and skipped the process of achieving consensus during preparation of the DPR. As a result, the locals were not well informed about the project, and local opposition could arise. One respondent who experienced local opposition (Interview 2212) regarded this as a reason for project delay and emphasized the misconceptions of local people about the project: "People have poor knowledge. … Sometimes people oppose … the work … because they have false ideas about [the] project itself. … When [this] happens, we have to stop [the] project for [some] time until they are convinced [by] us".

The lack of consensus on the projects that created conflicts between the stakeholders sometimes brought in lawsuits. When implementing agencies lost a lawsuit, they needed to change the project design, and this led to time and cost overruns. Even when they didn't lose the lawsuit, the legal process itself was a large hindrance for the project. For example, a respondent who was in charge of a project in Maharashtra that had faced lawsuits from environmental NGOs stressed the NGOs' misunderstanding of the project objectives and explained the protracted litigation:

> [For about] two years, we went from this court to that court. It went to high court. Later, it was taken up in the national green tribunal ... two good years [were] lost because of [a] court-given stay order on the project. Later on ... the court ordered [us] to continue these works, so we continued [them]. … If the court gives [an] interim order to stop … work … we cannot continue the work because it would be in contempt of the court. (Interview 2114)

Further, there were cases where plans were inappropriate due to lack of data. Older urban areas in India usually have complex underground utilities, and many parts of them were developed individually without a comprehensive plan. Many respondents indicated that basic data about the underground utilities were insufficient for the purposes of their project planning. For example, one respondent in West Bengal (Interview 5211) explained: "We don't know sufficiently about the underground utility. If it is [above] ground, you assess it, but in [the] underground, you can't even assess the condition". Another respondent in Maharashtra (Interview 2212) also emphasized the lack of information: "[One of the constraints] is underground services which are abruptly laid [in] some places ... which are not [mapped by] GIS". Due to the lack of data about the underground utilities, it was difficult to map the existing utility pipelines and to consider the pipelines in their plans. They could not figure out which lines needed to be shifted and therefore faced the situation of underground utilities needing to be moved during project implementation. Moreover, even if the project managers anticipated the potential problems of underground utilities, the conditions of the underground utilities could be worse than they expected. A respondent in Gujarat expressed this difficulty:

> These problems are anticipated. Because we are working in [a] city, we are aware … that there would be so many underground utilities, particularly [the] water supply and drainage. [This] was reflected when the contract document was prepared by [the] client. … So [taking this into consideration], contracting agencies [quoted] their rate. But now ... [the] contractor says [that they] … had not anticipated this [many] … underground utilities. (Interview 3232)

Moving the underground utilities required permission from certain managing authorities, which raised another critical problem in the Indian urban sector: the complex and slow procedure for intergovernmental approvals. It was common for an authority in charge of other public facilities to delay approval for the implementing agency's activities in its jurisdiction. One respondent in Maharashtra (Interview 2212) who regarded this problem as the primary reason for time and cost overruns explained:

“We don’t get [the] No Objection Certificates [NOCs] from various agencies at [the appropriate] … time. For example … if fiber cables are going [in along the road] ... [to suspend] the services, that particular department should issue us NOCs—which are not being issued at [the] proper times”.

Furthermore, there were limited activities that the JNNURM implementing agencies could undertake in the meantime, so they waited until the authority approved the JNNURM project activities, which sometimes took a few years. Even though the implementing agencies assumed that the intergovernmental approvals would take time, they could not ask for permission for any of their project-related activities prior to project implementation; they could only ask for permission after the detailed project design was finalized and sanctioned. The lack of data impeded apprehending existing underground utilities and finalizing the project design. Moreover, there were many cases where the implementing agencies only understood the underground conditions after digging the site. Thirty-three respondents answered that the concerned authority’s delayed permission was the main reason for project delay.

In particular, 10 of the 33 respondents who raised the issue of delayed permission indicated that Indian Railways did not allow them to traverse its railway and work in their territory at the appropriate time. One respondent in Uttar Pradesh explained the situation:

> No one can say when I will get the permission from the Railways … because the Railways is a very huge department ... we can’t easily convince them. We can go there locally only [for] persuasion. This is also [an] external condition … beyond our control. We needed the permission within two months, and we could not manage to get it within seven years. Only revised estimates [can be] submitted, [as] the only option. (Interview 4122)

For reasons such as impractical designs, local opposition, and lawsuits, some implementing agencies needed to change their project designs and estimates and to go through complicated bureaucratic procedures for additional approval. Getting approval for a revision of the DPR took a few months or years, and in some cases, the GOI did not allow the revision because it did not follow the government guidelines. In this regard, a respondent in Karnataka (Interview 1121) stated: “We should not go for any changes ... [because] that has contributed to [an] enormous delay in this [JNNURM project]”. In sum, unrealistic plans due to a disconnection with the local context and lack of data created diverse problems for project implementation that were related to the site conditions and intergovernmental approval.

6.2.1.3 Implementation and Construction

Most of the JNNURM projects that experienced problems at the project planning stages also experienced problems during the project implementation stage, such as improper contract management, on-site physical constraints, and financial constraints. For example, 16 respondents mentioned the tendering process as a problem. As described above, many implementing agencies were dependent on consultants for project planning and design, which meant that the agencies were not sufficiently familiar with the tendering process for project implementation. There were certain conditions for bidding in the program, such as prequalification of bidders and a minimum number of bidders, but some implementing agencies called for tenders without meeting these conditions. In such

cases, the GOI would ask for a re-tender because of the unsatisfied conditions. The tendering process was complicated and time-consuming, and the need to repeat the process led to project delays. In one case in Karnataka, a respondent (Interview1221) emphasized that the project was delayed for two years and two months due to tendering problems; they needed to invite tenders three times. The first tender was cancelled by the GOI because the implementing agency was not aware of the GOI's instructions and thus did not follow them. The cancellation of the tender generated conflicts between the implementing agency and the tenderer who was awarded the tender during the first tendering term, and these led to a lawsuit by the tenderer. Due to the lawsuit, the tendering process halted for about one year. The second tender was cancelled, again due to some mistakes on the part of a bidder, and the implementing agency needed to call for the tender a third time.

A case involving a solid waste management project in Uttar Pradesh also demonstrated that the implementing agency and bidders were not well informed about the tendering process and conditions. The respondent who worked on the project (Interview 4122) stated: "Firstly, it was assumed that we would build the plant under the one contract, and collection [and] transport [would be under] … another contract. But later on, it [the GOI's instruction for tendering] was revised that it [the contract] should be an integrated one". As a result, the respondent needed to call again for tenderers. The respondent also mentioned an additional problem: "[The] main cause [of time and cost overruns] was the unwillingness of the contractor". The respondent indicated that the contractor was reluctant to execute the project because the contractor anticipated that it would incur a loss since the carbon credit system that had been included in the original tender was removed from the project. This case demonstrates that there were defects in the process and requirements for the tender, but the participating agencies were not sufficiently aware of them.

In some cases, there were not enough bidders who met the minimum qualifications, and the implementing agencies had to repeat the tendering process until they had the required number of qualified bidders. The JNNURM was a nation-wide program, and many projects were initiated across the country at the same time. Prior to the JNNURM program, the urban sector did not have large-scale projects. Some projects in the JNNURM were different in size and modality from previous urban projects. Even though there were many contractors in India, the supply of qualified contractors for the JNNURM projects was less than the demand. Sixteen respondents reported experiencing problems in inviting a sufficient number of qualified bidders while calling for tenders. For example, one respondent in Maharashtra (Interview 2211) explained: "We float tenders at [the] right time, but due to [the] poor response of the tenderers, [there were project delays]. Some tenderers just fill up the tenders, but they aren't qualified [according to] all the criteria ... [so] we have to do re-tendering [and] re-tendering ... until we find the proper contractor". Another respondent in Gujarat (Interview 3111) explained: "When we started this [project] and invited the tenders, the scheme was across … India, so everybody was [wanting] to find good contractors. There was a shortage of good contractors". In this case, the respondent eased the criteria for tenders in order to invite more tenders.

The lack of qualified contractors was closely related to the experience and level of expertise of local contractors. Before the JNNURM, implementing agencies in the urban sector had cooperated with local contractors. However, the local contractors were not capable of executing the JNNURM projects, which were large-scale infrastructure systems in various sectors. One respondent in Gujarat explained the situation as follows:

> We put the experience and financial criteria in the tender. … The [local] contractors, who were working for [City X], are not [at] that [level of] expertise. … They may fill the tender, [but] when you evaluate them, you [discover] that there is only one [eligible] contractor among three or four … you re-invite the tender because there is [no] competition. (Interview 3132)

Furthermore, even if the bidders were qualified and met the criteria for selection, there were cases where the bidders were not able to execute the project. If the actual capability of the contractor who was awarded a tender was not sufficient to implement a certain technology or address complaints relating to logistics, the contract needed to be terminated during project implementation. Nine respondents said that it was difficult to identify the contractors that could actually perform the project. Some of these respondents indicated that they reframed the selection criteria or went through rigorous assessments because of this problem. For example, one respondent in Maharashtra explained:

> Our team leaders … [assess the tenders] very carefully ... whether this contractor … is really capable of doing [the] work or not. ... All the documents might [match exactly] what [the] tender [requires], but it's not like ... that person is really able to do the work. We visit the sites, and we do the entire procedure [of assessment]. Because once [you have] allotted the work, you … can't [just] take it back from him. Then, it will be a court procedure ... If we [look] into ... whether that contractor is really able to do the work or not, this procedure takes a little bit [of] time. We need to find the proper person to do that work, [and] it is again a … bit [of a] tedious process. Once we have allotted the work [to the proper person], the work will go on … in a very good manner. That is why our projects [are] completed [on] time. (Interview 2212)

Another problem encountered in tendering was the lack of local knowledge. As discussed above, due to a lack of experienced local contractors, the implementing agencies needed to hire outside contractors that were specialized in a certain sector, and this created another hurdle for project implementation. The outside contractors were not familiar with the local context and had not formed local networks. The contractors needed time to establish local networks to obtain local materials and labor. Moreover, since the contractors needed to move their employees and bring labor and materials from their base region, the cost increased. A respondent in Gujarat explained the situation as follows:

> To solve this problem [the lack of qualified bidders], they [the implementing agencies] have started to put these tenders on the net. So, contractors can see the availability of tenders. Definitely, the bidders coming from outside will bid higher … compared to local contractors, but we can get good expertise ... compared to local [contractors] who are not experts in [the type of project]. … Tenders come higher because ... they have to set up a local office ... [and] bring [materials and laborers] from Mumbai [the contractor's base region]. So initially, that ... is a [slowdown] in the time schedule. ... They have to spend some time to get local people, hire local labor, [and] know where the material is available locally. (Interview 3132)

Twelve respondents stated that, similar to the lack of capable contractors, there were insufficient construction materials and the quality of laborers was not good enough, which also contributed to project delays. One respondent in Karnataka (Interview 1211) described the delayed material supply: "These raw materials were not supplied properly ... [and] locally. Sand was not available. ... Because of [this], [the project] stopped for six months".

In addition, cultural or seasonal factors in India's urban sector hindered project implementation. Two respondents indicated that because it was a festival season, some authorities such as the traffic police did not allow the implementing agencies to proceed with their construction work. Five respondents stated that construction work ceased for a few months during monsoon season. A respondent in Maharashtra explained the limited time for construction as follows:

> Four months are for [the] monsoon[s], [when] we cannot dig the roads ... After that … for festivals, we have to wait, because there is local opposition. ... You can excavate … roads after Diwali [a long national holiday] … in November. So, from June ... [to] November, [a] 6-month working period is [gone]. ... [The] effective working time is 4–5 months in a year, so that is another reason [for project delays]. (Interview 2215)

As discussed above, many plans were not implementable, and the gaps between the plans and ground reality created many physical obstacles to project implementation. Furthermore, there were insufficient contractors that were qualified and capable of implementing the JNNURM projects. These factors compounded one another and caused the time and cost overruns in project implementation.

In addition to the physical obstacles, 26 respondents indicated that the financial structure related to project funds led to project delays and cost increases. Five of the 26 respondents mentioned the time gap between DPR preparation and DPR sanction. Due to the complex and slow bureaucratic procedure, the agencies spent much time obtaining the DPR approval, and the project costs increased as time passed. Hence, when the DPR was finally approved, the project could not be implemented at the cost that had been estimated in the DPR. Some examples follow:

> The approval of [the] DPR … is based on some schedule of rates, so [when the DRP was prepared], [the] rates were [for] the year … 2005–6. ... The project was approved in 2006–7 ... [and] when you floated the tender in 2007–8, two years [have] passed already. … They have a condition that whatever the extra, the Urban Local Body has to pay [it]. So, if a tender is [increased] ... [it] is [not] advantageous for the Urban Local Body. There should be a clause that whatever the extra … the GOI has to bear [it]. (Interview 3211)

> There is a vast difference between [the] rates … at the time of preparation of [the] DPR and at the time of implementation of the DPR … that is the basic reason for [the] increase of [the] project cost. So [if the] DPR cost is x, the DPR value after tendering becomes x plus 2. [It is] not even 1, [but] it becomes 2. (Interview 2212)

After project sanctioning, the tendering system that selected the lowest quote created a financial problem. Four respondents explained that when a tender was selected based on the lowest quote, cost overruns became unavoidable. The government rates were more likely to be lower than market rates, and when bidders estimated the project cost, they tended to lower it. Both bidder and implementing agency knew that the estimated project cost was not feasible, but the tendering system allowed the bidder with the lowest quote to be awarded the tender. In such a case, the cost increase should have been included in the original estimate. The following responses emphasized the difference between market rates and government rates and indicate a perception that the extra cost was not in fact due to cost overruns:

> This difference [between market and government rates] will always be there, and it [the estimated cost] will get inflated. There is … bound to be a cost overrun. ... If we [had] a framework which allows these things to be put into [the estimates], you [would] not call this … a cost overrun. These are the deficiencies built into your project preparation itself. … Unless you remedy this, these things will keep on happening. (Interview 2421)

> [Suppose the] cost [comes] to 4000 … [at] a chief engineer level … they [discuss] … the current [market] trend … [and the government rate becomes] 20% below or 10% below [the] overall market trend … [so this becomes] 3600. Their internal work is 4000, but the DSR [Delhi Schedule of Rates] will be 3600. This is the system. … Ultimately, the project cost is increased [in this way]. (Interview 2215)

The GOI's unrealistic rate schedule created a more complicated structure for project funds. Due to the price differences, the schedule of rates was too low in some city districts. However, the GOI did not approve the additional cost above the schedule of rates in such districts, even if it was unavoidable. In these cases, the implementing agency could not pay the billed cost to the contractor. The contractor suspended the project, and this in turn delayed the project implementation. One respondent regarded the fixed schedule of rates as the result of administrative expediency that simplified management by applying a flat rate to diverse districts where average prices are different. He indicated various problems in the schedule of rates:

> [City X] has a varying range from [an urban area] near … Mumbai metro region to … [a] rural area ... [the] schedule of rates that they [the central government] are preparing ... [is] applicable for general wards on average ... [but] those rates are not applicable for this [metropolitan part of the] city … close to Mumbai. This organization [does not have the] authority to finalize the rates. … You have to follow [the] government DSR. (Interview 2215)

These financial impediments—time gaps between proposal preparation and sanction, inevitable cost increases over the lowest estimate, and an unrealistic rate schedule—caused cost overruns that in turn became one of the reasons for delaying fund release. In the case of cost overruns, the local governments needed to submit revised estimates, which then required another GOI approval. Hence, even though the financial condition of the local government was sound enough to bear the extra cost, without the GOI's approval, the local government could not pay its contractors, and the revision of the project estimate needed to go through another lengthy administrative procedure.

Another problem with the revision of the estimate was the issue of who would bear the extra cost. When the revised estimates were approved, in most cases the GOI did not support the extra cost in the agreements, and state and local governments therefore needed to bear the increased cost. In some cases, the local governments were not able to pay the increased cost to the contractors, and the project was suspended or delayed due to the unsettled funding. Hence, the logistics related to release of funds were closely connected to project delays. Of the 26 interviewees who referred to financial problems as a reason for time and cost overruns, 16 respondents considered the delay in the release of funds to be a major problem. A respondent in Karnataka (Interview 1212) described this problem as follows: "In 2011–2012, there was [a] 1-year delay in releasing funds at the [central and state] government level … the contractor … had stopped all work because of [the] delay in payments. ... [For one] whole … year, [the] project had suffered. … There should be funds ready for implementation".

Another reason for delays in releasing funds was related to reform agendas. As a prerequisite for receiving the next installment from the GOI, the state and local governments were required to implement mandatory and optional reforms such as increases in cost recovery and function transfers. As explained in Section 3.3, the reforms were intended to empower local governments by transferring functions, funds, and functionaries from state governments, so most of the reforms needed to be adopted by the state governments. However, there were cases where local governments implemented their mandatory reforms but the state-level reforms were not adopted. In these cases, although the implementing agencies completed a certain part of the project implementation with the settled funds, the GOI did not provide the next installment for the project implementation because of the unsatisfactory status of the reform implementation. One respondent in West Bengal (Interview 5111) emphasized: "[The] release of funds is also linked with the reform [work]. Most of the Local Bodies are not in a position to implement the reforms as described by the Government of India. So we are worried whether the fund[s] will be given or not".

Project plans that did not consider the financial constraints discussed above caused projects to be suspended and required time-consuming plan and estimate revisions. The most critical reason for the time and cost overruns was the vicious circle between project delays and cost increases. The project delays caused costs to escalate as time passed, and the price escalations required additional time for approvals from the central and state government levels, a lengthy and complicated procedure that caused the project to be delayed again.

6.2.1.4 Post Project Implementation

The factors leading to time and cost overruns in project implementation also influenced the operation and maintenance (O&M) stages of a project. As described above, in a number of cases, local governments that were excluded from the project planning process and, in some cases, did not participate in project implementation, were then made responsible for the O&M of a project. In these cases, due to their lack of participation, the local governments did not have ownership of the project outcome, and they were reluctant to take responsibility for its O&M (for details, see Section 5.2.1).

One of the reasons for the evasion of responsibility was that local governments did not have staff that were well-equipped for the O&M stage. When parastatal agencies implemented a JNNURM project and local governments were not involved in the process, some of the local governments were not prepared to operate the project at the time of the project handover. For one thing, they did not have enough staff who were equipped with the necessary knowledge and information about the project. Therefore, without extra staffing, the O&M of the project was an additional burden for existing staff at the local government. Eight respondents mentioned the lack of staff as a problem in the O&M stage. Due to the lack of staff with adequate knowledge and skills, there were conflicts between agencies. A respondent in Uttar Pradesh (Interview 4211) stressed the lack of staff in the local governments: "All types of operation and maintenance cannot be done by [the] municipality ... Proper resources should be there for the maintenance of the project". Another respondent (Interview 4121) indicated the same problem: "They [the local governments] have insufficient staff for [O&M], so they have asked us [a parastatal agency] to maintain on their behalf ... they have insufficient [staff] for doing this".

In addition to the lack of staff, the O&M cost was a reason behind the reluctance to take over a project. Sixteen respondents mentioned insufficient cost recovery via user fees. Particularly in the case of West Bengal, due to a political decision by the state government, the local governments were not allowed to collect user fees, and this became another conflict surrounding the handover of projects. One respondent (Interview 5111) highlighted the situation of the local governments as follows: "The municipalities … [do not collect a] water tax, [and] … [lack] some revenue … that's why the municipalities are tumbling. These are policy matters [and] … political decisions". Like this respondent, many respondents in West Bengal were opposed to the state government policy and perceived that it weakened the local government's capacity. Without collection of user fees, the operation of the project tended to be a burden to the local governments because their revenue was not sufficient to operate the service/infrastructure.

Concerning the reimbursement of operation costs, there was distrust between the state and local governments. Although the state government planned to cover the O&M costs to implement the no-user-fee policy, the local governments were reluctant to bear the financial risk of O&M costs in case the stage government did not provide a sufficient subsidy. One respondent explained the conflict between the state government and the local governments as follows:

> They [local governments] will not be able to maintain the project outcomes in [the] future, because they will not be allowed to [collect] user charges from citizens. [The] state government has a policy that they will pay from their own budget and … maintain [it without a user charge]. … But municipalities are afraid [that] if they take up the project and in [the] future … the state government [withdraws] their support, they will not be able to stop the water supply to their cities, [and] the burden will [fall on the ULBs]. So they are afraid of this [and] reluctant to take up the project. [The] state government is bearing the burden, so there is no financial problem. … But ULBs are apprehensive [that] at some point of time … the state government [may not] have any money for them, [and] the entire burden will automatically come to them. (Interview 5221)

As described above, the project implementation hurdles were a knotty problem combined with other issues from the beginning of planning through to O&M. Figure 6-2 shows the complexity of the problems. The project implementation hurdles could not be separated from the problems before and after implementation. A problem at a certain stage of a project became a cause of or resulted from problems at other stages of the project.

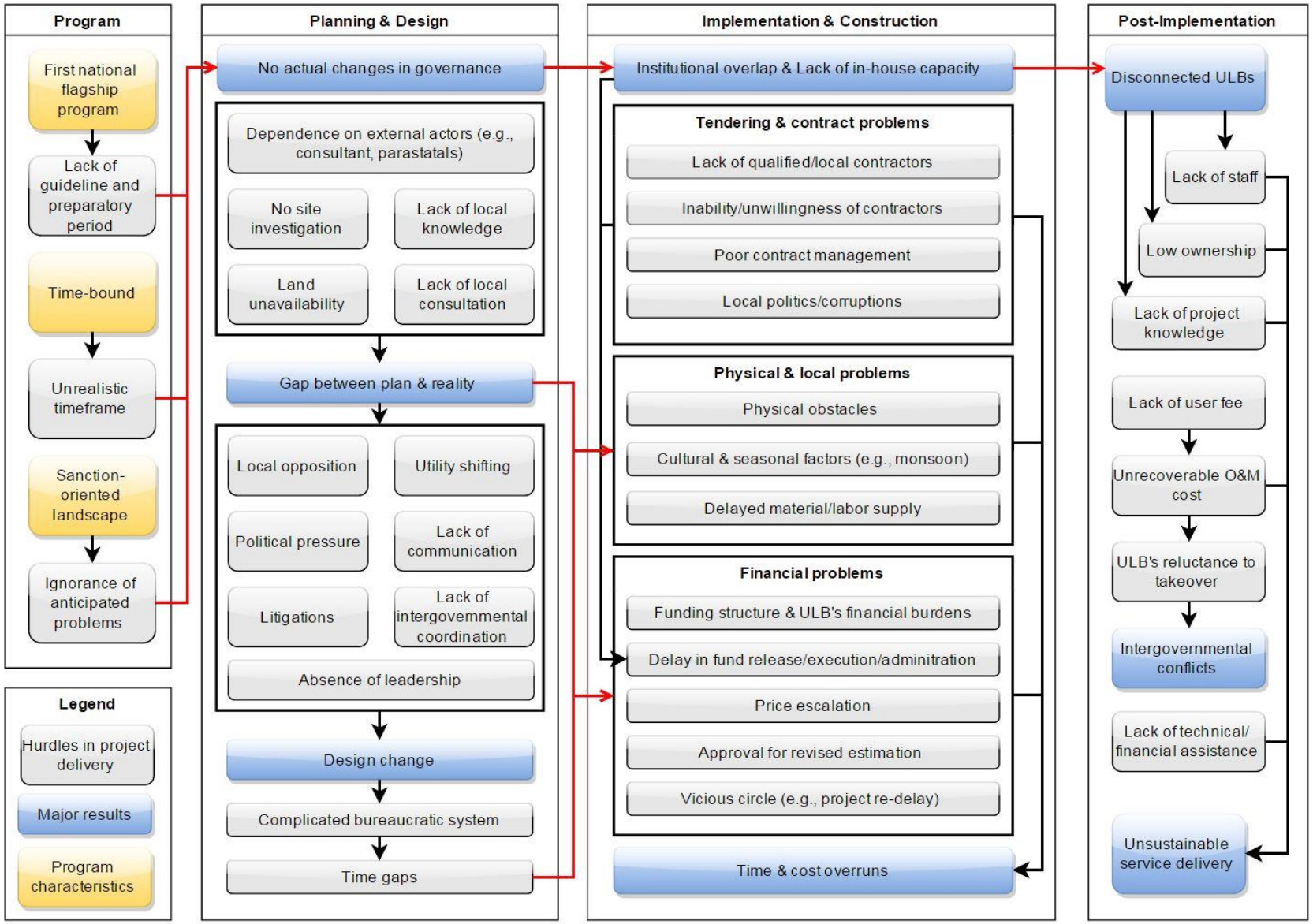

Figure 6-2 Problem Tree in the Case of the JNNURM

6.2.2 Influences of Capacity Factors on Project Implementation

The main focus of this section is to verify the influences of the capacity factors identified in Chapter 3. In general, project implementation is closely connected with capacity at different levels. In the case of India's urban sector, most project participants did not consider the capacity factors as a direct cause of the hurdles in project implementation, so the relationship between capacity, performance, and project outcomes was unclear. Based on the capacity factors explained in Chapter 3, this section analyzes the project hurdles emphasized by respondents, and draws implications for the relationships between capacity, performance, and project outcomes in the case of the JNNURM.

6.2.2.1 Enabling Environment

The enabling environment for a project consists of contextual factors. In the case of India's urban sector, various contextual factors at every stage of the project were mentioned by the respondents. As described above, the JNNURM projects were time-limited projects that went through a short preparatory period. Because of this, the JNNURM projects were assigned to participating agencies based on the existing functions of the agencies, and the main authorities for project implementation varied depending on the states, which had different degrees of devolution. As a mandatory reform, devolution was pursued in all states, but the time-bound and result-focused characteristics of the program strengthened the existing institutional structure and established the roles of participating institutions based on the existing institutional structure.

Governance, one of the capacity factors at the enabling environmental level, influenced project implementation and operation. Fragmented institutional structures hindered coordination between institutions and was responsible for time and cost overruns. In many JNNURM projects, there were institutional overlaps that made it difficult to clarify responsibilities during project implementation. One respondent in Maharashtra even where the institutional structure for the JNNURM is less complex than other states emphasized the influence of the institutional structure more than financial or political reasons:

> We [have] three different institutions trying to solve one problem of urban mobility, and … there are lots of coordination issues in the multiple organizations. ... There is no single entity for urban mobility [and] ... no institutional innovation which allows [a] certain integration and cohesion of all the activities in that sector. ... This is one of the reasons why such a big project, despite all the money and the political strength, couldn't reach [its goal]. ... Lots of people [have] a stake in [it] … so that could be a reason [for time and cost overruns]. (Interview 2411)

Moreover, the institutional overlap hampered the integrity and continuity of work related to the different stages of a project. For example, when local governments did not participate in project implementation, the local governments were likely to become reluctant to take over the responsibility for O&M because their levels of knowledge and ownership related to the project were low. Nine respondents regarded this institutional disconnection in the project delivery process as a problem. For example, one respondent in Karnataka (Interview 1411) stated: "If we implement the project, the O&M

will be very easy for us, knowing what this one [project] is. If somebody [else] does it and hands it over, we do not know … what the situation [is]. … Then the O&M will be [a] … bit difficult".

These contextual factors at the enabling environment level were combined with various factors at other levels and created other contextual factors that had critical influences on the project implementation. As described above, many respondents perceived the JNNURM's complicated bureaucratic procedure as a major reason for project delay. Delays in administrative processes were related to the GOI's approvals on matters such as the DPR, design change, and installment of funds. The complicated procedures were originally developed because of a lack of accountability to local governments. One respondent in Gujarat (Interview 3212) commented: "In the government … the decision [always] takes its own time ... it [a project] should be accountable to where [the] powers are given [and] to [a] certain person who can [make] his own decision". The respondent gave the example of purchasing a small screw:

> If you happen to buy a screw, a private sector person will go and buy it from [a nearby] hardware shop … a hardware shop two miles away might give him one penny less, but nobody will bother about it. But, if you happen to buy it in the public sector environment, you will have to have comparative statements from three shops, [and] you will buy it. … [F]etching those comparative certificates might fetch you [a] few … dollars [more] than a penny. (Interview 3212)

Another respondent in West Bengal (Interview 5112) also described the complicated procedure to obtain approval for a revised DPR that needed to pass through SLNA, the State Level Sanctioning Committee, and CSMC, and stated: "With these routes, it takes 4–5 years to have the revised DPR sanctioned".

There were many rules and regulations that participating agencies were required to follow, and in some cases, the rules and regulations were not relevant to the context around the project. One example was the inappropriate schedule of rates that could not be applied to ground realities (see Section 6.2.1.3). As a capacity factor at the enabling environment level, the strict rules and complex procedures were closely related to the reasons for time and cost overruns.

Politics is another of the most frequently emphasized contextual factors in the literature, and there is sometimes an unseen, complex interplay between politics and CD (Baser & Morgan, 2008). In the case of India's urban sector, some respondents mentioned politics as a hindrance to project implementation and considered political cooperation between levels of government to be a fundamental component of project delivery. For example, 12 respondents emphasized alignment of the same political party at different government levels as a critical factor for political cooperation (for details, see Section 5.2.1).

With regard to political influence, some respondents referred to inappropriate politics at the local or state government level that might be related to corruption. They indicated that this caused conflicts between stakeholders and became one of the major problems in project delivery. One respondent gave an example:

> [Related to] the pipe supply, instruction has come [from high level officials at the state government] … [such as] "You have to purchase [this type] from this company". … Contractors and agencies … were compelled to buy [it] from their own … contractors. They were [only] willing to allot work to their own contractors, [and] from them they got a percentage. … The local politics have affected the [work] of all the [municipal corporations]. (Interview 4211)

Another respondent described a situation in which user fees could not be collected because of political issues and corruption of elected bodies. In light of an upcoming election, the collection of user fees was stopped by the corporator—a representative elected as a member of a municipal corporation—appealing to voters. The respondent stated:

> Local politics is there. One corporator won [the election], and … the corporator told the people [not to] pay the user charge. … [One reason was] to get the sympathy of the local people for the party … The other thing was that this person [the elected corporator] … want[ed] … the private partner … [to] recruit some of his persons in the company as … worker[s]. They [the private partner] refused that. … Then, this person told the people, "Don't pay [the user charge] (Interview 4212)

As a contextual factor, the low availability of qualified contractors and human resources became a reason for the time and cost overruns. The large-scale urban projects in the JNNURM increased the demand for contractors with relevant skills and experience. Similar to the local governments, which did not function in certain urban sectors before the JNNURM, local contractors that collaborated with the local governments did not have experience in large-scale project execution in various infrastructure sectors. Hence, the implementing agencies in the JNNURM were more likely to hire national or international contractors that had experience in the execution of similar projects. As described in Section 6.2.1.3, some respondents indicated that it was difficult to find capable contractors, and the supply was not sufficient to meet the demand. Moreover, the national and international contractors that were hired for the JNNURM projects had knowledge and experience related to the execution of the project, but they faced problems in utilizing local material and labor due to their lack of local knowledge and local networks. Therefore, the quality and quantity of qualified human resources and capable contractors was one of the components of the enabling environment that had a critical influence on project delivery. A respondent in Maharashtra emphasized the lack of human resources in the private sector as follows:

> Overnight, you cannot create experts in the country … Suppose every corporation does 10 projects; 63 cities [need to execute] 630 [large] projects. … Now you need to have experts to do this additional … work. ... Because lots of work comes [in], either we need to have more people within [the] country [and] train more people or get people from [the] outside to take this responsibility. This was the biggest problem when [the] JNNURM came in ... So, it is not [a matter of] capacity building for government engineers. You have to [build the capacity of people] … outside [of the government agencies] also. ... We also need to create a set of people in this country to take up challenges. (Interview 2211)

In addition, the urban projects were affected by factors related to economic conditions. For example, increases in prices and the exchange rate influenced the cost of construction materials and labor and led to increases in project costs, which then became a reason for project delays.

6.2.2.2 Organizational Level

Overall, one of the most critical factors at the organizational level was the devolution that the JNNURM

pursued as one of its main objectives. The degree of the devolution to local governments varied depending on the state, and it determined the governance, that is, the number of participating institutions, the structure of the institutions, the role of each institution, and the politics between the institutions (for details, see Section 5.2.1).

In this context, the JNNURM basically aimed to achieve two contradictory objectives, namely, empowering local governments and implementing urban infrastructure projects quickly, and the contradiction led to the current states of the JNNURM. One example illustrating the contradiction was requiring the achievement of reform agendas as a prerequisite for fund installation. The reform agendas were intended to promote the devolution, but the contextual situation in some states was not suitable for implementing the reform agenda within the allowed time. Hence, the implementation of the reform agenda could not satisfy the requirement for fund release, and this hindered the implementation of the projects. In other words, the maneuver to empower local governments was not compatible with the objective of supplying infrastructure systems quickly. In some states, contrary to the original objective, the devolution was achieved only nominally to meet the requirements for fund release (for details, see Section 5.2.1). For example, one respondent in Uttar Pradesh indicated that the devolution was achieved in documents only:

> They [ULBs] are public representatives, [but] not given responsibility. ... If they are not given power … [and] they are not accountable to anything, how can you give them responsibility? So, accountability is not given to them, [and] … power is not given to them. [It is given to them] in documents, but in practice, it is not there. (Interview 4421)

From the perspective of organizational development, the organizational structure and system in an organization affected various stages of projects. For example, most of the local governments did not have a unit committed to project planning and design, so they were not involved in the planning and design process. One respondent in Gujarat (Interview 3232) explained: "[City X] Municipal Corporation doesn't have [an] in-house design cell, so they outsourced [project planning]… if you don't have … in-house capacity, you have to outsource it to … an institute or private firm". For this reason, in part, most DPRs for the JNNURM projects were formulated by external consultants, and the DPRs were more or less infeasible for implementation. As discussed above, at the stage of project implementation, the implementing agencies were faced with problems caused by the infeasible plans.

In addition, while a few organizations established a dedicated cell for management of the JNNURM projects, most organizations distributed project-related work to departments that were already established or hired contractual employees with the budget for the Project Implementation Unit (PIU) in the JNNURM. In particular, the JNNURM was a time-limited program driven by the GOI, so the participating organizations did not need to restructure their organization for the program. The organizational structure was closely related to the fragmented management of the projects. A respondent in Gujarat cited interdepartmental problems such as land acquisition and emphasized the need for a unit in charge of coordination:

> There is no single coordination [among the departments whose work needs to be] coordinated ... Before proceeding [with the project] …, each agency should [set up] a coordination cell. ... [In] interaction with other departments, problems … can be avoided, provided they have their own internal functionaries to sort out all the problem[s]. (Interview 3131)

Similar to the interdepartmental coordination problem, fragmented management could affect coordination between different government agencies. As discussed above, at the implementation stage of the large-scale projects, the implementing agencies experienced difficulties in receiving approval from the concerned authorities to move utility pipelines or to close roads. The success of the approval process could be closely related to the organization's communication capability, and the fragmented organizational structure could hinder this. In the urban sector in India, the institutional structure had a significant influence on every stage of the project delivery process.

Another factor that was related to communication capability was public relations, and it affected the success of a project. Two contrasting cases of Bus Rapid Transportation System (BRTS) projects demonstrate the influence of public relations on facilitating project delivery. In the two cases, many other conditions such as the institutional structure were similar, but the project managers explained the influence of public relations on project implementation in two different ways. The respondent who worked on the project in a city in Gujarat indicated that public relations were one of the success factors of the project. The respondent's answer demonstrates the strategy that government officials applied for better public relations:

> When we started this BRTS, we involved the people in our project. Once we constructed one bus station, we … kept [it] open for [the] public [and] said … "Give your suggestions". So, whatever suggestion they [may] have given, we are trying to improve our system. Similarly, when we constructed [the] pilot project for 12.5 km, for 3 months we allowed everybody to travel by bus free of cost. … People [have] to be involved in our project. ... If citizens are not involved, your project will not be successful. (Interview 3231)

In contrast to this city in Gujarat, the respondents from a city in Maharashtra mentioned that they failed to manage media and promote public relations for their BRTS project. The respondent who worked on the BRTS project explained that the issue of public relations hindered the project implementation and gave the general public a bad impression of the project:

> They [the general public] did not support [the project] initially. They created … problems that also delayed the project. It had been given [a] bad name by [the] media … If something happen[ed] in the BRTS corridor, they [would] highlight it and make it an issue in the city. [Because of] our bad media handling, we have utterly failed. In a professional way, it [the project] is a success. It has improved a lot [in terms of] … indicators like travel time [and] the number of passengers. … [But] they have created [a] bad picture in the minds of the people … that … landed us in trouble. (Interview 2113)

Another determinant of the institutional structure was the staffing of the participating organizations. For example, the lack of dedicated staff or units in local government was one of the most frequently perceived problems (24 respondents), and it was responsible for local governments being excluded from the process of project planning and implementation. A respondent in Uttar Pradesh described this as follows:

> These are the projects ... funded by central government, and … time-bound projects, so these projects need good capacity and good engineers. Because ... they [parastatal agencies] [were] already doing these [types of projects] before the JNNURM ... they can do [them] better. As far as maintenance of these services is concerned, we [local governments] are already doing it …

> but the construction [that] we can do later ultimately depend[s] on the manpower. (Interview 4111)

To fill staffing gaps at the local government level, the GOI provided financial support for local governments to hire contractual employees in the JNNURM's PIU. However, this was only a temporary solution, for facilitating project implementation. At the O&M stage, local governments were concerned with their lack of staff. A respondent in Gujarat (Interview 3211) stated: "The issue is operation and maintenance on [a] day-to-day basis: who will operate our infrastructure? ... So we [give the work] on [a] contract basis. … In terms of human resource[s] … we [lack staff]".

In some states, the financial condition of the local government became one of the reasons for local governments' unwillingness to take over project outcomes. In India's urban sector, the financial viability of an organization was a critical factor for project delivery. Budgets allocated by the GOI and the state government did not create problems in the project planning and implementation stages because in most cases, the local government's share was decided based on the financial condition of the local government and was comparatively small. However, cost increases that exceeded the allocated budget led to a conflict between different levels of government. Some responses concerned the financial conditions of the local governments:

> [The] corporation's financial status is not … robust. It can't fund all the projects, so it is very much dependent on the grants [that it receives] from the central government and state government. [If] there is any time overrun to get these grants, [X Municipal Corporation] has to put [in] their own money. They have to do [it] by compromising their other development issues. (Interview 2333)

> Funding comes from the central government, and accordingly, they [ULBs] execute the [projects]. Sometimes ... they may not get the funds in time or ... the amount suggested. In these circumstances, some constraints will be there [for] the corporation. (Interview 3131)

Many of the respondents argued that the GOI should reserve funds for price escalation, relax the strict regulations on reimbursements for price escalation, and pay for the deficits arising from price escalation. The financial conditions of local governments became more critical at the O&M stage. Since the JNNURM focused more on the creation of infrastructure systems, the financial conditions of local governments had a significant influence on the quality of the infrastructure system services after project completion. The GOI had considered this aspect, so the reform agendas already included increases in the collection of user fees. However, in many cases, the coverage and rates of the user fees were not sufficient for the local governments to operate the system. As described above, the case of West Bengal demonstrated conflicts around the financial risks and capacity of the local governments for project O&M.

Leadership was another critical capacity factor at the organizational level in the Indian urban sector. Twenty-two respondents indicated the critical role of leaders in project delivery, and there were a few cases where a leader in an organization had a large influence on project delivery. One case in Karnataka served to demonstrate the importance of leadership. In situations where a project faced problems, a former department head who took responsibility for the JNNURM projects played a critical role in seeking solutions and communicating with concerned authorities. However, after his transfer, the JNNURM projects were delayed substantially and could not make any progress due to an absence of

leadership. A respondent in charge of one of the delayed projects explained:

> For any project, we should have a head who … has full knowledge [and] motivate[s] his staff. ... Earlier in 2010–11, we had Mr. [A] as a superintending engineer of the JNNURM. ... He was the main reason [for the] success of this project during those days. After his [transfer], this project is suffering … [and] we don't have a dedicated officer for [the project]. … Now nobody is taking interest ... [and there is] lack of motivation. … Nobody is there to guide us [concerning] what step we need to take. (Interview 1212)

This respondent emphasized that the problem of obtaining permission from other authorities could be solved by effective communication on the part of the project leader. Moreover, the leader's commitment facilitated project implementation and motivated the staff to perform the project enthusiastically. At the project planning stage, the vision of leaders affected project initiation and decision-making. Various cases demonstrated that approaches to the JNNURM projects varied depending on the leader's perspective on CD. Even within a single state, some leaders focused more on in-house capacity building than outsourcing, and some leaders did the opposite (for details, see Section 5.2.3).

6.2.2.3 Individual Level

Capacity factors at the individual level could change, depending on the environmental and organizational capacity. When combined with other factors, the capacity factors at the individual level had a significant influence on projects from the planning stage through to O&M.

For changes in capacity at the individual level, the JNNURM included many CD activities such as the Rapid Training Program (for details, see Section 3.3). However, since capacity at the individual level cannot be developed in a short time, the lack of existing skills, knowledge, and experience was found to be an impediment to project delivery. Respondents rarely regarded the lack of skills and knowledge as the main reason for time and cost overruns, but this lack was related to the local governments' reliance on private consultants. At the project planning stage, local governments were excluded from the process due to the lack of skills and knowledge, and this in turn was regarded as one of the main reasons why the plans that were developed were unrealistic.

In some states, the level of skills and knowledge in the local governments raised the issue of accountability and became a reason for the state government postponing the transfer of functions and assigning the project implementation to parastatal agencies under the state governments. In other words, in these states, the state government became the main decision-maker for the JNNURM projects and allocated the roles for the project to concerned agencies. As discussed above, a structure with multiple implementing agencies caused institutional overlaps, and these overlaps had a critical role in contributing to other project hurdles such as discord among government agencies and disconnections between the stages of a project delivery process. In these cases, the decisions made by the state governments caused a lack of communication and cooperation and led to conflicts between the involved agencies, which in turn had a negative influence on project delivery. The decision-making entities

perceived that local governments were not adequately equipped with the relevant skills and knowledge, and this perception resulted in the structure established for the JNNURM projects.

The lack of skills, knowledge, and experience affected environmental and organizational capacity factors such as governance and organizational development interventions. The capacity factors at other levels had significant influences on other capacity factors at the individual level, such as individual attitudes and ownership. For example, an institutional structure that provided limited roles for local governments dampened their willingness and lowered their personal interest in the project (for details, see Section 5.2.1).

In conclusion, the capacity factors at different levels interacted with each other and shaped "capacity" as a collective term. These factors were closely connected with the project hurdles and constrained the project delivery in various ways. At the environment level, the ambivalent setup between empowerment of local governments and rapid implementation of projects can be regarded as the fundamental reason for the identified project hurdles. The setup was combined with a limited time frame for the JNNURM projects, and in many cases, it did not provide the involved organizations or individuals with a learning environment for CD. Even though the knowledge, experience, human resources, and financial capability at the organizational and individual levels were inadequate, the exclusion of local governments from project participation determined the entire landscape around project delivery and affected the project performance and results.

6.2.2.4 Summary

The influence of capacity factors on project performance and program outcomes is summarized in Table 6-1.

Table 6-1 The Influence of Capacity Factors on JNNURM Projects

Perceived Project Hurdles	Program	Planning & Design	Implementation	Operation & Maintenance
	• Short timeframe • Insufficient preparation time • Competition for acquiring funds • Uniform applications for diverse settings	• Infeasible plan • Local opposition and lawsuits • Lengthy bureaucratic procedure for approval	• Tendering and contractor problems • Unworkable site conditions • Conflicts over sharing costs • Price escalation	• Evasion of responsibility • Financial risks
Enabling Environment	**Governance & Institutional structure**: (in some cases) institutional overlaps due to lack of devolution, coordination problems	**HR supply:** lack of qualified/capable consultants **Politics:** lack of consensus, insufficient legislation	**HR supply:** lack of qualified/capable contractors **Economic conditions**: delay in material supply, price fluctuation **Politics:** delay in intergovernmental permission **Anticorruption**: local politics	**Governance & Institutional structure**: decision-making by state governments, (in some cases) conflicts over user fee policy
Organization	**Devolution of powers**: (in some cases) not compatible with main objectives of the program	**Organizational development**: no planning unit, dependency on consultants **Communication & partnership:** low level of public awareness **Leadership**: (in some cases) tendency to outsource	**Organizational development:** fragmented management, contractual employees, lack of staff **Financial condition:** financial difficulties **Leadership**: (in case of its absence) inadequate problem solving and lack of motivation	**Organizational development:** lack of staff, (in some cases) reluctance to take on responsibility **Financial condition:** no 100% cost recovery, financial difficulties
Individual	**Skills & knowledge:** lack of skills and knowledge, accountability problems, (in some cases) no experience	**Skills & knowledge**: dependence on consultants **Attitude & ownership**: low level of ownership, conflicts over project plans	**Skills & knowledge**: inadequate contract management **Attitude & ownership**: no personal interest, inadequate contract management	**Skills & knowledge:** (in some cases) lack of knowledge about project implementation **Attitude & ownership**: low level of ownership, negative attitude toward responsibility

6.2.3 Capacity, Performance, and Project Outcomes

The identified capacity factors have a significant influence on performance and project outcomes. Conversely, project performance could influence CD. Baser and Morgan (2008) indicate that improved results lead to more demand, more confidence, and more resources to invest in CD, and they create a rising spiral of improvements in capacity. In other words, CD changes project performance, and through the feedback process, the project performance encourages the participants to improve their own capacity and to provide an improved enabling environment for CD. In the case of India's urban sector, this converse influence did occur. This section reviews how, when CD was pursued as a means for development projects, the project objectives and performance influenced capacity.

6.2.3.1 Enabling Environment

The JNNURM brought critical changes to the enabling environment, and one of these changes was a shift in perspectives. Some respondents emphasized that the JNNURM shifted the focus of the GOI to urban problems. They said that the GOI had traditionally given more attention to rural problems, but then it recognized the urban problems as an urgent issue and started to mainstream this issue. In addition, the JNNURM led to the empowerment of local governments that deal with the urban sector. For example, a respondent in Maharashtra (Interview 2411) stated: "What we observed in JNNURM [was] the shift of [the] GOI from [the] rural setting to [the] urban setting. For the first time, the GOI … focused its energies and resources towards urban cities. ... [E]specially the local bodies have [come to] the forefront".

Accordingly, the JNNURM became an opportunity for the GOI to consider the capacity issues related to local governments. Hence, as the first flagship urban program in India, the JNNURM has fundamentally changed the environment for urban projects with a shift of the GOI's focus from rural to urban and from asset creation to the CD of local governments. The respondent mentioned above explained the change in detail:

> Why … [is] government … [now] trying to focus on capacity building? In the first phase … they tried to put money in capital … intensive projects [and] development of assets … now, [for] the assets that have been created, [the] operation, maintenance, and service period has started. As far as creation of assets is concerned, in India, it's an established field. You can get good contractors, good consultants, and good professionals which are available for good creation of assets. But when it comes to [the] operation and maintenance phase … not many of the options are available. You have to either depend on the existing setup, or the other option is to get [a] private player. The private players are not that strong in operation and maintenance, so they [the government] thought [that it is] better to concentrate on capacity building. (Interview 2411)

In this regard, devolution has been one of the key pillars of the JNNURM for empowering local governments, and with this component, the JNNURM aimed for changes in governance in the urban sector.

Project performance and results influenced system building in India's urban sector. First, 27 respondents talked about system building, and many of them regarded this as one of the positive influences of the program. The procedures for project proposals and sanctioning were established through the JNNURM, and the roles were clarified and assigned to the agencies involved in the projects. Instructions concerning requirements and the reporting system were provided to participating agencies:

> Through JNNURM [support], we got the funds [and] we got a system [that] all the government bodies [are] involved [in]. … It is … systematic support from the GOI. There are regular meetings at so many levels. At the [state] government level, at the director level, and at the central government level, they [review] … the quality of work. … This is because of the JNNURM. (Interview 4311)

Furthermore, the agencies reviewed the status quo for their city and prioritized their projects in the urban sector by formulating the CDPs and DPRs that are the main components of the JNNURM. This established a systemic approach to urban issues that the agencies adopted in their agency. The JNNURM changed the institutional structure for project performance, and the changes enhanced capacity in the agencies involved in the program.

In terms of administrative procedure, the projects and reforms led to changes at the enabling environment level. In a broader context, the JNNURM established the basis for decentralization and empowerment of local governments.

In addition, the local governments tried new types of projects in the JNNURM that were beyond the scope of the work of local contractors. In this regard, the networks with the private sector expanded to include national or international contractors. One respondent in Maharashtra described their approach to collaboration with expanded networks in the private sector:

> There [were] so many areas … which we thought we would work on. We prepared the plan, and started working. ... I started working with my own … [contacts]. When I realized that this number [was] not sufficient, we started taking [on] additional help. [The] additional help is people, experts in the various fields. ... We started exploring the possibilities. We went to the [domestic and international] market to explore the possibilities. People were showing [an interest in] helping [us] out. We said ... you will come and train our people, work along [with] our people, and see [us] … through … it. So they agreed to do that. We entered into a contract with those people. (Interview 2211)

While respondents indicated that other capacity factors such as politics and sociocultural factors at the enabling environment level constrained or facilitated project delivery (see Section 6.2.2.1), the impact of project performance and results on the factors at the environmental level were not referred to directly.

6.2.3.2 Organizational Level

The JNNURM influenced capacity at the organizational level in India's urban sector, and devolution has been one of the key pillars of the JNNURM for empowering local governments. However, it was not implemented as intended. In the case of Maharashtra and Gujarat, which had been following a tradition

of devolution for a long time and had established the relevant acts prior to the JNNURM, project execution without the necessary organizational development intensified a tendency toward outsourcing and dependence on consultants (for details, see Section 5.2.2).

In the states where the state governments have taken on the main functions in the urban sector and have become the decision-makers in that sector, there were nominal changes in institutional structure and process. The cases in Uttar Pradesh exemplify the nominal changes. Before the JNNURM, local governments had played a limited role in the maintenance of street lights and collection of solid waste. They were excluded from the main functions in the urban sector, and a specialized agency under the control of the state government instead took responsibility for each field. After the JNNURM, local governments became involved in fund transfers and project approval in most urban projects. That is, local governments were the entities that received the project funds first and sent them to the implementing agencies. In this nominal structure, the implementing agencies were hired and supervised by the local governments. The actual role of the local government was limited to transferring project funds and securing land for the projects. In such cases, the project performance and project outcome may not have influenced capacity. A respondent in Uttar Pradesh (Interview 4111) explained the ground reality: "Basically … they [UP Jal Nigam] [have their] own engineers and [are] doing [the] work … and we are directed to give money to these [parastatal] agencies and they will do [the] work … money is coming to us and we are transferring money to them and asking for QPR".

There were various activities for organizational development related to the JNNURM. Project performance also affected the organizational structure in an agency. To facilitate performance, some agencies established special cells and hired contractual employees to be in charge of JNNURM projects. For example, for the O&M of project outcomes, some cases utilized Institution-Building approaches such as establishment of subsidiaries or joint ventures with a private partner (for details, see Section 2.2.1). The following case is an example:

> [City X] Municipal Corporation has formed a separate body, [X] Jan Marg limited [a subsidiary company]. Basically, construction of [the] BRTS network is [conducted] by [the municipal corporation] with [the] help of [Y consulting firm], [the] PMU [Programme Management Unit], and contractors. After the construction is completed, [the municipal corporation] hand[s] over this entire network to [the subsidiary company] who [is] responsible [for] operating the buses and managing the entire network … [because] they [the municipal corporation] might not have enough staff to take care of the operations and maintenance of BRT … they were required to form [the] separate body. (Interview 3232)

This case illustrates a change of capacity factors at the organizational level for project O&M.

In project planning and design, there were many cases that relied on external experts for many reasons, such as time constraints. At the stage of project implementation, the GOI supported State Level Nodal Agencies and local governments, both financially and technically, to adopt PMUs and PIUs to facilitate project implementation. These units were private consulting firms or contractual employees who assisted the government agencies (SLNAs and local governments) during the project period. However, those were temporary interventions and were not integrated with the endogenous capacities of the government agencies. The organizational development activities were adopted to better the project performance, but they were more likely to be driven by the central government and dependent on the outsiders. Hence, the interventions did not promote an increase in capacity.

One of the most substantial benefits of the JNNURM was the financial support for most stages of the project delivery process. Five respondents stressed the financial benefits of the JNNURM for local governments. One respondent in Maharashtra emphasized that they could initiate new types of projects in the urban sector due to the financial support:

> This is [an example of] a project that … [would] not be executed within municipal corporations. We received funding from the JNNURM [and] the government of India ... [so] there [was] a chance [for us to] change … the river and the lakes … I strongly feel that by executing this project, the lakes have really become good. (Interview 2114)

Another respondent in Uttar Pradesh also spoke of the program's effect on the financial condition of local governments:

> Our share [of the project funds] is from the state government … If you calculate [that] one thousand crores is the project cost, 30 percent [the ULB share] is 300 crores. Many local bodies can't bear that. They [the state governments] gave [us] money in the form of an interest-free loan. In easy installments, we can pay. Without JNNURM, it [wouldn't] happen. [This] is … financial support. (Interview 4311)

In addition, the JNNURM adopted a new system for cost sharing and new fund requirements and established a procedure to structure project finance. In particular, the GOI devised many tools for local governments to enhance the financial viability of project O&M. Through the reform agendas, the GOI pursued 100% cost recovery in the water and solid waste sectors by increasing the coverage and the rate of collection of user fees.

Moreover, the GOI prepared the credit rating of local governments and intended to provide a setup for local governments to be recipients of direct investments. However, these interventions proved to be impractical and did not change the conventional structure for project financing in India's urban sector. While various tools to improve financial condition were developed at the organizational level, other capacity factors such as politics at the environmental level and knowledge at the individual level were not supportive of the tools. An example of this is the conflict that occurred between the state government and local governments in West Bengal over collecting user fees in the water sector (for details, see Section 5.2.1). While they were involved in projects from planning to operation, the local governments went through institutional changes in their organization and networks to facilitate the project performance and to improve their capacity. However, in some states, the local governments were only involved in limited work, and parastatal agencies continued the routine work for the JNNURM projects. In these cases, there was not much change in the local governments' financial capacity or in their functions and systems. Moreover, some project outcomes for which the JNNURM did not cover O&M costs could weaken the financial capacity of the operating agencies, mostly local governments, and the local governments were aware of the financial risk. In these cases, the project outcomes and performance had a negative influence on capacity at the organizational level.

Regarding capacity factors at the organizational level, the GOI adopted various approaches to organizational development in organizations and expanded networks. These were followed by substantial support from the GOI, such as PMUs and PIUs. However, the intended interventions for CD were focused on temporary assistance rather than organizational transformation, and project performance and results made greater contributions to changing the organizational capacity.

6.2.3.3 Individual Level

Most respondents perceived that the skills and knowledge of project managers and engineers were sound, and they did not regard capacity factors at the individual level as a direct reason for time and cost overruns (see Section 5.2.3). In spite of this perception, project performance and results influenced capacity factors at the individual level. Twenty-one respondents suggested involvement in projects as a tool for CD, and seven respondents specifically stated that capacity at the individual level was improved while they were participating in a project (see Section 5.2.4).

Regarding project hurdles, some respondents indicated that the experience gained in project performance was helpful for preparing subsequent projects. They emphasized that they could identify the potential problems for the projects that followed, they discussed solutions for the potential hurdles at the stage of proposal preparation, and they could adopt the solutions before their projects were launched. For example, most respondents mentioned problems related to land acquisition or obtaining permission from other government authorities as a critical hindrance during project implementation. Concerning the former, one respondent in Uttar Pradesh (Interview 4121) stated: "Based on the master plan, we have earmarked land in … DPRs … [there will not be a] problem of land as we have already earmarked and … tried to acquire [it]". Here, the capacity to predict problems and to solve the problems had been improved through project participation. Another respondent in West Bengal emphasized the importance of experience in connection with permission problems:

> Due to lack of experience, we are now facing these kind[s] of problems, and [this situation has given] us a better [idea]. In [the] future, we will try to apply [this idea] to central government departments before floating the tender. We will think [it over], if it is possible. Then the problems can be sorted out. [This] needs … coordination from all the government departments. (Interview 5222)

Respondents emphasized that in the case of India's urban sector, local governments can acquire skill, knowledge, and project information when they participate in project implementation and collaborate with outside experts. However, as discussed above, without relevant organizational development such as staffing, many of the respondents were reluctant to take over the project. Without organizational development, project performance and outcomes had a negative influence on capacity factors such as attitude and ownership at the individual level (for details, see Section 5.2.3). In other words, not every project's outcome and performance had a positive influence on capacity factors at the individual level. While the JNNURM emphasized the CD of local governments, performance of a project without other CD interventions such as the provision of staffing could conflict with the JNNURM's CD objective.

Most project performance and outcomes provided opportunities to increase skills and knowledge at the individual level. However, the context and the existing capacity of the organization determined the scope of project participation. When the existing capacity of an organization was considered insufficient to participate in the project, the organization did not have an opportunity to increase their capacity through project participation. In addition, when the O&M of the project outcome was assigned to the organization without sufficient time for the organization to improve its capacity and performance, the

insufficient time affected soft capacities such as attitudes, and this could reduce capacity at the individual level.

6.2.3.4 Summary

The influences of project performance and program outcomes on capacity factors are summarized in Table 6-2.

Table 6-2 The Influence of Project Performance on Capacity Factors

	Enabling Environment	Organization	Individual
Program	• Paradigm shift • Changes in governance and institutional structure • System building: administrative procedure	• Facilitating devolution (nominal changes in some cases)	• Focus on CD: various tools adopted
Planning & Design	• System building: adoption of CDPs and DPRs	• Increasing dependence on consultants	• Limited influence (knowledge transfer in some cases)
Implementation	• Expansion of networks with private sector	• Financial support • Organizational development (temporary changes in some cases)	• Skill and knowledge through experience
Operation & Maintenance	• Limited influence (continuing established roles)	• Conflicts between institutions and financial burdens (in some cases)	• Low ownership (evasion of responsibility in some cases)

6.3 DISCUSSION AND CONCLUSION

This chapter investigated the relationship between capacity factors and project performance to determine whether a lack of capacity was the main reason for time and cost overruns. Three groups of research questions were posed in Section 6.1: What project implementation hurdles exist in the urban sector in India?; How are capacity factors related to the hurdles? How do capacity factors affect different stages of JNNURM projects? How do the JNNURM projects affect the capacity factors?; and What kinds of measures related to capacity development should be adopted to improve performance and project outcomes?

This chapter answered these research questions by analyzing the content of 58 interviews about delivery of the JNNRUM projects. To answer the research questions, Section 6.2.1 reviewed the hurdles at each stage of project delivery that were emphasized by various participants in the JNNURM. Based on the project hurdles, the influence of capacity factors on project performance was identified in Section 6.2.2. Section 6.2.3 then examined the converse influence of project performance on the capacity

factors. Through investigating these influences, this research aimed to fill the gaps in discussions concerning the relationships between capacity, performance, and project outcomes.

A summary of the answers to each research question addressed in this chapter follows.

- RQ4: What project implementation hurdles exist in the urban sector in India?

The reasons for time and cost overruns in the case of the JNNURM were various. However, the underlying reason was the landscape of the JNNURM, where the priority of participating agencies was to secure project funds and have their projects sanctioned within a limited period of time. In that landscape, project planning did not reflect the ground reality, and most inventions were result-oriented. Similarly, in the project planning stage, after a project was sanctioned the agencies focused mainly on project completion without considering the capacity of the organizations or individuals. In a number of cases, participating agencies were not prepared to perform the project, but they were pushed for project completion. Hence, the projects faced many hindrances that resulted in a vicious circle of project delays and price escalation.

- RQ5: How are capacity factors related to the hurdles? How do capacity factors affect different stages of JNNURM projects? How do the JNNURM projects affect the capacity factors?

The capacity factors at various levels were closely related to the vicious circle of project delays and cost increases in project delivery (see Table 6-1). The enabling environment in which the JNNURM was implemented created a number of problems. For example, the devolution of authority from states to local governments that was achieved on paper to receive central project funds, generated various problems relating to institutional structures and created procedures that, when combined with contextual factors that were beyond the scope of the program, led to project delays and cost increases. The capacities at the organizational level created different conditions in the agencies and networks of participating agencies that facilitated or hindered project delivery. The capacity factors at the individual level were critical at every stage of project delivery, and a lack of capacity at the individual level became a reason for capacity interventions at other levels. In particular, soft capacities such as attitudes and mindsets were affected by capacity factors at other levels.

The respondents mentioned more or less direct reasons for time and cost overruns, such as gaps between the plans and reality, on-site hurdles, and delayed permissions. However, no single factor taken alone determined the project performance. Each reason for the time and cost overruns was closely related to interplays among various capacity factors.

Similar to the influence of the capacity factors on project performance and results, project performance influenced CD (see Table 6-2). Above all, project participation from planning to O&M had a positive influence on some capacity factors at the individual level such as skills and knowledge. However, taking over a project outcome without participating in the project had a negative influence on other capacity factors at the individual level such as attitude and ownership. The capacity interventions at the environmental and organizational levels were included as formal components in the JNNURM, but the formal interventions led to temporary changes and were rarely integrated within the organization and environment.

These findings in the case of the Indian urban sector demonstrate two-way causal relationships between capacity and performance and project outcomes and capacity. As shown in Figure 6-3, the stages of the project delivery process were closely related to each other, and a result at one specific stage could become a problem for other stages. The problems were caused by a complex of individual, organizational, and contextual factors. These factors shaped the setting around the project, and the project performance affected the setting, forming a spiral structure between the project delivery process and capacity factors.

Every component was related to the others, and it was difficult to separate a component from the others to analyze it in isolation. This demonstrates that the perspective of a traditional simple cause–effect relationship is not adequate for capturing the relationships among capacity, performance, and project outcomes in India's urban sector, for these involve complex interactions between various factors. In this regard, the complex interactions between the components should be more emphasized than a simple linear relationship between capacity and project outcomes.

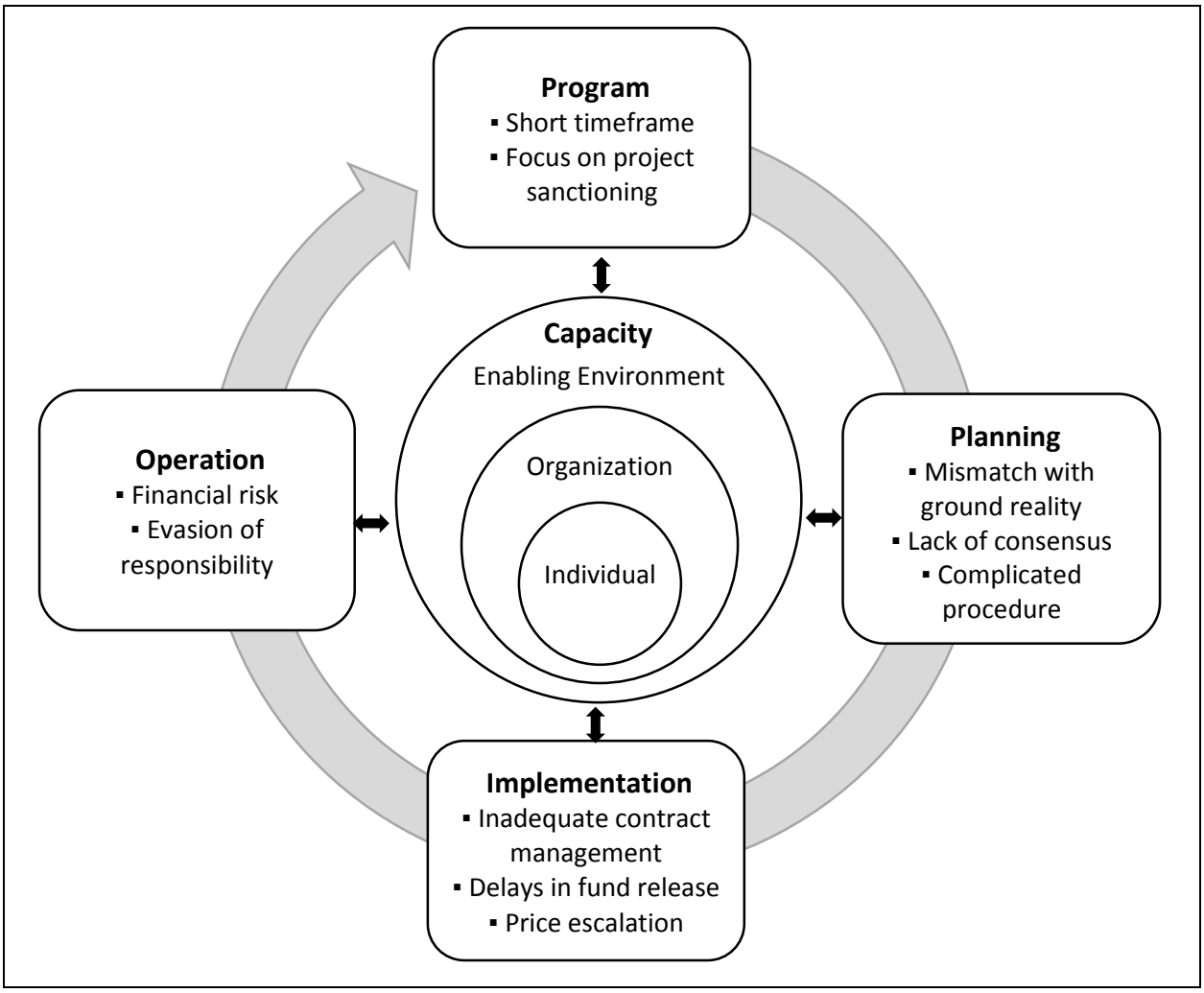

Figure 6-3 Project Hurdles and Capacity Levels

- RQ6: What kinds of measures related to capacity development should be adopted to improve performance and project outcomes?

As described in Chapter 2, perspectives about capacity can be divided into two groups. One group views capacity as an end, while the other views capacity as a means for achieving development goals. In this regard, Baser and Morgan (2008) argue that past interventions for CD have been little more than efforts narrowly focused at improving project and program implementation, and that organizations have often been regarded as pieces of techno-rational machinery that need to be fixed or further developed through the process of CD.

This study of India's urban sector provides such an example, with a narrow focus on CD for project improvement. The GOI adopted many CD interventions to facilitate project implementation and approached capacity as a means for the JNNURM's objective to deliver the quick provision of infrastructure in response to rapid urbanization. In this regard, the GOI recognized the lack of capacity at the local government level as a reason for the low performance identified in its program appraisal.

However, most interviewed local government officials disagreed with the GOI's perspective on their capacity; rather, they perceived that they were able to implement projects when they were given adequate resources and opportunities for project participation (for details, see Section 5.2.3). In line with the perspective of the local government officials who recognized participation as an essential prerequisite, many cases in India's urban sector were more likely to present the condition of a "low commitment, low capacity, low performance equilibrium that is a classic trap of weakened systems" (Baser & Morgan, 2008). The program pursued the empowerment of local governments as a formal objective, but the conditions in the programs were not supportive for this objective and led to low levels of commitment to the program. In addition, the low levels of performance that followed the low levels of commitment caused ineffective CD processes. The fundamental reason for this trap may be that the GOI only approached capacity as a means for the goal of the JNNURM.

This chapter focused on the complex causal relationships between capacity, performance, and project outcomes in the Indian urban sector. This study showed that in the Indian urban sector, capacity, performance, and project outcomes do not stand in one-way causal relationships but are rather interconnected with one another as both cause and effect. Capacity interventions may not have the desired effects of CD without a comprehensive understanding of these interconnected relationships. In this regard, the GOI's approach to capacity as a means for project implementation should be accompanied by an approach to capacity as an end in itself, allowing sufficient time and supportive environments for CD to happen.

6.4 REFERENCES

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CHAPTER 7 PATHWAYS TO BETTER PROJECT IMPLEMENTATION: THE IMPACTS OF CAPACITY FACTORS

7.1 INTRODUCTION

Chapter 6 investigated the interactions between capacity, performance, and outcomes in the project delivery process. The case studies in Chapter 6 demonstrated that the capacity factors identified in Chapter 3 were closely related to project performance and outcomes. Both formal and informal CD processes were found to have positive influences on project performance and outcomes, and vice versa. In particular, many respondents indicated that the capacity of individuals and organizations participating in the JNNURM program was enhanced, which highlights capacity as an end goal of CD. In contrast, this chapter focuses on capacity as a means for development and examines combinations of capacity factors that can create better project outcomes.

Chapter 6 explored the relationship between capacity factors and project outcomes by considering performance as "the result of the application and use of capacity" (Baser & Morgan, 2008). Capacity can also be measured in relation to project outcomes. Thus, capacity is a means to an end and an end in itself. When framed in this way, performance provides a spiral structure between capacity factors and project delivery. This chapter empirically examines multiple conjunctural causation, that is, "causality that leaves room for complexity" (Berg-Schlosser et al., 2009, p.8), between capacity factors and project outcomes.

As described in Chapter 2, many CD interventions are designed with insufficient evidence and unproven assumptions about their effectiveness, due to the ambiguity of the concept of CD. In addition, little information is available about how existing CD guidelines have been used and what the results have been (Horton, 2011), and there are few empirical studies of the impacts of CD interventions. To operationalize the concept of CD, however, the impacts of capacity factors should be investigated to gain an understanding of the causality between capacity factors and the outcome of interest. CD interventions that are not built on an understanding of this causality can result in counter effects with respect to the intended development goals (for details, see Chapter 5.2.4).

As discussed in Chapter 6, the relationship between capacity and outcome is not linear, so research methods analyzing linearity are typically not encouraged. Measuring a single aspect of capacity does not have any significant meaning with respect to capacity as a whole, and scrutinizing a single aspect of capacity runs counter to the holistic view of the concept of CD (Baser & Morgan, 2008). If CD initiatives are to achieve sustainable results, capacity needs to be considered not just at one level, but in terms of the linkages between levels and the complexity of the whole system (Pearson, 2011). For these reasons, to investigate the impacts of capacity factors, research questions need to capture comprehensive dimensions of capacity at each level of analysis. Thus, this chapter answers the following research questions:

- RQ7: Which combinations of capacity factors at different levels led to successful/unsuccessful project implementation in terms of project cost?
- RQ8: What kinds of CD actions are needed to improve project implementation?

Unlike statistical regression methods that determine the independent effect of each variable on an outcome, QCA focuses on combinations of configurations that lead to an outcome (Jordan et al., 2011). Hence, the QCA method allows capacity factors at different levels to be included in the analysis free from the issue of multicollinearity, which enables the researcher to study how they affect project implementation individually and collectively (for details, see Chapter 4.3.2). Using the QCA method, this chapter aims to understand not only the causation between capacity factors and project outcomes, but also the interactions between capacity factors at different levels as one of the key aspects of CD. Thus, this approach to causation between capacity factors and project outcomes does not take the diametrical position of the case study findings in Chapter 6, but the complementary position to understand interactions between capacity factors as well as to unravel the relationship between capacity factors and project outcomes in a different way.

In Section 7.2, the outcomes and conditions at the enabling environment, organization/network, and individual/project levels are identified to conduct the QCA, and indicators to measure the outcomes and conditions are explained. Section 7.3.1 reviews the principles of necessary and sufficient conditions. The next two sections answer Research Question 7: Section 7.3.2 analyzes the necessary conditions and Section 7.3.3 analyzes the sufficient conditions. Section 7.4 summarizes the findings of each analysis and discusses the implications of the findings by answering Research Question 8.

7.2 OUTCOME AND CONDITIONS

Section 3.4 identified and described the capacity factors based on the JNNURM literature and the preliminary field research. The identified factors can individually and collectively lead to cost overruns and underruns. Given the theoretical framework of this research, 11 capacity factors were selected based on the availability of reliable data and the variety of configurations, and these were included as conditions for the QCA process. The set of all capacity factors is shown in Table 4-6, which provides associated information such as the indicators for each capacity factor, data sources, a research method using each indicator, and the reason why an indicator might have been excluded from the QCA. An overview of QCA, including the selection of cases, was presented in Section 4.3.3. The selected project data that were collected are shown in Appendix D, the process of calibration and the data for the organizational and environmental conditions are shown in Appendix E, and the details of the analysis, including the truth table, are shown in Appendix F.

7.2.1 Outcome

The first step of the QCA process is to determine the outcome of interest to the research (Jordan et al., 2011, p.1162). Based on Research Question 7, the outcome for the QCA analysis is the cost overruns and underruns for the projects. To generate a fuzzy variable, this research used data from the Urban Infrastructure and Governance (UIG) project implementation status reports.

This study included 126 JNNURM projects in 12 cities; the selection of the cases was described in Section 4.3.3.2. Since the cases in the QCA include incomplete projects, the percentage of the cost overrun was generated using two different functions. In the case of completed projects, the cost overrun was measured by subtracting the approved cost from the actual cost of the project. The percentage of the cost overrun was calculated by dividing the overrun amount by the approved cost:

$$\text{Cost overrun of completed project} = \frac{(\text{Actual Cost at Completion as per Mar 14 QPR} - \text{Approved Cost})}{\text{Approved Cost}}$$

For incomplete projects, the earned value approach was utilized. The idea of earned value is based on a development of the completed percentage of the budgeted cost (Halpin, 2006). It measures the percentage of the project's goals that have been accomplished and predicts the outcome at completion, "using units of measure which are at the core of the value system of the project" (Sumara & Goodpasture, 1997, p.13). For example, the estimated cost at completion (ECAC) is calculated as the ratio of the actual cost of work performed (ACWP) to the budgeted cost of work performed (BCWP) multiplied by the budgeted cost at completion (BCAC; (ACWP/BCWP)*BCAC), where BCWP is equal to the actual percentage of work completed times BCAC. Since the quarterly project documents provide information on the actual cost utilized and the percentage of the work that has been completed, the estimated cost at completion was calculated using the information at the reported time (i.e., as per the March 2014 Quarterly Progress Report). For each incomplete project, the estimated cost at completion was substituted for the actual cost incurred in a completed project, and the percentage of the cost overrun against the approved cost was then calculated in the same way as for the completed projects:

$$\text{Cost overrun of incomplete project} = \frac{\left(\left(\frac{\text{Actual Cost of Work Performed as per Mar 14 QPR}}{\text{\% of Work Completed}}\right) - \text{Approved Cost}\right)}{\text{Approved Cost}}$$

7.2.2 Conditions

Like independent variables in quantitative research, "conditions are the variables that distinguish one case from another" (Jordan et al., 2011, p.1162). The number of cases is closely related to the number of

conditions, and as more conditions are included in the QCA process, more cases are needed to fill the logic space. For this reason, the selection of conditions is important in the QCA process.

Amenta and Poulsen (1994) identified six strategies for selecting causal conditions: 1) comprehensive approach, 2) perspective approach, 3) significance approach, 4) second look approach, 5) conjunctural approach, and 6) inductive approach (Yamasaki & Rihoux, 2009, p.125). This research adopted the inductive and conjunctural approaches. In the inductive approach, "conditions are mostly selected on the basis of case knowledge," while in the conjunctural approach, "conditions are selected on the basis of theories that are conjunctural or combinatorial in construction and that predict multiple causal combinations for one outcome" (Yamasaki & Rihoux, 2009, p.125). In other words, conditions were selected based on the conceptual framework of this research considering local context and existing frameworks for CD that cover multiple levels.

Each selected condition has specific indicators that are used to measure its status quantitatively and to generate a fuzzy variable. For the conditions that have more than two indicators, the values for the indicators were consolidated to generate a continuous variable or an interval variable, depending on the characteristics of the indicators. The formula/criterion for the measurement for each indicator is shown in Appendix E.

To transform conventional variables into fuzzy variables, it is necessary to calibrate them so that the fuzzy variables conform to the standards of fsQCA (Ragin, 2006). The end product of the calibration is a membership score for each variable ranging between 0.0 and 1.0. The set of conditions has three types of variables: 1) binary variables, 2) interval-scale variables, and 3) continuous variables.

For conditions that have "yes or no" information, such as whether the implementing agency is the ULB, the fuzzy variable was defined dichotomously. Some conditions have multiple indicators that were coded with presence or absence. In this case, each indicator was given an equal weight, and the scores for each item that was present were added for a maximum potential score of 1. For example, for organizational development, which has 3 indicators, 0 was assigned to a case with none of the indicators present, and 1 was assigned to a case with all the indicators present. A case with one indicator present was assigned 0.33, and a case with two indicators present was assigned 0.67.

For conditions that have continuous variables, a calibration function in the fsQCA software Fuzzy-Set/Qualitative Comparative Analysis 2.0 (Ragin, Drass, & Davey, 2006) was used to generate fuzzy membership scores. Based on the original values for the condition, values corresponding to the three qualitative breakpoints that structure a fuzzy set were assigned. For the threshold for full membership, the cross-over point, and the threshold for full nonmembership, respectively, the maximum, average, and minimum values of the conditions were used. This function enabled the creation of fuzzy scores corresponding to the original values (Ragin, 2006). Appendix D shows the data at the project level, Appendix E provides details about the calibration of each condition, and Appendix F shows the final truth table for the QCA phase of this study.

Table 7-1 shows the conditions selected for the QCA investigation and their indicators. The following sections explain each condition at the enabling environment, organization/networks, and individual/project levels.

Table 7-1 Conditions and Indicators for Fuzzy-set QCA

Level	Condition	Description	Indicator	Calibration	
Enabling environment	Supply of human resources	Condition of human resources in a state	Labor force's mean number of years of schooling	After direct calibration of each indicator, average of fuzzy scores of the three indicators	
			Literacy rate		
			Higher education institutes per million		
	Economic condition	Status quo of a state's economy	Gross state domestic product per capita	After direct calibration of each indicator, average of fuzzy scores of the two indicators	
			Average growth rate		
	Anticorruption	A state's effort to reduce corruption	Index for the state's anticorruption effort	Index score	
	Accountability	Abilities to engage citizen groups	Enactment of public disclosure law (Y/N)	Sum of scores for each indicator (Y= 0.5, N=0)	
			Enactment of community participation law (Y/N)		
Organization / networks	Devolution of powers	Status quo for achievement of devolution reforms	Devolution status of 12th Schedule functions (Y/N)	Sum of scores for each indicator (Y= 0.2, N=0)	
			Constitution of Metropolitan Planning Committee (Y/N)		
			Constitution of District Planning Committee (Y/N)		
			Devolution status of functions in city planning (Y/N)		
			Devolution status of functions in water & sanitation (Y/N)		
	Financial capacity	A ULB's financial condition and creditworthiness	Credit rating of cities (From AAA to D)	0.05 reduced per lower grade	Average of scores of the two indicators
			Financial status items in MOA checklist (rate of property tax coverage, rate of collection efficiency, rate of water sector cost recovery)	Average of scores of the three items	
	Organizational development	A ULB's effort to develop its organization	Presence of HR strategy (Y/N)	0 = all N; 1 = all Y; 0.33 = 2 N & 1 Y; 0.67 = 1 N & 2 Y	
			Presence of internal training systems (Y/N)		
			Sufficient staff (Y/N)		
Individual/ project	Implementing agency	Authorized agency for project implementation	ULBs or parastatal agency	0 = Parastatals or others 1 = ULB involved	
	Project size	Approved project cost	Approved project cost in DPR (skill & knowledge related)	Direct calibration	
	Project cost share	Central assistance rate for project funds	Rate of "Additional Central Assistance (ACA) Released" for project "Utilization" (attitude & ownership related)	Direct calibration	
	Project sector	Project sector	Water-related sector or transportation sector (skill & knowledge related)	0 = transportation-related 1 = water-related	

7.2.2.1 Enabling Environment

Section 3.4 of this research identified and explained six capacity factors at the environmental level: 1) governance structure, 2) supply of human resources, 3) accountability, 4) economic condition, 5) politics, and 6) anticorruption. Since these factors represent a context in a state, all of the projects in that state have the same condition as these factors. Governance structure was excluded since the condition of governance structure can overlap with other conditions—the type of implementing agency and the level of devolution of powers can explain the governance structure. Politics was excluded because only partial data were available in the literature and from interviews for quantifying the information. Thus, the following four factors were included as conditions in the QCA.

Supply of human resources

This condition indicates the quality of human resources found in a state. The fuzzy score for this condition was generated using three state-level indicators: 1) mean number of years of schooling for the labor force, 2) literacy rate, and 3) number of higher education institutes per million population members. The value of each indicator was converted to a fuzzy score by the fs/QCA software's calibration function, and the fuzzy scores of the three indicators were averaged to produce the fuzzy score for supply of human resources.[11] If a state has a greater mean number of years of labor force schooling, a higher literacy rate, and a larger number of higher education institutes per million, the state will have a higher fuzzy score.

[11] A fuzzy set can be seen as a continuous variable that has been purposefully calibrated to indicate degree of membership in a well-defined set (Ragin, 2009). To ensure that the scores make sense at the case level, the fuzzy sets should be based on the researcher's substantive and theoretical knowledge, and such calibration should not be mechanical (Ragin, 2009). Therefore, some studies modify the calibrations based on the study context. For example, in order to create fuzzy scores for certain conditions, Verweij, Klijn, Edelenbos, and Van Buuren (2013) first averaged fuzzy scores for multiple indicators for the condition and then assigned specific fuzzy scores to the condition based on the average.

Unlike common QCA studies where one continuous indicator creates fuzzy scores for one condition, some conditions in the present CD study have multiple continuous indicators. The fuzzy scores for each indicator were directly calibrated by the calibration function to prevent loss of information. Then, to develop fuzzy sets for these conditions, the average of the fuzzy scores of the multiple indicators for each condition was used. There were two reasons for this. First, the average score can represent the degree of each condition more precisely and comprehensively than other scores such as the minimum or maximum scores. The aim of this stage of calibration is not to combine the multiple different conditions using the fuzzy set operations negation, logical "and", and logical "or", but rather to represent each condition. Thus, the multiple indicators needed to be comprehensively considered to represent each condition. Second, this study assumes that when a condition has multiple indicators, the indicators represent the condition equally. Due to a lack of information for assigning relative weights, this study assigned the same weight to each indicator to create fuzzy scores for the conditions in an interval scale (e.g., if each "Yes" scores 0.2 and there are 5 "Yes" scores for a condition, then the condition becomes 1). To maintain a coherent rationale for the calibration, this study averaged the fuzzy scores of the indicators for the continuous conditions.

Accountability

Accountability exists when rights holders such as public service clients are able to make duty bearers such as public service providers deliver on their obligations (UNDP, 2009). This condition therefore includes information about how a state engages its citizen groups for better project delivery. The fuzzy score for this condition was generated with respect to two state-level reforms: 1) enactment of public disclosure law and 2) enactment of community participation law. If a state government achieved both in its reform checklist for the Memorandum of Agreement (MOA), the state has full membership in the fuzzy set for this condition. A state that achieved only one reform has 0.5 membership in this condition, and a state that achieved neither reform has full nonmembership.

Economic condition

This condition indicates the status quo of a state's economy. In the case studies, cost escalation due to a rise in prices had a negative influence on cost overruns by creating a vicious circle of price escalation, revision of project cost estimation, and project delays. Thus, a fast-growing state economy is likely to contribute to cost overruns due to an associated rise in prices. The fuzzy score for this condition was generated using two state-level indicators: 1) gross state domestic product (GSDP) per capita and 2) growth rates. The average value from 2006 to 2012 for each indicator was converted to a fuzzy score by the fs/QCA software calibration function, and the two fuzzy scores were averaged to determine the fuzzy score for economic condition. If a state shows a higher GSDP and growth rate, the state has a higher fuzzy score for this condition.

Anticorruption

An understanding of issues relating to corruption is important for understanding the local context and improving CD, and working within an environment where corrupt practices are widespread presents a challenge (Boyd, 2009). In the case study findings, corrupt elected representatives and officials caused conflicts between stakeholders—what respondents called *local politics*—which could lead to time and cost overruns. This condition indicates a state's efforts to reduce corruption and uses an established index for the fuzzy score. A state with a higher score has devoted more effort to reducing corruption and showed less corruption.

7.2.2.2 Organization/Networks

Section 3.4 identified and described five capacity factors at the organizational level: 1) devolution of power, 2) financial capacity, 3) organizational development, 4) partnership and communication, and 5) leadership. Since these factors provide the context for a city, projects in the same city will have the same values for these factors. This research focuses on the ULB's capacity for the JNNURM project delivery. When project implementation was led by other agencies, ULBs had a limited role in project implementation. Despite the limited role, the ULB's capacity could influence the implementation. Thus,

ULB-related information is used in the conditions at the organizational level to make connections with the ULBs' capacity. Partnership and leadership were excluded because data in the literature and from the interviews were insufficient to quantify the information. Thus, the following three factors were included in the QCA conditions.

Devolution of power

This condition is closely connected to the governance structure at the environmental level and indicates the extent to which a city's ULB is empowered. The fuzzy score for this condition was generated using five items in a city's reform checklist for the MOA: 1) transfer of functions in the 12th Schedule to the ULB[12], 2) constitution of a District Planning Committee (DPC), 3) constitution of a Metropolitan Planning Committee (MPC), 4) transfer of the city planning function, and 5) transfer of the water supply and sanitation functions. Each indicator was given an equal weight of 0.2. The value 0 was assigned to a case with none of the indicators present, while 1 was assigned to a case with all of the indicators present. When a city has achieved more reforms, the city has a higher fuzzy score for this condition.

Financial capacity of ULBs

The JNNURM emphasizes the ULBs' capacity to attract investment in urban infrastructure services, and the case study found that a ULB's financial condition has an influence on other capacity factors. This condition is related to the financial viability of the ULB's project delivery. The fuzzy score for this condition was the average of 1) the city's credit rating and 2) the status quo for its property tax and user charges. For the credit rating, 0.95 was assigned to AAA cities, and 0.05 was subtracted for each lowering of the grade. The value for the second indicator was collected from each city's MOA checklist, as the average score of 1) the property tax coverage rate, 2) the collection efficiency rate, and 3) the cost recovery rate for the water sector. When a ULB has a higher score, the ULB has a better financial condition in terms of creditworthiness and revenue.

[12] The JNNURM required specific reforms for states and cities to implement the 74th Constitutional Amendment Act. One of the reforms was the transfer of 18 functions listed in the 12th schedule. These are: 1) urban planning, including town planning, 2) regulation of land use and construction of buildings, 3) planning for economic and social development, 4) roads and bridges, 5) water supply: domestic, industrial, and commercial, 6) public health, sanitation, conservancy, and solid waste management, 7) fire services, 8) urban forestry, protection of environment, and ecology, 9) safeguarding the interests of weaker segments of society, including the handicapped and mentally retarded, 10) slum improvement and upgrading, 11) urban poverty alleviation, 12) provision of urban amenities and facilities: parks, gardens, and playgrounds, 13) promotion of cultural, educational, and aesthetic aspects, 14) burials and burial grounds, cremations, cremation grounds, and electric crematoriums, 15) cattle pounds and prevention of cruelty to animals, 16) vital statistics, including registration of births and deaths, 17) public amenities, including street lighting, parking lots, bus stops, and public conveniences, and 18) regulation of slaughter houses and tanneries.

Organizational development of ULBs

The professional field of organizational development is a major area for thinking about and practicing CD (Richter, 2010). This condition captures how much effort a ULB has made to develop its organization. The fuzzy score for this condition was based on three interview questions related to organizational development: 1) presence of an HR strategy/policy, 2) presence of internal training systems, and 3) sufficient staff. A value of 0 was assigned to a case with none of the indicators present, and 1 was assigned to a case with all of the indicators present. Each indicator was given an equal weight, and 0.33 and 0.67 were assigned for the presence of one or two of the indicators, respectively. When a ULB has a higher score, the ULB is considered to have a better organizational development condition.

7.2.2.3 Individual/Project

Factors relating to a person's competencies are included in the individual level. Section 3.4 identified three capacity factors at this level: 1) skills and knowledge, 2) attitude and ownership, and 3) other project factors. Since the JNNURM focuses on gaps in the technical capacity of deployed staff at ULBs, skills and knowledge were discussed extensively in the case studies. In addition, attitude and ownership were also discussed in association with endogenous capacities and governance. For the QCA analysis, 126 projects that could be managed by hundreds of staff were analyzed. Due to the large set of cases, information about the capacity of individual staff members was not available for incorporation into the QCA process; however, reliable data relating project factors were available. According to the case study findings, a ULB's capacity is related to many project factors. For this reason, the following four project factors were included in the QCA conditions to enable interpretations with regard to capacity factors at the individual level.

Implementing agency

Since the GOI recognized ULBs' lack of capacity as a reason for underperformance in project delivery, the type of agency authorized for project implementation is a critical QCA condition for investigating the GOI's perspective. Furthermore, this condition can provide important evidence in combination with other project conditions for interpreting the QCA results and deriving implications about capacity factors at the individual level such as skills, ownership, and experience. In cases where a project was implemented by a ULB, the fuzzy score for this condition is full membership, while the score is full nonmembership in all other cases.

Project size

The case studies found that project size can indirectly explain capacity factors at the individual level such as level of skills and knowledge. Since the JNNURM provided substantial financial assistance, it allowed the implementing agencies to propose large-scale projects that had not been attempted before the

JNNURM. In this regard, project size can be connected with experience and technical capacity at the individual level. The fuzzy score for this condition was based on the approved project costs in the Detailed Project Reports (DPRs), using the fsQCA software calibration functions.

Share of cost

In some cases, the source, composition, and conditionality of financial flows had a determining effect on the CD process (Baser & Morgan, 2008). Similar to the project size condition, the budget share condition can be related to capacity factors at the individual level, such as attitude and ownership, and at other levels, such as the financial condition of the ULBs. It is common knowledge that when an organization or individual makes a higher contribution to a project cost, the organization or individual tends to have a greater sense of ownership. In this way, soft capacities at the individual level can be speculated based on the project cost share condition. The fuzzy score for this condition was based on the percentage of additional central assistance (ACA) released for the project cost that was utilized at the reported time in the Quarterly Progress Reports (QPRs), using the fsQCA software calibration functions.

Project Sector

The JNNURM program divided its projects into several sectoral categories. Table 7-2 shows eleven different sectors categorized by the JNNURM. In the case studies, respondents did not recognize the project sector as a critical factor for project delivery. However, in states where multiple agencies were involved in the JNNURM project implementation, the projects were assigned based on the project sector or jurisdiction. Thus, the project sector could be related to the ULB's capacity. For this reason, the QCA included the condition of the project sector, dividing the sectors into two groups. The cases in Sectors 1, 3, 4, and 8 were combined with the water and sanitation sector, and the cases in Sectors 2, 6, 7, and 11 were united in the transportation sector. The cases in Sectors 5 and 9 were excluded during selection of the cases (for details, see Section 4.3.3.2). Only one case in Sector 10 was included in the QCA cases, but it was processed as a missing value.

Table 7-2 Sector-wise Details of Projects Sanctioned under the JNNURM (UIG)

Date: as of Mar 20, 2014 (Amount Rs. in Lakhs)

No	Sector	No. of Projects	Approved Cost	Total ACA Commitment (Central Share)	Total ACA Released	No. of Projects Completed
1	Drainage / Storm Water Drains	79	896305	371174	272951	28
2	Roads / Flyovers / RoB	110	905386	380526	231970	60
3	Water Supply	203	2563790	1236461	798781	68
4	Sewerage	138	1950362	928055	500648	34
5	Urban Renewal	10	46445	19249	9765	4
6	Mass Rapid Transport System	26	668068	323505	200014	7
7	Other Urban Transport	17	79065	37159	26976	12
8	Solid Waste Management	50	252037	136046	75284	12
9	Development of Heritage Areas	8	28622	19275	7508	2
10	Preservation of Water Bodies	4	11671	6861	5667	0
11	Parking Lots and Spaces on PPP Basis	5	86042	33728	10336	0
	Total	**650**	**7487792**	**3492040**	**2139900**	**227**

7.3 RESULTS

7.3.1 Consistency and Coverage

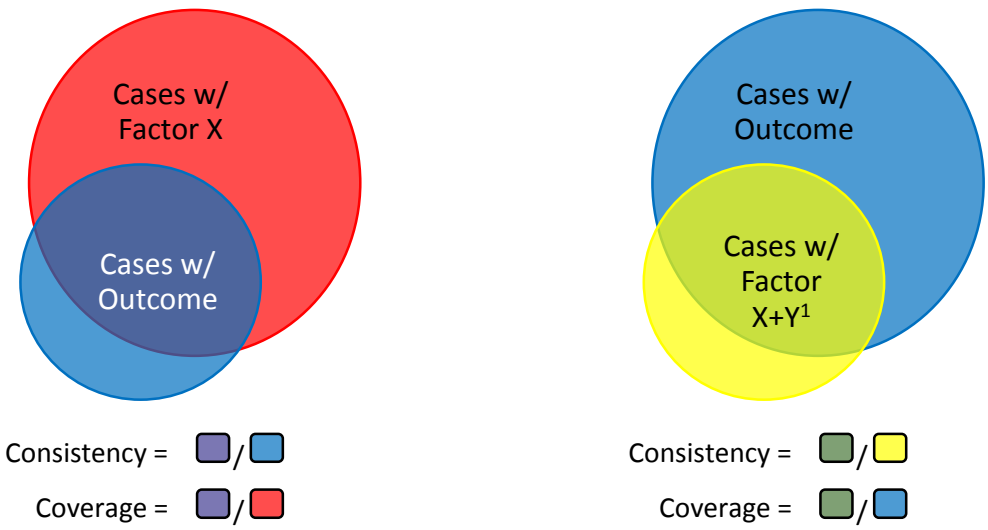
Using fsQCA, the analysis identified combinations of the capacity factors that can be associated with cost overruns and underruns for the 126 JNNURM projects (for more details about the analysis approach, see Section 4.3 and Appendices D–F).

Fuzzy membership scores address the varying degrees to which different cases belong to particular sets defined with full membership and full nonmembership (Ragin, 2009). Creation of fuzzy set scores by direct and indirect calibration requires theoretical and case-based knowledge, which this research developed in Chapters 5 and 6 (for more details about this process, see Appendix E). Once calibration of conditions and outcomes for all cases was completed, the next step was to assemble a truth table composed of columns for each condition and outcome and rows representing the configuration for each case (Jordan, 2012). The truth table for this study is shown in Appendix F.1.

Empirical cases can be plotted within a multidimensional vector space with 2^k corners, where k is the number of conditions, and the membership for each case can be calculated using fuzzy algebra (Ragin, 2009). The membership of each case is the minimum of its memberships in each condition. For example, if a case's fuzzy scores are 0.7 for Factor X and 0.2 for Factor Y, the membership (fuzzy set score) of the case for Factors X and Y (expressed as "X*Y" in the results of the truth-table analysis) is the minimum of

its memberships in Factor X and Factor Y, which is 0.2. This multidimensional vector space can be converted into a crisp truth table that can potentially have 2^k rows (the crisp truth tables are shown in Appendix F.2).

There are two main ways to analyze the truth tables: through analysis of necessary conditions and analysis of sufficient conditions. These analyses allow the researcher to identify conditions that are necessary for an outcome of interest and combinations of the conditions that are sufficient to create the outcome. The fsQCA software examines necessary conditions and sufficient conditions for the outcomes based on the concepts of consistency and coverage. Figure 7-1 shows Venn diagrams for visualizing the concepts of necessary and sufficient conditions.



Necessary Condition
(Factor X is necessary to cause the outcome)

Sufficient Condition
(Factor X+Y is sufficient to cause the outcome)
[1] "+" indicates a logical "and," which means that the minimum score in the combinations is the degree of membership for the case. This is expressed as "X*Y" in the results of the analysis.

Sources: Chan (2010) and Jordan (2012); note inserted.

Figure 7-1 Venn diagram Example for Necessary Condition and Sufficient Condition

Consistency measures the degree to which one condition is a subset of the other (McAdam et al., 2010). A necessary condition is a condition that must be present for the outcome to occur, but its presence does not guarantee that occurrence (Ragin, 2009). The fuzzy set scores for a necessary causal condition (Factor X in Figure 7-1) are consistently greater than or equal to the fuzzy set scores for the outcome condition for most cases (McAdam et al., 2010).

When cases having causally relevant conditions demonstrate the same outcome, the cases are included in a subset of the outcome, and the conditions shown in the cases can be interpreted as sufficient to

create the outcome (Ragin, 2009). The fuzzy set scores for a sufficient causal condition (Factors X+Y in Figure 7-1) are consistently less than or equal to the fuzzy set scores for the outcome condition for most cases (McAdam et al., 2010). In other words, a necessary condition is a superset of the outcome, and sufficient combinations of conditions are subsets of the outcome (Ragin, 2009).

The formula for determining consistency in an fsQCA study is: Consistency ($X_i \leq Y_i$) = $\sum (\min (X_i, Y_i)) / \sum (X_i)$, where "min" indicates the selection of the lower of the two values. In the analysis for a sufficient condition, X_i represents membership scores in a combination of conditions and Y_i represents membership scores in the outcome (Ragin, 2009). In the analysis for a necessary condition, X_i represents membership scores in the outcome and Y_i represents membership scores in a condition. Consistency scores greater than 0.8 for sufficient conditions and 0.9 for necessary conditions are commonly used as thresholds for establishing the relevant causal relationship between the conditions and outcomes (Jordan, 2012).

There are three types of solutions in the analysis of sufficient conditions: 1) complex solutions using no unobserved configurations, 2) intermediate solutions using plausible unobserved configurations, and 3) parsimonious solutions using all of the unobserved configurations. In any QCA analysis, there will be many unobserved configurations, the so-called logical remainders, that are theoretical combinations of conditions that are not found in any of the cases analyzed, and a researcher can decide to what degree these unobserved configurations should be included in the analysis based on the researcher's substantive knowledge (Jordan, 2012).

After a model for the sufficient combinations of conditions is determined, the coverage needs to be considered to understand to what extent the model can explain the outcomes. While consistency plays a similar role to significance, coverage assesses relevance. If X (e.g., Factor X+Y in the sufficient condition of Figure 7-1) is determined to be a consistent subset of Y (e.g., the outcome in the sufficient condition of Figure 7-1), its coverage score reveals how important the combination of conditions represented in X is in accounting for Y (McAdam et al., 2010).

7.3.2 Necessary Conditions

The fuzzy scores created by direct and indirect calibrations were included in the truth table (see Appendix F.1). The truth table was used to conduct an analysis of necessary conditions for cost overruns and cost underruns. Table 7-3 shows the result of the analysis of necessary conditions for cost overruns. None of the conditions have a consistency score above 0.9, which means there is no single condition that can be considered as a necessary condition for creating cost overruns by itself.

Table 7-3 Analysis of Necessary Conditions for Cost Overruns

Factors	Conditions	Consistency	Coverage	Negated conditions	Consistency	Coverage
Implemented by ULB	ulb	0.529	0.572	~ulb	0.471	0.570
Approved project cost	apcost	0.467	0.810	~apcost	0.802	0.683
GOI share	goi	0.526	0.698	~goi	0.855	0.859
ULB financial condition	financ	0.810	0.791	~financ	0.614	0.844
ULB organization condition	od	0.824	0.705	~od	0.434	0.746
Devolution status	devolv	0.697	0.680	~devolv	0.546	0.752
Accountability	accouta	0.461	0.658	~accouta	0.664	0.633
Human resource supply	hrs	0.654	0.862	~hrs	0.771	0.777
State economic condition	econ	0.737	0.823	~econ	0.688	0.805
Anticorruption index	anticorr	0.462	0.806	~anticorr	0.835	0.710
Project sector	water	0.573	0.539	~water	0.427	0.622

However, some conditions have scores close to 0.9 and could be regarded as potential necessary conditions for cost overruns based on the case study findings. First, the high consistency score (0.855) for negated GOI share means that a lower share of project funds from the GOI might have an influence on cost overruns. The lower share of funds from the GOI could create burdens on the state and local governments that must take on greater financial risks, and the combination of a lower share with other conditions such as the project size and the financial condition of the local government could increase the possibility of cost overruns (the influence of the central share of the project funds is discussed in depth in the following section).

Second, the high consistency score (0.835) for the negated anticorruption index might be connected with cost overruns. This finding could be related to the problems caused by local politics that some respondents mentioned (for details, see Section 6.2.2.1). Senior officials and politicians who used the project for personal interests caused serious conflicts between stakeholders, which led to time and cost overruns. Thus, less effort devoted to reducing corruption can be a potential necessary condition for cost overruns.

After the necessary conditions for cost overruns were analyzed, an analysis of necessary conditions for cost underruns was conducted. Table 7-3 presents the result of the analysis of necessary conditions for cost underruns. As in the analysis for cost overruns, none of the conditions have a consistency score above 0.9. Thus, no single condition can create cost underruns as a necessary condition by itself.

Table 7-4 Analysis of Necessary Conditions for Cost Underruns

Factors	Conditions	Consistency	Coverage	Negated conditions	Consistency	Coverage
Implemented by ULB	ulb	0.527	0.428	~ulb	0.473	0.430
Approved project cost	apcost	0.504	0.656	~apcost	0.854	0.546
GOI share	goi	0.812	0.808	~goi	0.696	0.524
ULB financial condition	financ	0.849	0.622	~financ	0.716	0.739
ULB organization condition	od	0.803	0.515	~od	0.541	0.698
Devolution status	devolv	0.760	0.557	~devolv	0.563	0.583
Accountability	accouta	0.486	0.521	~accouta	0.681	0.486
Human resource supply	hrs	0.705	0.698	~hrs	0.861	0.651
State economic condition	econ	0.778	0.652	~econ	0.789	0.692
Anticorruption index	anticorr	0.544	0.712	~anticorr	0.851	0.543
Project sector	water	0.654	0.461	~water	0.346	0.378

Similar to the analysis for cost overruns, some conditions have scores close to 0.9 and could therefore be potential necessary conditions for cost underruns in the JNNURM projects. The high consistency score (0.854) for negated approved project cost means that smaller approved costs might be associated with cost underruns (the influence of approved costs is discussed in depth in the following section). In relation to the case study findings, since the JNNURM was the first national urban program to support large-scale projects, when projects were relatively small, they tended to align with the size of the project that the implementing agency was familiar with managing (for details, see Section 6.2.3.3). In such cases, the experience and know-how of these organizations could be utilized more effectively. Other conditions with scores greater than 0.8 cannot be explained based on the case study findings.

The analysis of necessary conditions can be used to identify the conditions that can be removed from the fuzzy truth table before conducting the analyses of sufficient conditions. A necessary condition should be considered as relevant to any sufficient combination of conditions. If a necessary condition is included in a truth-table analysis, it is often eliminated from solutions that include logical reminders such as parsimonious solutions (Ragin, 2009). The results for both cost overruns and cost underruns showed that there was no necessary condition that has a consistency score above 0.9. Thus, all of the conditions were used for the truth-table analyses of sufficient conditions.

7.3.3 Sufficient Conditions

Using the same truth table (Appendix F.1), the analyses of sufficient conditions for cost overruns and underruns were conducted. Even though intermediate solutions allow researchers to more easily incorporate theory- and case-based knowledge into the analysis than parsimonious or complex solutions, this study adopted the parsimonious solution. This is because the case studies in Chapters 5 and 6 provide relevant information for understanding each path of this analysis and can be utilized to interpret the path in accordance with the context of the urban sector in India. Thus, the parsimonious

solution that uses all the logical remainders was adopted to generate simpler combinations of conditions (the analysis results of the other solutions are shown in Appendix F.3 and F.4).

7.3.3.1 Analysis of Sufficient Conditions for Cost Overruns

Figure 7-2 shows the sufficient conditions for cost overruns. There are six pathways that sufficiently explain the cost overruns. The consistency score for this solution is 0.86 and the coverage score is 0.51, which meets common thresholds for being a sufficient condition (for the individual scores and cases, see Appendix F.3).

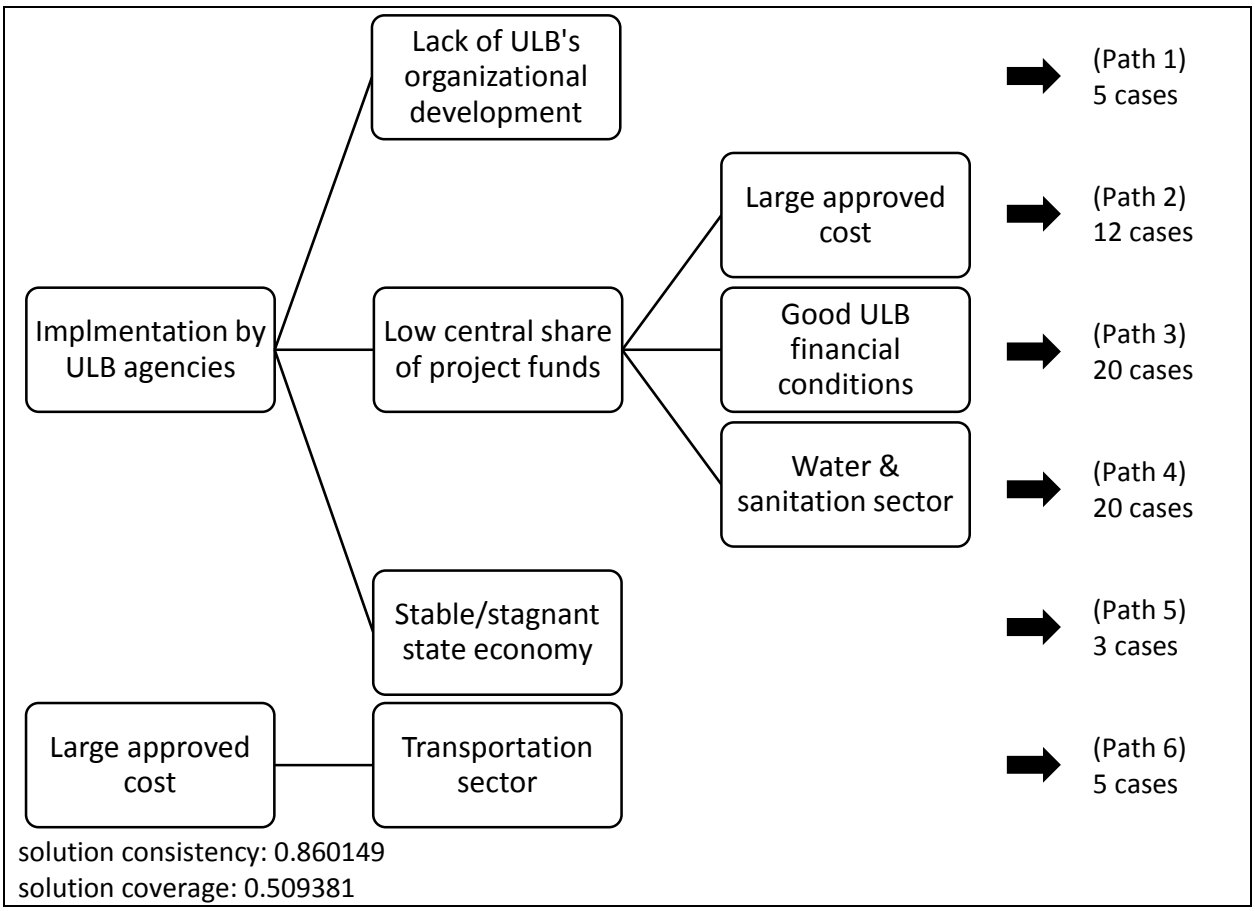


Figure 7-2 Sufficient Conditions for Cost Overruns

The cases with the six combinations are as follows:

1) projects implemented by ULBs without an organizational development system;
2) large-scale projects with a low central share of project funds implemented by ULBs;

3) projects with a low central share of project funds implemented by ULBs in healthy financial conditions;
4) water and sanitation projects with a low central share of project funds implemented by ULBs;
5) projects implemented by ULBs in a stagnant state economy; and
6) large-scale transportation projects.

When a project was implemented by a ULB that did not have a good system of organizational development such as its own training programs, organizational development strategies, and sufficient staffing, the project tended to have cost overruns (Path 1). Path 1 bears affinities to the GOI's common perceptions that emphasize that ULBs have capacity gaps for performing projects. Five cases in West Bengal and Maharashtra demonstrate this path.

Two conditions, the ULB as the implementing agency and a lower share of funding from the GOI, are included in Paths 2 to 4, and these paths are demonstrated in many cases in West Bengal, Maharashtra, and Gujarat. Large projects with a lower central share of project funds that are implemented by ULBs tended to experience cost overruns (Path 2). When a project had a lower central share of project funds from the GOI, the state and local governments bore more of the financial burden and the possibility of cost overruns increased. The general perceptions of a local cost share tend to assume that the greater the local cost share, the higher the project ownership, and the better the project performance. However, this result takes the opposite position. In the case studies, ownership was largely determined by whether the participating agencies were involved in the project from the beginning, not by whether the agencies owned the project outcome or had a high share of the project costs (for details, see Section 6.2.1.4). Hence, this QCA result (Path 2) indirectly supports the findings from the case studies, and demonstrates that a higher share of project funds from state and local government does not have a positive impact on project implementation in terms of cost overruns.

It is also possible to interpret this result (Path 2) based on the relationship between cost overruns and the lower central fund share. In most cases, the GOI did not support the additional cost beyond the approved cost, and state and local governments therefore needed to bear the increased cost. Thus, when there were cost overruns, since the amount borne by the GOI was fixed, the central share of project funds decreased. Thus, the central shares of project funds were in inverse proportion to cost overruns, which means that the greater the cost overruns, the greater the funds from state and local government and thus the lower the share of funds from the GOI. Thus, the causal relationship can be interpreted in the reverse direction.

In Path 2, the cost overruns could be affected by the size and share of project costs, which are closely related to the experience and know-how that are considered as capacity factors at the individual level. Some projects in the JNNURM were different in size and modality from previous urban projects, and prior to the JNNURM program, some ULBs had not managed large project budgets (for details, see Section 6.2.3.3). Hence, large projects initiated by the JNNURM in Path 2 could represent a new type of project for a ULB that lacked the experience and know-how to manage a large-scale contract. The large approved cost could be associated with a lack of know-how and experience on the part of the ULB, and this lack of know-how and experience could cause cost overruns.

When projects with a lower central share of project funds were implemented by financially healthier ULBs, cost overruns were found to occur (Path 3). The condition of a lower central share of project funds is connected with the good financial condition of a ULB, so these need to be explained together. The JNNURM mission cities were classified into different categories based on the populations and characteristics of the cities. Metropolitan cities received 35% of the project budget from the GOI for their JNNURM projects, whereas others received more than 50% (see Table 7-5). In the cases of financially weak ULBs, the local government's 10% share used to be borne by the state government or paid with interest-free loans from financial institutions. In other words, the financial structure of the JNNURM project varied depending on the financial conditions of the ULB, so the two conditions are closely connected with one another.

Table 7-5 Share of Project Budgets

Category of Cities/Towns/UAs	**Grant**		**ULB or Parastatal Share/Loan**
	Central	**State**	
Cities/UAs with populations greater than 4 million	35%	15%	50%
Cities/UAs with populations of 1 – 4 million	50%	10%	30%
Cities/towns/UAs in NE States and Jammu & Kashmir	90%	10%	-
Cities/UAs other than those mentioned above	80%	10%	10%
Desalination plants within 20 km of seashore & other urban areas	80%	10%	10%
Source: MOUD (2006)			

As discussed above, the GOI did not support additional costs beyond the approved costs, and the extra costs needed to be borne by state or local governments. Therefore, the financially weak ULBs had to pay more attention to their financial situations, and they took preemptive steps to avoid the cost overruns. Meanwhile, the ULBs that could bear cost overruns were less concerned about the overruns and had a more laissez-faire attitude. In the case studies, a respondent from one metropolitan city (interview 2215) indicated that the slow GOI process for approving revised estimates was a reason for project delays, but he did not consider the cost overrun itself as a problem because his agency could pay the extra costs. This demonstrates that officials at financially strong ULBs may have a more laissez-faire attitude about cost overruns. In combination with the attitude as a capacity factor at the individual level, the financial condition as a capacity factor at the organizational level affected the project implementation.

Another way to interpret this result relates to the data set used in the analysis. The ULBs that could afford to bear increased costs could complete project implementation by paying the extra costs. However, ULBs that had severe problems in mobilizing financial resources might not have been able to pay their contractors and complete their projects due to unpaid bills. Consequently, some projects might have been delayed due to the ULB's unhealthy financial condition, with less than 70% of the projects completed. In such cases, the projects were excluded from the data set to minimize errors in estimating the project cost at completion. Therefore, the projects implemented by financially unhealthy

ULBs that were delayed substantially and had extreme cost overruns were eliminated before settling on the 126 cases, and as a consequence they were not included in this analysis.

Water- and sanitation-related projects with a lower central share of project funds implemented by ULBs could also create cost overruns (Path 4). Even though many cases on these paths came from Maharashtra and Gujarat, it is difficult to conclude that the projects in these states had more cost overruns. In these states, the ULBs are a single authorized implementing agency for the JNNURM projects, so Maharashtra and Gujarat have more projects implemented by ULBs than other states. For this reason, the cases in these states appeared more frequently in these paths.

While the conditions included in Path 1 to Path 4 are related to capacity factors at the individual and organizational level, Path 5 shows a capacity factor at the environmental level. In Path 5, the condition of the state economy in combination with the condition of the implementing agency type constitutes another pathway to cost overruns. In the case studies, price increases influenced project cost escalation that created a vicious circle between project delay and cost overruns (for details, see Section 6.2.1.3). The case studies suggested that the growing state economy contributed toward cost overruns. However, the present result demonstrates that a stagnant state economy combined with the type of implementing agency could constitute a sufficient condition for cost overruns, which is different from the case study finding. One way to understand this result is that a stagnant state economic condition might be connected with nonavailability of good local contractors and consultants (for details, see Section 6.2.2.1). Three cases in Uttar Pradesh and West Bengal demonstrate this path, and in these states qualified local contractors and competent consultants might be less available than in other states, since most of them are located in the metropolitan cities of states with faster economic growth. Thus, poor economic conditions in some states may have led to a lack of qualified and available contractors/suppliers, and project outcomes could be worse as a consequence.

Path 6 concerns the project's approved cost and the project sector, and five cases in Karnataka, Maharashtra, and Gujarat demonstrated this sufficient condition. The transportation-related projects with large approved costs tended to have cost overruns (Path 6). The relationship between large approved costs and cost overruns were discussed above. This path shows that the project sector became a condition for the cost overruns in some cases, but there is no potential way to explain the sectoral factor based on the case study findings or theoretical knowledge.

7.3.3.2 Analysis of Sufficient Conditions for Cost Underruns

Figure 7-3 shows three pathways to cost underruns. The consistency score for this solution is 0.83 and the coverage score is 0.76, which meets common thresholds for being a sufficient condition (for the individual scores and cases, see Appendix F.4).

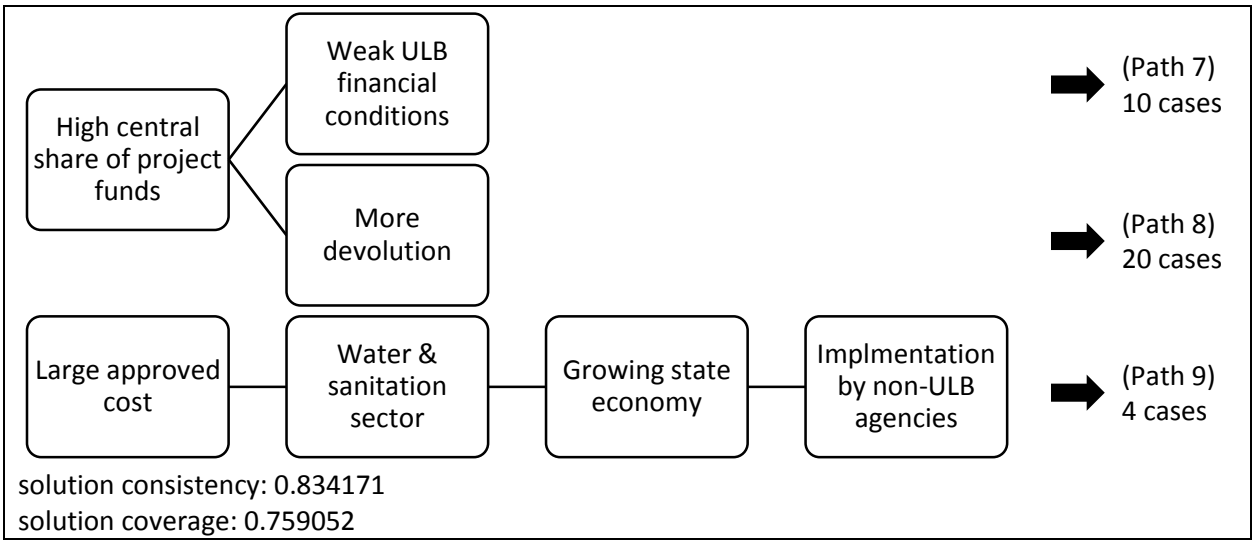


Figure 7-3 Sufficient Conditions for Cost Underruns

The cases with the three combinations are as follows:

1) projects with a high central share of project funds in a city where the ULB was in an unhealthy financial condition;
2) projects with a high central share of project funds in a city where more devolution reforms had been achieved; and
3) large-scale water and sanitation projects implemented by non-ULBs in growing state economies.

A high central share of project funds is included in the first two combinations of sufficient conditions for cost underruns. Path 7 to cost underruns is a part of the reverse condition of Path 3 to cost overruns. The projects with a higher central share of project funds in cities where the ULBs were financially weak tended to lead to cost underruns (Path 7). Ten cases in West Bengal, Karnataka, and Uttar Pradesh demonstrate this path. As described above, while a ULB in a healthy financial condition was burdened by a higher local share of project funds due to the lower central share of these funds, the ULB could be relatively unconcerned about the way it managed its projects since it could afford to bear the extra cost. On the other hand, ULBs in weak financial conditions were assisted by a higher central share of project funds, and the projects in the ULBs' cities could have cost underruns regardless of whether a project was implemented by a ULB or non-ULB agency.

In Path 8, the high central share of project funds combined with the status of devolution created another combination of sufficient conditions for cost underruns: projects with a high central share of project funds in cities where more devolution reforms were implemented could have cost underruns (Path 8). Twenty cases in Maharashtra, Gujarat, and West Bengal demonstrate this path. The devolution status is closely related to capacity factors at the environmental level such as governance (for details, see Section 5.2.1. and 6.2.2.1). The degree of the devolution to local governments varied depending on the state, and it determined contexts around the JNNURM projects. In the case studies, many respondents emphasized that the project itself could serve as an informal CD process. The transfer of functions, funds, and functionaries was critical to enabling ULBs to be involved in project processes and

thereby have opportunities to improve their capacity. Path 8 can support this finding. The projects with higher central shares of project funds in cities where the ULB was more autonomous were more likely to be implemented in accordance with their context, and this could be the reason why they had cost underruns. In addition, as the case studies suggested, projects with more financial support from the GOI and more devolved responsibilities might present opportunities for the implementing agencies to improve their capacities and be more concerned about project implementation. The effect of this combination of conditions can be different from the laissez-faire attitudes of financially strong ULBs with limited financial assistance, and stress therefore needs to be placed on devolution combined with greater financial assistance. The devolution for empowerment is considered as a basis for CD in this study, and this finding proves the significance of devolution.

Path 9 to cost underruns can be explained by comparing it with Path 6 to cost overruns. In Path 6, the transportation projects with large approved costs demonstrated cost overruns. In contrast, when water and sanitation projects with large approved costs were implemented by non-ULB agencies in a state where the economy was growing faster, the projects were more likely to have cost underruns (Path 9). The condition of the project size—large approved cost—is the same for both paths, but its combination with other conditions such as project sector, implementing agency type, and economic circumstance leads to different outcomes. However, unlike other paths that have cases in more than two states, this path is shown in four cases in one state, Karnataka. Thus, it could be a pattern in this state only and might not be applicable to other states.

7.4 DISCUSSION AND CONCLUSION

Chapter 5 reviewed the perceptions of CD in the Indian urban sector to identify differences between theory and practice. Chapter 6 focused on the two-way interaction between capacity and project outcomes through perceived project hurdles and investigated the spiral process of CD. This chapter examined the capacity factors necessary and sufficient for project cost overruns and underruns. Through this examination, this chapter verified the findings in the previous chapters with empirical data and discussed the issues related to capacity gaps for project delivery in the urban sector in India.

In particular, while Chapter 6 examined the impacts of capacity factors on the stages of a project cycle, this chapter used QCA to find pathways to better project delivery. Most CD researchers have adopted case studies in their research due to the qualitative characteristics of CD and sensitivity to context. However, different methods can study different aspects of capacity. Therefore, if more diverse research methods are utilized in CD studies, the complexity and causality of CD can be revealed. In this regard, it should be emphasized that this chapter adopted an emerging research method that is unique in the field of CD, and it demonstrated the effectiveness of the new approach.

The adoption of QCA to explore the complexity and causality of CD, led to the following two research questions that were posed in Section 7.1: Which combinations of capacity factors at different levels led to successful/unsuccessful project implementation in terms of project cost? and What kinds of CD actions are needed to improve project implementation? This chapter answered the research questions

by studying 126 projects in the urban sector in India. In Section 7.3, this study identified six pathways to cost overruns and three pathways to cost underruns, and discussed potential impacts of capacity factors at different levels as well as actions to improve project delivery when describing the capacity factors.

A summary of the answers to each research question addressed in this chapter follows.

- RQ7: Which combinations of capacity factors at different levels led to successful/unsuccessful project implementation in terms of project cost?

Necessary conditions that by themselves can create cost overruns or underruns did not emerge. This implies that the capacity factors were intertwined with one another and led to the intended outcomes via their interaction. This finding supports CD theory that maintains that improving one aspect of performance may not bring about the intended result, but a comprehensive CD approach can promote genuine progress.

There were six combinations of capacity factors that can cause cost overruns, and three combinations of capacity factors that can cause cost underruns. As shown in the combinations, the impact of some conditions were distinct with respect to the two outcomes. For example, while a low central share of project funds was dominant in the pathways to cost overruns, a high central share of project funds appeared in pathways to cost underruns. The financial condition of ULBs also appeared in pathways to both outcomes. Unlike the common perception, the healthier financial condition of ULBs led to cost overruns. State economic conditions and the type of implementing agency also appeared in pathways to both outcomes, and the different status of these factors led to opposite outcomes. However, the number of cases in the path to cost underruns is relatively small, so it is difficult to generalize the impacts of the different status of these factors.

The project sector is one causal condition that was found in the pathway to both outcomes. While the transportation sector was included in a pathway to cost overruns, the water and sanitation sector was included in pathways to both outcomes. Other conditions such as the type of implementing agency combined with the sectoral condition determined the outcomes, either cost overruns or cost underruns. Like the condition of the water and sanitation sector, the condition of large approved costs was included in pathways to both outcomes, with other factors determining the specific outcomes.

Unlike the factors included in the pathways to both outcomes, the lack of a ULB's organizational development only appeared in a sufficient combination for cost overruns, and higher achievement of devolution reforms only appeared in a sufficient combination for cost underruns.

Like every empirical study, this study has certain limitations with respect to its data collection, analysis, and interpretation.

First, for this analysis, the selected outcomes were based on the approved project cost and actual expenses, and for this reason, the combinations of the conditions causing each outcome tended to be skewed by financial and economy-related factors such as the share of the budget and the state economy. When the outcomes are generated using other indicators that allow quantification of effectiveness and efficiency in project delivery, the combinations of conditions may include capacity factors other than financial and economy-related factors. Even though the cost overrun is only one of

the measurable indicators for evaluating project delivery, it was the most reliable, available indicator in the case of the JNNURM project for this study.

In relation to this limitation, alternative project outcomes could be assessed using different indicators. For example, additional outcome indicators include the time a project was delayed, the quality of service provided by the urban infrastructure, and user satisfaction with the service provided. Each of these outcome indicators could be related to different combinations of capacity factors. Future research could explore each of these indicators and compare the results to the findings of this research.

Second, although the case selection aimed at maximizing the variance of conditions, projects for which the fourth installment of central assistance had not been paid and where the physical progress of the work was less than 70% of the total work were excluded—thus, 68 cases were systematically excluded from the dataset. This intentional exclusion that was needed to minimize errors in estimating the cost at completion limited the variance of certain conditions by generating an imbalance in the number of projects included within jurisdictions. Due to the case selection process, projects in certain states or cities were included more than projects in other states or cities—while the maximum number of projects in a given city was 28, the minimum number was 3. Thus, some cases shown in the pathways to the outcomes were biased towards a certain state, and this makes it difficult to generalize the results beyond the state (e.g., Path 9). However, the case selection process was a necessary step of QCA. Furthermore, this study analyzed 126 cases, which is much larger than the number included in typical QCA studies, which consist of around fifteen cases. Thus, this study can provide greater validity for generalization. Balance in the number of cases with specific conditions should be considered in future studies.

Third, the QCA analysis used various indicators to create the conditions that can represent the capacity factors identified in previous chapters. However, in spite of their significance for CD, some capacity factors such as leadership could not be included in the QCA part of this study due to lack of data availability and reliability. In addition, to ensure the validity of the capacity factors used and to maximize the replicability of the analysis, this study included indicators that were quantitative or quantifiable without being subject to the researcher's perspective, such as census data. The analysis results might be affected by the nature of the data that were used. When other, unused capacity factors are included in the data set, other types of combinations of conditions might be generated. Future studies can focus more on these factors.

Fourth, this analysis utilized substantial case-based knowledge to incorporate ground realities into the analysis. Nonetheless, there were certain limitations on the use of the case-based knowledge for calibration. While the field research and the case studies provided useful information at the city and state levels, they only provided partial information at the project level, since 126 projects were included in this analysis. Thus, this study could not incorporate project-by-project situations into the outcomes and conditions.

Some projects demonstrated an extreme condition such as exceptionally higher or lower percentages of cost overruns. For example, three projects showed overruns that were higher than 100%, and three projects showed underruns that were higher than 30% underruns, which is not the usual situation for urban projects. In such cases, the projects might have experienced scope changes due to unavoidable

problems related to certain site conditions and contextual factors, which can cause substantial estimate revisions. In the case studies, some respondents indicated that there were no actual site investigations for the proposed project, and due to unrealistic plans, they could not proceed with certain parts or regions of the project (for details, see Section 6.2.1.2). In the cases showing higher than 30% underruns, the scope of the project could have been reduced and the project might consequently be marked as complete. However, in this study, cost overruns and underruns were calculated with respect to the original approved costs, and revised estimates/budgets for the projects were not considered. Data that reflect various situational factors such as unforeseen site conditions and owner-directed changes would be necessary to account for modifications in project scope, but these were not available. As a consequence, the levels of overruns or underruns may not reflect either good or bad project delivery. Even though a number of extreme projects in the JNNURM were excluded during the case selection process by applying the criteria based on physical and financial progress, an unintended variance at the project level due to lack of information about the project-specific situation may be a limitation of this study.

Lastly, contradictory configurations occur when cases with identical values for relevant conditions display different values for the outcome of interest, and there are a number of strategies[13] to address these contradictory configurations (Yamasaki & Rihoux, 2009). The present study has 17 contradictory cases in the combinations of sufficient conditions. Of the study's 126 projects, 17 projects (13%) were included in pathways to different outcomes. (For details, see Appendices F.1, F.2, and F.3. Appendices F.2 and F.3 show the contradictory cases in each path.) Out of the 83 projects whose fuzzy score for the outcomes is above 0.5, 14 cases (17%) were included in some pathways to cost underruns and out of the 43 projects whose fuzzy outcome score is below 0.5, 4 cases (3%) were include in some pathways to cost overruns.

The calibration of fuzzy membership values, necessity analysis, truth-table analysis, and subset analysis are highly iterative processes, and retroactive reasoning must be used throughout the study to justify the calibration and inclusion of the possible conditions (Jordan, 2012). Through the iterative process, the problem of contradictory configurations—a set of empirical cases with the same set of condition values that display different outcome values—can be resolved or excluded from the analysis (Rihoux & De Meur, 2009). In this study, through the iterative processes of calibration and analysis, ten different sets of outcomes were created (for detailed information, see Appendix E) and more than 300 models with different configurations were examined. To minimize the contradictory configurations, certain knowledge was needed to exclude cases or recalibrate conditions. However, due to the lack of project-by-project information, the data set for this study could not be completely free of contradictory configurations.

[13] Rihoux and De Meur (2009, pp.48-9) identify the eight most common strategies, which are: 1) simply add some condition(s) to the model; 2) remove one or more condition(s) from the model and replace it/them by (an)other condition(s); 3) reexamine the ways in which the various conditions included in the model are operationalized; 4) reconsider the outcome variable itself; 5) reexamine the cases involved in each specific contradictory configuration in a more qualitative and "thick" way; 6) reconsider whether all cases are indeed part of the same population; 7) recode all contradictory configurations as [0] for the outcome value; and 8) use frequency criteria to "orientate" the outcome.

Compared to other QCA studies, however, the data set for this study was considerably large. In addition, the proportion of the contradictory cases was 13%, which is below the common threshold for an inconsistency level for sufficient conditions (20%), and two thirds of the contradictory cases had outcome values between 0.44 and 0.63, which are close to the cross-over point (0.5). For these reasons, this study retained the cases that created contradictory configurations rather than excluding or manipulating them. Notwithstanding their small proportion in the large data set, the existence of these inconsistent cases constitutes a limitation of this study.

- RQ8: What kinds of CD actions are needed to improve project implementation?

Most of the QCA results verified the findings in the case studies. The QCA results provide support for many opinions about the need for organizational development and institutional reform. In particular, the QCA results related to a ULB's financial status, the rate of the central share of project funds, and the amount of approved costs can be associated with many aspects of capacity at the individual level, such as know-how, experience, and attitude. These results demonstrate that capacity factors at different levels are highly interactional and that the combined factors can lead to different project outcomes. In general, the cases that were included in a specific pathway provide generalizable implications for cost overruns and underruns in contexts with those conditions.

While most guidelines provided by major international agencies are organized based on the perspective of a comprehensive approach, CD interventions in practice rarely adopt a comprehensive approach. In addition, there are few empirical studies that attempt to evaluate causation based on the comprehensive perspective. Using the QCA method, however, this study not only contributes to diversification of research methods but also enhances CD theory based on the multidimensionality of the concept. Even though only one capacity factor at the environmental level—state economy—was included in pathways to different outcomes, the influence of this factor was evident. The sufficient combinations of conditions demonstrate that the capacity factors at the individual, organizational, and environmental levels can be combined in different ways and generate different outcomes through their interaction. In this regard, the design of interventions to fill the identified capacity gaps in India's urban sector should consider the interactions between individuals, their organizations, and the environment around them to create better outcomes.

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CHAPTER 8 CONCLUSION

8.1 SUMMARY AND CONTRIBUTION

This research began with the question "How can we operationalize CD?" From this starting point, the research sought to reveal the operational values of CD. Following the introduction in Chapter 1, the main theories and ideas related to CD were explored in Chapter 2. This literature review was then used in Chapter 3 to identify the capacity factors that are applicable to the urban sector in India and to develop a CD framework to guide this research. The research methodology was outlined in Chapter 4, followed by a presentation of the research findings in Chapters 5–7. Chapter 5 investigated the gaps between CD theory and practice through the lens of practitioner perceptions of CD. Chapters 6 and 7 examined the relationship between capacity and development goals using different methods and data sources.

This research contributes to both CD theory and CD practice. The research was based on a comprehensive approach that not only considers CD at multiple levels but also covers different CD subjects such as context, actor, dimension, process, and impacts. Through this comprehensive approach, a CD research framework was developed and used to identify important findings that can help researchers and practitioners operationalize the complex concept of CD.

Table 8-1 provides a summary of problems that were found in the existing CD literature, how these relate to the research objectives of the present research, and the main research findings and contributions.

Table 8-1 Summary of Research Objectives, Findings, and Contributions

Problems	Objectives	Findings		Contributions
There are no CD frameworks that are applicable to the urban sector in India	Develop a theoretical framework for CD research focused on the urban sector in India	• Reviewed existing literature on CD and summarized the main CD principles • Identified capacity factors at different levels and developed a framework applicable to the urban sector in India	→	Developed a theoretical framework for CD in the urban sector in India and applied this to a real-world case
Gaps exist between CD in theory and in practice	Understand how capacity and CD are perceived and applied in practice	• Identified the gaps between theory and general perceptions of CD in terms of context, actor, dimension, and process • Demonstrated a variable understanding of CD based on different group characteristics	→	Identified the perspectives on CD held by internal actors
			→	Articulated how the concept of CD is applied in practice
There is a lack of understanding of the relationships between capacity, performance, and project outcomes	Identify how capacity is connected with project performance and outcomes	• Investigated influences of capacity on the project cycle • Analyzed two-way causal relationships between capacity, performance, and project outcomes	→	
			→	Revealed the relationships between capacity and development goals
Few empirical studies have attempted to identify the causal relationships between capacity and project outcomes	Empirically examine the impacts of capacity on project outcomes	• Identified six pathways to cost overruns and three pathways to cost underruns • Investigated the interaction of capacity factors at different levels and their conjunctural impacts	→	
			→	Diversified the research methodologies used in the field of CD by applying QCA to a real-world problem

More detailed accounts of the main research contributions follow.

- **Developing and applying a CD framework to a real-world case in urban India (Chapters 2 and 3)**

Since the 1950s, CD has been the focus of much research by the international development community (see Section 2.2). Many major international organizations have proposed guidelines and CD frameworks. This research reviewed the extensive literature on CD (§ 2.3 and 2.4), summarized essential CD principles (§ 2.5), and identified capacity factors that are applicable to the urban sector in India (§ 3.4). This information was then used to develop a CD framework that is applicable to the Indian urban sector (§ 3.5). The CD framework follows a logical approach similar to other established frameworks; it consists of key factors and covers the multiple levels of CD. This research demonstrates how existing CD frameworks can be revised and applied to a regional context through locating critical CD factors in a new theoretical framework. By using this framework to investigate the complex relationship between framework components such as capacity factors and project delivery (Chapter 6) and to examine the

impacts of capacity factors on project delivery (Chapter 7), this research demonstrates the usefulness of the framework for understanding the urban sector in India, which expands the literature discussing CD theories in a new, important way.

- **Understanding the perspectives of CD held by governmental agencies rather than the perspectives of international organizations (Chapter 5)**

CD originated from a view that emphasizes endogenous capacity and transformation based on the endogenous capacity of internal actors (Kühl, 2009). Although many international agencies have studied CD, the arguments are mainly related to its position as an external force (ADB, 2011; EuropeAid, 2010; HLG, 2011; OECD, 2006a; UNDP, 2009; World Bank, 2011b). Unlike these studies, this research focused not on the context of international agencies as external actors requiring domestic actors to initiate CD programs, but on a context in which capacity issues were raised by the interaction between governments at different levels (§ 3.3). Although the existing approaches to CD by international agencies most likely influenced the approach to CD adopted by the GOI, this research provided a regional perspective on CD that includes local governments (§ 5.2). To date, the majority of studies on CD have been led by international agencies (Chapter 2). The significance of the present research is that it studied the process and meanings of CD arising in the regional context led by internal actors (§ 5.3).

- **Understanding the application of the CD concept in practice (Chapters 5 and 6)**

Nearly every major organization in the development industry has published at least one policy paper on CD (Kühl, 2009). However, most capacity analysis has arisen out of the operational experience of managing projects and programs (Baser & Morgan, 2008). Thus, while the theoretical discussions on core principles and practice guidelines are extensive (James & Hailey, 2007; Lopes & Theisohn, 2003), the development industry is entrenched in conventional practices in many respects (Boyd, 2009). This research moves beyond the theoretical discussions found in many existing CD studies and provides an example of how CD can be studied in the context of a significant urban infrastructure program in India. By investigating the application of CD in the JNNURM, this research provides a rich understanding of how CD is applied in practice. Moreover, by capturing the perceptions of diverse stakeholders in the Indian urban sector, this research identifies the gaps between theory and practice in terms of context, actor, dimension, and process, and documents the multidimensionality of the concept (§ 5.2 and Table 5-3). For example, while theoretical discussions emphasize CD as a comprehensive approach, practitioners perceive CD as training or staffing. In addition, it is evident that CD theory and practice are intertwined in the urban sector in India (§ 6.2). This finding can be used to conceptualize the components of CD and better integrate these components with existing research (§ 5.3 and § 6.3).

- **Revealing the relationship between capacity and development goals (Chapters 6 and 7)**

Many studies have contributed to the development of CD theories, but few have empirically applied the theories to a real case. Although conceptual frameworks focus on endogenous CD, they are never applied “backwards” to look at past activities in light of CD (Baser & Morgan, 2008), and little information is available about how the CD guidelines have been used and what the results have been (Horton, 2011). Using cases studies (Chapter 6) and QCA (Chapter 7), this research advances our understanding of the relationship between capacity and development goals such as improving project performance. Unlike traditional thinking on the linear relationship between capacity, performance, and

project outcomes, the case studies reveal two-way causal relationships between capacity, performance, and project outcomes that form a spiral structure between the project cycles and capacity factors (§ 6.2 and Figure 6-3) . Better capacity can enhance project performance and lead to better outcomes (§ 6.2.2), and project performance and outcomes also influence and reinforce capacity in the reverse direction (§ 6.2.3). Moreover, through QCA, this research identified the causal relationships between capacity factors and outcomes and demonstrated that the capacity factors generate different outcomes through their interactions with other capacity factors (§ 7.3). This finding contributes to our understanding of how capacity is interconnected with development goals (§ 7.4).

- **Introducing QCA to CD research and diversifying CD research methodologies (Chapter 7)**

Few reports on evaluations of CD programs are available in the public domain, and papers published in professional journals tend to be single evaluation studies (Horton, 2011). As the first application of fsQCA considering capacity at multiple levels, this research diversifies the methodological approach to CD research. In particular, using the QCA technique, which analyzes multiple pathways to outcomes, this research has demonstrated how combinations of capacity factors at different levels can result in the successful/unsuccessful delivery of a project (§ 7.3). This research also shows how the more traditional approach to CD research that relies on case studies can be expanded and integrated with the QCA technique. The result is a more comprehensive and nuanced understanding of capacity that could have important implications for CD research in multiple fields (§ 7.4).

8.2 IMPLICATIONS FOR CAPACITY DEVELOPMENT PRACTICE AND POLICY

This research has identified the significance of CD for the urban sector in India. The research has significant implications for CD policy and practice in the urban sector in India that are discussed in the following sections. The broader implications for CD policy and practice for other countries are also discussed.

8.2.1 Implications for the Urban Sector in India

The JNNURM program provided a systemic approach to addressing urban issues in India. It attempted to respond to India's rapid urbanization by promoting not only physical improvements through substantial project assistance, but also institutional reforms focusing on empowerment of local governments. It facilitated physical, financial, institutional, and paradigmatic changes in the urban sector in India. With respect to CD, it adopted various tools in accordance with program objectives and CD theories.

This research focused on capacity issues during the first phase of JNNURM (2005–2012) and the transitional phase (2012–2014). The research documents the opinions of project implementers and demonstrates that different conditions of institutional and individual capacity that combine with external interventions such as financial support can lead to different project performance and

outcomes. Even though the GOI's initiatives to develop institutional and individual capacity were comprehensive and systematic, this research found that many of these initiatives, such as earmarking CD funds without guidance for utilization and providing training without considering transfer systems, were not effective in practice.

Having recognized CD problems through the experience of the first phase of the JNNURM, the GOI attempted to address the problems during the second phase of the JNNURM and through the 12th Five Year Plan. The second phase of the JNNURM paid more attention to CD, and the GOI provided clear recommendations for advancing CD in the 12th Five Year Plan (HPEC, 2011; Planning Commission, 2011b, 2012a, 2012b). As shown in Tables 3-4 and 3-5 and described in Section 3.3.5, the GOI identified deficits in the JNNURM program's previous approach to CD and formulated policy recommendations to address these deficits. However, even though the recommendations are well structured, the findings in this research point to new pathways for improving capacity.

The GOI treats urban governance and capacity building as separate themes in the urban sector, despite their similar contexts. Not only is governance recognized as a critical capacity factor in existing CD literature, but governance has also been a determinant of changes in ULB capacities in the context of India's urban sector. Thus, urban governance should not be treated as a separate theme, but should rather be incorporated into capacity discussions. Without integrating the theme of urban governance with the theme of capacity building, the recommendations for CD will remain similar to the previous approach. Although the Working Groups on Capacity Building for the 12th Plan provided several recommendations, most recommendations are biased toward institution strengthening and human resource development. This is in part due to the disconnection between capacity discussions and urban governance. In its recommendations for urban governance, the GOI recognized the close relationship between different capacity levels of the ULBs and the status of JNNURM project deliveries, and these recommendations emphasize the empowerment of ULBs for CD and JNNURM project delivery. However, the recommendations continue to focus on achieving the reforms that were advanced in the first phase of the JNNURM and not on actively connecting the reforms to the ULBs' capacities. In sum, the enhancement of urban governance needs to be regarded as a critical factor for CD, especially with respect to improving the capacities of ULBs.

This research found that the governance structure, which varied depending on the state, shaped different contexts for CD, and the interview respondents showed different perceptions of CD that depended on their context. This implies that uniform recommendations for all stakeholders may not be effective. When urban governance is led by entities at the central government level, flexibility needs to be offered to local entities so that they can adjust the recommendations to fit their context. In connection with this flexibility, there should be clear guidance from the central government that provides a coherent understanding of the CD program and the meaning of CD. Without a coherent understanding of CD among stakeholders, evaluation of the impact of CD interventions becomes problematic.

The theme of capacity building should be replaced with the theme of capacity development by reconsidering the current capacity of ULBs and embodying the concept of *transformation* in the program, rather than replacement. The first phase of the JNNURM adopted many interventions at the organizational level, such as financial assistance for hiring consultants in the "Programme Management Unit," but most interventions were disconnected from changes in the in-house capacity of ULBs. This

research demonstrated that CD interventions devised by the JNNURM to address capacity gaps in the ULBs led to temporary changes and were rarely integrated with the transformation of existing capacities. Similar to the JNNURM's previous approach, in the 12th Plan the Working Groups recommend outsourcing in various areas of the urban sector. However, to effect different results than those of the previous approach, the 12th Plan should devise and include tools to transform the external expertise into internal capacity. For example, as suggested by some respondents (for details, see Sections 5.2.2 and 5.2.4), hired consultants can train government officials through on-the-job training. As suggested by a Baser and Morgan (2008) study, by examining the history of organizational changes and the roles of the organizations in the extended networks, a relevant strategy for each organization can be devised. The UNDP (2009) also notes that functional capacities lie at the heart of the transformation driving the CD process. Thus, the GOI should devise tools that focus more on soft capabilities.

To bring about substantial changes in the capacity of ULBs, capacity issues in the urban sector in India should be approached from a comprehensive perspective on capacity that takes its multiple levels into account. This research found that institutional and individual capacities are influenced by other contextual factors and that no capacity factor by itself determines whether a project will be a success or a failure. Thus, adopting a narrow approach to CD can lead to oversimplification and make it impossible to identify the capacity issues that are actually impacting project performance.

In the comprehensive approach, changes in institutional and individual capacity can be accelerated by not only formal and external interventions, but also by informal and hidden processes. The CD approach under the JNNURM focuses on overt interventions such as earmarking funds for CD. However, the present research demonstrates that *informal* and *shadow* processes in project participation are as important as formal and external CD interventions. Many respondents indicated that their participation in project delivery became an opportunity for learning-by-doing, and they considered project participation from the very beginning to be a key aspect for CD. Approaches to CD in the second phase of the JNNURM should consider providing more opportunities for project participation and connecting the devised CD interventions with the activities in the project cycle, and these approaches should be institutionalized in a system. This system should be designed to enable learning and be able to adapt to new initiatives/ideas as they arise, rather than relying on formal training institutions or an earmarking of funds for CD. The GOI's approach to CD in the first phase of the JNNURM is considered ad hoc and sporadic (Planning Commission, 2011b); for details, see Section 3.3). One of the main reasons is that the GOI approached capacity as a means for the quick provision of infrastructure, one of the program objectives, and regarded CD interventions as a tool to facilitate project implementation. The other objective of the JNNURM was the empowerment of local governments, but the perspective on capacity as a means for project delivery did not support the other objective and CD became a second priority. Eventually, the existing perspective on CD negatively affected not only the empowerment of ULBs but also project delivery. Therefore, the GOI's approach to CD should be based on the perspective that capacity is an end in itself and should allow sufficient time for actors to develop their capacities through learning-by-doing.

In addition to the Working Groups' numerous recommendations for the 12th Five Year Plan, this research suggests fundamental changes in the approach to CD for JNNURM II as follows:

- Integrate the theme of urban governance with the theme of capacity building;

- Engage ULBs in project delivery from the stage of project initiation, even though the project is planned and implemented by other agencies;
- Devise a common platform between ULBs and consultants where knowledge transfer can take place;
- Identify context-actor relationships in each state and apply different tools for CD based on historical changes in the involved organizations;
- Avoid the uniform application of CD and present multiple options for customizing the CD applications to fit the local context;
- Identify contextual constraints on CD and project delivery that are beyond the direct control of the program and suggest alternatives to overcome these constraints;
- Provide sufficient time for ULBs to adjust themselves to their new functions and build their capacity;
- Provide more opportunities for project participation focusing on informal CD processes; and
- Provide sufficient funds for CD and the autonomy for organizations to utilize these funds in accordance with their own situations.

These suggestions are not meant to replace current initiatives by the MOUD, such as fostering municipal cadres and establishing regional hub-institutions for training, but to enhance the effectiveness of the CD programs.

8.2.2 Implications for Other Urban Programs

As described in Section 3.2, many developing countries are facing challenges related to rapid urbanization such as the lack of infrastructure systems and services, and the urban infrastructure program in India provided a unique opportunity for exploring capacity and CD. The case of the JNNURM includes diverse contexts in terms of the physical environment, institutional setting, and socioeconomic conditions, and covers various aspects of CD. This research highlights several important implications for urban programs in other countries.

The case of the JNNURM shows that when a government designs a development program, it should first consider identifying the relevant capacity factors and then use these to assess stakeholder capacity. It also demonstrates that CD interventions should be implemented before the infrastructure program and should be designed in accordance with the program cycle. As existing CD literature highlights, no matter which objectives of the program are pursued, the context for the capacity issues should be understood before the program planning and design (ADB, 2011), and a balance between short-term and long-term interventions as well as the timing for these should be considered by both external interveners and internal actors (Baser & Morgan, 2008).

Furthermore, CD should be handled as both a means for development goals and an end in itself. When CD is utilized only as a means for achieving other development goals, the CD process itself tends to be neglected, which could undermine the achievement of development goals. Adding a focus on CD as an end in itself may result in long-term capacity enhancements, which could promote sustainability of

development goals. Thus, CD interventions should be accompanied by relevant monitoring and evaluation of systems with respect to both the development goals and the CD process itself. During monitoring and evaluation, practitioners and policy makers should be aware of the complex causal relationships between capacity, performance, and development goals. These complex interactions should be emphasized rather than assuming a simple linear relationship between capacity and development goals.

One of the most important principles for CD that the case of India's urban sector demonstrates is that capacity issues cannot be solved by financial assistance alone. When institutional assistance was limited, the financial assistance that was earmarked in the program went unspent. The local context and existing endogenous capacity should be considered when institutional assistance is provided. Moreover, a key aspect of CD is the institutional setup that distributes powers and responsibilities fairly in accordance with the local context and the stakeholder's capacity. With fairly distributed powers and responsibilities, informal CD processes can take place among the stakeholders, driven by autonomous entities and fitting into the local context.

8.3 LIMITATIONS AND FUTURE WORK

8.3.1 Limitations

Like all empirical research, this research has certain limitations in terms of data collection and analysis as well as the justifications for the research findings.

8.3.1.1 Data Collection and Analysis

This research utilized case studies, which have well-known limitations. First, the participants used many different terms relating to the multidimensionality of capacity interchangeably. Even though this interchangeability was carefully considered, there is a possibility that interview participants were misunderstood. Some participants were confused about the use of specific terms, and their misperceptions about these terms might have led to a misunderstanding of the research questions. During data collection, miscommunications could occur, and the selection of particular terms could be affected by the participants' lack of fluency in the interview language of English. Aware of these issues, this research attempted to articulate alternative interpretations of terms and disclosed all of these alternative interpretations in the case studies.

During the data analysis, the researcher's worldview can also influence the interpretation of the results. To address this issue, the participants' opinions were articulated using the research propositions and the research framework was used to minimize the influence of the researcher's worldview.

As described in detail in Section 7.3, the QCA has limitations with respect to data collection and analysis. Five specific limitations were discussed, all of which are related to data availability and reliability. Even though this research utilized abundant data from various sources and incorporated in-depth theory- and case-based knowledge to interpret the results, it still faced common challenges in the QCA process such as case sensitivity in selecting conditions and cases because of limited information at the project level. In addition, some capacity factors could not be included due to an absence of reliable data. The large size of the data set also had pros and cons for the data analysis. The large data set provided more generalizable results, but it also created more difficulty because of the vast case-based knowledge that needed to be analyzed. However, this research maintained transparency throughout the QCA process and provided full details about the data collection and analysis. Therefore, many inherent challenges in QCA were adequately addressed.

8.3.1.2 Justification of Research Findings

In general, the case study method has limitations with respect to identifying the generalizable results and exploring causality between factors. However, by including diverse contexts around similar capacity issues and clarifying the potential influence of the contexts, this research attempted to address the limitation concerning the generalizability of case study research. In addition, this research used extensive data to produce meaningful results beyond a single case. Nevertheless, since context around capacity issues is one of the most critical components in CD studies, the context of the cases should be taken into account when the conclusions from the case studies of this research are applied to other CD research.

For the QCA results, there exists the possibility of alternative explanations. There were certain pathways and conditions, such as the project sector, that could not be easily explained due to a lack of project-level information. Moreover, 13% of the sample cases that were included in the pathways led to contradictory outcomes. Due to a lack of information, this research did not drop the cases in the contradictory configurations and minimized manipulations of project data while calibrating conditions. The existence of these cases weakens the soundness of the pathways. Furthermore, this research analyzed the combinations of ten capacity factors, and the inclusion of additional conditions could alter the pathways to each outcome. However, by using a large data set, applying specific criteria for case selection, and using diverse indicators for condition calibrations, this research increases both the generalizability of the findings to other projects in India and the replicability of the analyses.

8.3.2 Future Research

Future research suggestions are related to the limitations discussed above. This research attempted to ensure the validity and reliability of data collection, analyses, and interpretations by using multiple sources and considering the possibility of other explanations. In particular, the two research methods that were adopted complemented one another. The QCA results underpinned the case study findings, and at the same time the case studies provided considerable information for interpreting the QCA

results. Nonetheless, there were limitations related to data availability, and future research on the JNNURM that expands on this work could address these limitations.

For the case studies, in order to generalize the research findings, similar and different conditions than those included in this research need to be studied. In particular, future research should focus on (1) the gaps between theory and practice identified through the participants' perceptions of CD, and (2) the complex relationships between capacity, performance, and project outcomes. Based on different geographic boundaries such as national-, regional-, or local-level programs, general perceptions can be gathered, and a comparison of perceptions beyond the boundary of a country, region, or community can enhance our understanding of the application of CD.

Finally, this research is the first application of the QCA method to CD. In order to extend the QCA, the outcome and condition variables should be diversified. As described in Section 7.3, different outcomes can be utilized to measure project success, and qualitative data can also be included in the analysis, if accurate indicators are identified. In addition, the use of project-by-project information will enable more sophisticated combinations of capacity factors to be explained. The QCA method can also be used for other CD studies focusing on different aspects rather than multiple levels, as well as on other contexts such as differential goals rather than project delivery. Such future work will help to unravel the ambiguousness and complexity of CD.

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APPENDIX A INTERVIEW PROTOCOL FOR PRELIMINARY RESEARCH

This protocol is approved by the Institutional Review Board at Virginia Tech (IRB # 12-790).

Preliminary Field Research - Interview Protocol

- Interview questions will be customized depending on participants (supervisor(S)/ working level staffs (W)) and agencies (government/ donor agency/ academia/ training institutes/ NGO).
- The interview questions are about participant's experience, knowledge, perspectives, and opinion on each section.

0. Introduction
1. Current/past infrastructure development in India
2. Current/past capacity building programs for the infrastructure development
3. Sustainable infrastructure development in India
4. Alternative capacity building program for the sustainable infrastructure system (Evaluation of capacity/ Needs assessment)
5. Further study

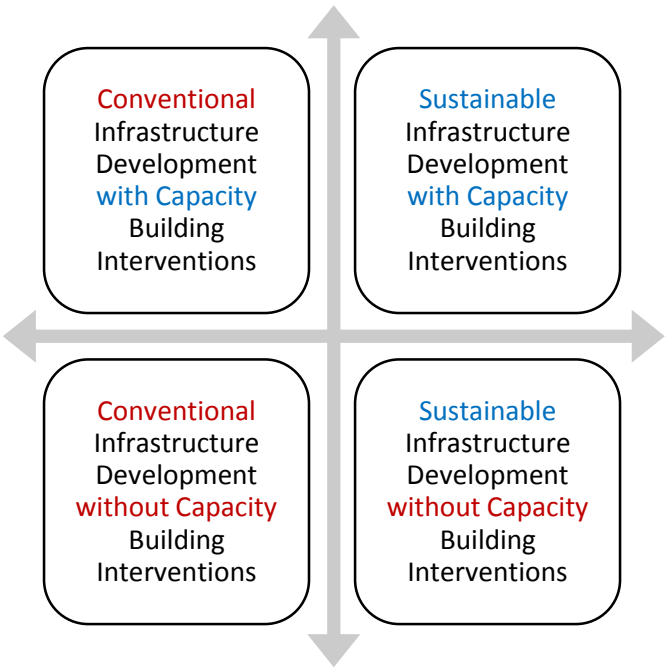

Figure A-1 Main Themes of Preliminary Research

0. Introduction

Could you tell me the project that you are participating in? (W) / could you tell me your organization's program for urban infrastructure development in India? (S)

Table A-1 Preliminary Research Interview Questions

Type	Main Questions	Back-up Questions	Remarks
1. Current infrastructure development in India			
Knowledge/ perspective	• What are the critical issues concerning infrastructure project implementation in India?	Are you familiar with the Jawaharlal Nehru National Urban Renewal Mission (JNNURM)? What do you think about the current infrastructure projects under the JNNURM?	Many reports indicate that planned infrastructure projects in India have experienced under-performance such as time and cost overruns which hinders other aspects such as economic development. The reports also indicate that one of the biggest reasons of under-performance is the capacity gap—such as a lack of qualified human resource, a lack of skills and knowledge of existing workforce, and an inappropriate organizational system, etc.
Experience	• What is your main concern with your (or your organization's) projects?	What are the reasons for this concern? What kinds of actions do you think need to be taken to solve the problems?	
Opinion	• Do you agree that the capacity gap exists, and is it the cause of the under-performance of infrastructure development in India? If so, why? If not, why not?	What do you think of the opinion on under-performance? (If disagree) How do you define under-performance of infrastructure projects? What factors do you think will be most critical to the implementation and maintenance of infrastructure projects India?	
2. Current capacity building program for the infrastructure development			
Knowledge/ perspective	• What kinds of capacity are most important for current infrastructure development in India? (e.g., individual technical skill and knowledge, leadership, communication, institutional structure, work process, etc.)	Are you familiar with the concept of capacity building (CB)? What do you think CB means? What types of activities are linked with CB, and what do you think the activities are designed to achieve? (e.g., training, organizational incentive, etc.)	When JNNURM was initiated in 2005, there was 5 percent earmarked budget for CB. According to the mid-term appraisal of the Five Year Plan, the budget was rarely used, even though other components of the budget for actual projects were spent as planned.
Experience	• Do you think that capacity building programs have a low priority at the local government level?	Why do you think the budget was not spent? Was the budget for CB used in your organization? If so, how? If not, why not? How do you evaluate your performance for your project? Do you think that	

Type	Main Questions	Back-up Questions	Remarks
	• Have you participated in any CB programs for the projects under the JNNURM? What do you think about the program?	the CB program you participated in was helpful for your work? If so, why? In what ways? If not, why not? In what ways?	
Opinion	• What are the main obstructions to the current CB program at an individual and institutional level?	What do you think of the current/past CB program under the JNNURM? What kinds of impact dose the CB program have (e.g. improving an individual's capacity, facilitating implementation and maintenance of projects)?	
3. Sustainable infrastructure development in India			
Knowledge/ perspective	• What do you think are the main differences between conventional and sustainable infrastructure system?	Are you familiar with the concept of sustainable infrastructure? How do you describe sustainable infrastructure development? What kinds of components need to be considered in sustainable infrastructure system?	Even though the term "sustainable infrastructure" is used widely by international organizations, a common agreed upon definition is hard to find. Common features in each of the definitions: 1) many organizations recognize SI as a key tool for sustainable development; 2) the definitions of SI emphasize values of infrastructure in three dimensions of sustainability.
Experience	• For your project to become sustainable infrastructure project, what aspects of your project do you think needs to be changed or enhanced?	Do you think that your project can be considered as sustainable infrastructure project? If so, why? If not, why not?	
Opinion	• Do you think that India needs to adopt more sustainable infrastructure systems? If so, why? If not, why not?	What benefits do you expect from the sustainable infrastructure development? What factors are critical to the implementation and maintenance of sustainable infrastructure projects?	
4. Alternative capacity building program for the sustainable infrastructure system			
Knowledge/ perspective		Are you familiar with the Capacity Building for Urban Development (CBUD) project initiated	Capacity building of Urban Local Bodies to take up the challenging

Type	Main Questions	Back-up Questions	Remarks
		recently? What do you think about the contents of the CBUD projects?	task of implementing projects and reforms under JNNURM is recognized as a priority of the Mission. The CBUD project is expected to result in the up-gradation of institutional and human resource capacity for improved urban governance and basic services. The Mission Directorate accepts proposals from States/UTs and ULBs and Training Institutions.
Experience	• How do you evaluate your knowledge and skills to perform the sustainable infrastructure project?	Have you attended any CB program which supports sustainable infrastructure development? If yes, what do you think about the program? What aspects of the program were helpful? Are you interested in learning more about sustainable infrastructure (e.g. rating system, infrastructure assessment tools, etc.)	
Opinion	• Considering future demands for sustainable infrastructure, what kind of skill sets and knowledge are needed to facilitate sustainable infrastructure development?	What kinds of alternative options (modalities, subjects, etc.) for CB can be considered? Are these alternatives likely to be successful? How can such a program be institutionalized? What are the roles of higher educational institutions?	
5. Further Study			
Opinion	• For a survey to see the relationship between CB and its outcomes quantitatively, what kinds of questions should be asked to what kinds of people?	(Data collection) Does a study on impacts of the past/current CB programs exist? What kinds of indicators need to be used to capture the impacts of the CB program? Do you think the results of CB program are reflected in the reform and project progress?	

APPENDIX B INTERVIEW PROTOCOL FOR CASE STUDIES

This protocol is approved by the Institutional Review Board at Virginia Tech (IRB # 13-667).

- Interview questions are about participant's experience and opinions, and will vary depending on the participant's organization.

1. Current/past JNNURM projects

- Could you tell me the JNNURM projects that you are (or your organization is) participating in?
- What is your main concern with your (or your organization's) project?

2. Capacity issues in the projects

- Do you agree that a capacity gap exists, and is it the cause of time and cost overruns of the project implementation?

3. Capacity at individual/project level

- How do you evaluate your (or your staffs) capacity to perform the JNNURM project?
  - Were the staff's skill and knowledge effective to implement the project?
  - Were collaborations with consultants effective to implement the project?
  - Were there any influences of project types (sector, modality, etc.) on implementing the project?
  - Have you participated in any capacity building programs under the JNNURM? What do you think about the program?

4. Capacity at organizational level

- How do you evaluate your agencies' capacity to perform the JNNURM project?
  - Were the reforms effective to implement the project?
  - Was the institutional structure effective to implement the project?
  - Does your agency have any organizational development strategies (HRD policy, incentive system, recruitment and retention policy, own trainings)? Were they effective to implement the project?
  - Was financial condition of your agency effective to implement the project?
  - Were collaborations with civil organizations or experts effective to implement the project?
  - Were there any leaders to implement the project? How did they contribute in the project?
  - Does your agency have any actions for accountability? Were they effective to implement the project?

5. Capacity at enabling environment level

- What do you think about environment to perform the JNNURM project?
  - Were economic conditions effective to implement the project?
  - Were sufficient qualified people or contractors available to implement the project?
  - Were political conditions in your state effective to implement the project?
  - Were there any social conditions effective to implement the project?

6. Needs for alternative capacity development program

- Considering effective project delivery, what kind of capacity development programs are needed to facilitate it? What do you suggest to promote better project implementation?

7. Further study

Any suggestions for this research (data collection, interviewees, etc.)

APPENDIX C CODING PROCESS AND CODES

C.1 FIRST CYCLE CODING

Attribute coding

Attribute Coding is the notation, usually at the beginning of a data set rather than embedded within it, of basic descriptive information (Saldaña, 2009).

- Interview information: state, city, interview location, interview date, interview time, interview type, agency name, agency type, the number of JNNURM projects of the agency, interviewee name, interviewee designation, recording time, recording file name, transcript ID.
- Attribute values used in the attribute coding (Figure C-1): transcript ID, interviewee name, state, city, agency name, agency type, interviewee designation, recording time.
- Interview ID (Table C-1): State, City, Organization Type, Interviewee number (e.g., Interview 4213: interviewee 3 at the ULB of City 2 in Uttar Pradesh).

Table C-1 Interview Identification Number

No	State	City	Organization Type	Interviewee
1	Karnataka	City 1 in the state	ULB	Interviewee 1 in the organization
2	Maharashtra	City 2 in the state	Parastatals	Interviewee 2 in the organization
3	Gujarat	City 3 in the state	Private sector/others	Interviewee 3 in the organization
4	Uttar Pradesh	State-level organization	-	Interviewee 4 in the organization
5	West Bengal	-	-	Interviewee 5 in the organization

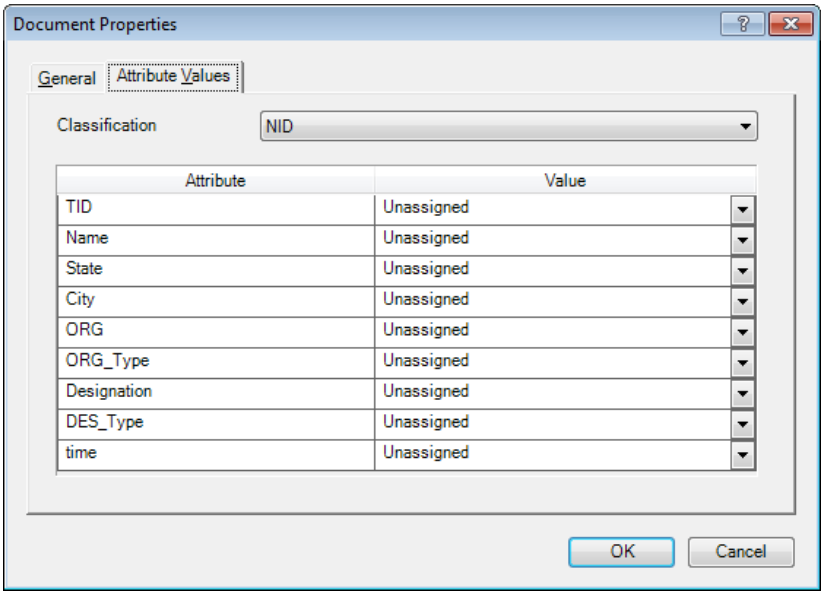

Figure C-1 Example of Attribute Values

Structural Coding

Structural Coding applies a content-based or conceptual phrase representing a topic of inquiry to a segment of data that relates to a specific research question used to frame the interview (Saldaña, 2009).

- The structural codes were auto-coded based on the interview questions: interview documents can be auto coded based on style or structure—e.g., paragraph styles of the set of questions (QSR, 2014).

- Structural codes:

Category: Question~ organization introduction
Category: Question~ project information
- Sub-category: Question~ project initiation
- Sub-category: Question~ project success factors
- Sub-category: Question~ PPP agreement
- Sub-category: Question~ relationship with private sector

Category: Question~ problems on project delivery
- Sub-category: Question~ governance
- Sub-category: Question~ motivation
- Sub-category: Question~ problems on BRTS project
- Sub-category: Question~ relationship with private sector

Category: Question~ project evaluation
Category: Question~ capacity evaluation
- Sub-category: Question~ financial conditions
- Sub-category: Question~ governance
- Sub-category: Question~ leadership
- Sub-category: Question~ motivation
- Sub-category: Question~ organization record
- Sub-category: Question~ partnership
- Sub-category: Question~ politics
- Sub-category: Question~ public engagement
- Sub-category: Question~ recruitment
- Sub-category: Question~ relationship with private sector

Category: Question~ suggestions on capacity development
- Sub-category: Question~ autonomy
- Sub-category: Question~ governance
- Sub-category: Question~ leadership
- Sub-category: Question~ low interests in capacity development
- Sub-category: Question~ motivation
- Sub-category: Question~ recruitment
- Sub-category: Question~ relationship with private sector

Descriptive coding

Descriptive Coding summarizes a word or short phrase that is the basic topic of a passage of qualitative data. It is essential groundwork for Second Cycle coding and leads primarily to a categorized inventory, tabular account, summary, or index of the data's contents (Saldaña, 2009).

- Descriptive codes were created based on keywords from the respondent's answer to the interview questions (Figure C-2).

- Descriptive codes: 182 nodes

  e.g., Suggestions for capacity development
  - Code: Staffing
  - Code: Supporting infrastructure
  - Code: Trainings
  - Code: Deployment of senior people
  - Code: E-government system
  - Code: Exposal
  - Code: Collaboration
  - Code: Involvement to project implementation
  - Code: Learning by doing
  - Code: Political supports
  - Code: Reforms
  - Code: Revenue generation
  - Code: Funds and opportunities
  - Code: Empowerment
  - Code: Environmental changes
  - Code: Pilot projects
  - Code: Self-esteem

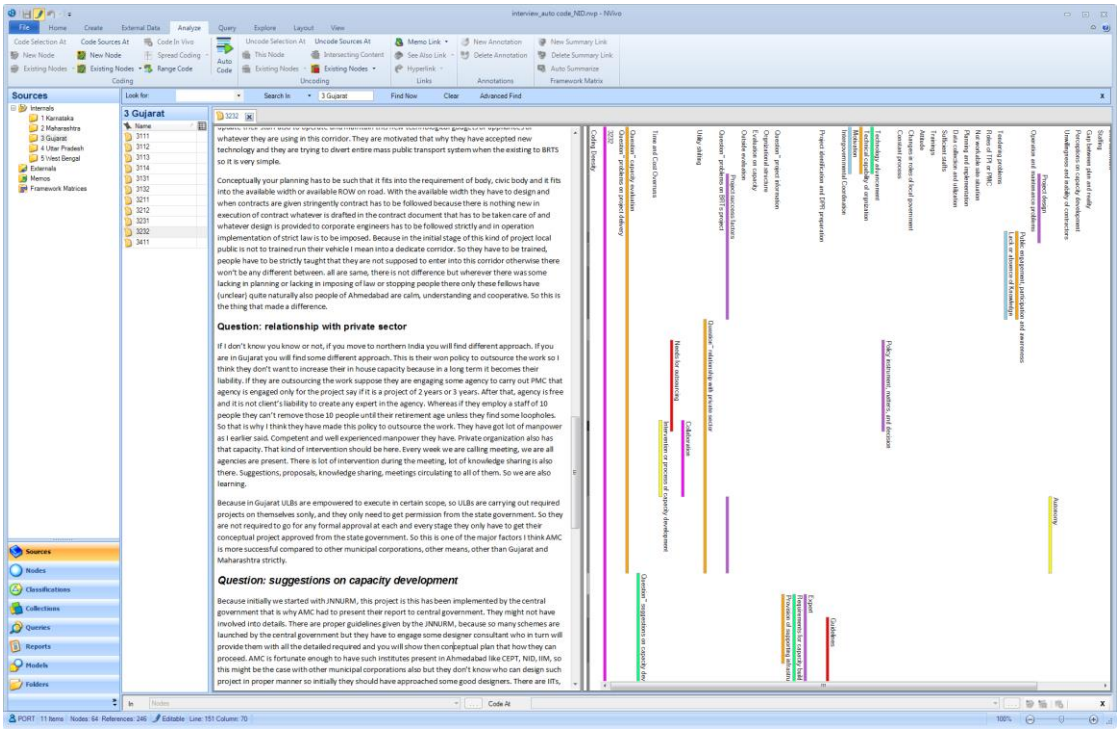

Figure C-2 Example of Coded Documents

C.2 CHAPTER 5: SECOND CYCLE CODING

Hypothesis coding

Hypothesis coding is an application of a researcher-generated, predetermined list of codes onto qualitative data specifically to assess a researcher-generated hypothesis (Saldaña, 2009).

- Two categories of the structural codes were mainly used:
  1) Question~ capacity evaluation
  2) Question~ suggestions on capacity development.
- Themes of the hypothesis coding were developed based on CD principles in Section 2.5 (Table C-2), and based on the themes, the hypothesis codes were analyzed.

Table C-2 Classifications of Hypothesis Themes

Theme	Context	Actor	Dimension	Process
Classification	Single Implementing agency	Positive perceptions of dependence	Individual and organizational levels	Formal interventions
	Multiple Implementing agency	Negative perceptions of dependence	Enabling environment level	Informal interventions

- Hypothesis codes:

Category: Context
- Sub-category: Autonomy
  - Code: Decision making system
  - Code: Policy matter/endogenous capacity/institutional structure
  - Code: Extents of reform
  - Code: Financial structure
- Sub-category: Politics
  - Code: Interference and conflict
  - Code: Political alignment/accountability
  - Code: State government interference and financial supports
  - Code: No political interference
- Sub-category: Accountability
  - Code: Trust between levels of governments
  - Code: Public relations, Right of Information
  - Code: Contractual employees vs. permanent employees
  - Code: Ownership

Category: Actors
- Sub-category: Dependency on consultant
  - Code: Perception of government- not over-dependency
  - Code: Perceptions of private actors- over-dependency
  - Code: UPJN – no dependency
- Sub-category: Roles of external interveners
  - Code: Changes in ULBs' roles
  - Code: Roles of ULBs- accountability /routine works/outside evaluation
  - Code: Attitude- public-private relationships/outside evaluation

    - Code: Attitude- morality/outside evaluation
- Sub-category: Needs for outsourcing
    - Code: Efficiency- establishment problems
    - Code: Technical advance
    - Code: Knowledge transfer
    - Code: Necessary process (assumption: absence of experience and absence of capacity)
    - Code: Not-necessary process (in-house capacity)
- Subcategory: Development of in-house capacity
    - Code: Reality - lack of interaction/lack of interest and no involvement
    - Code: Reality - lack of interaction/lack of local knowledge
    - Code: Cases of enhancements in capacity

Category: Dimensions

- Sub-category: Levels of capacity
    - Code: Training and transfer system
    - Code: Organization level-staffing
    - Code: Organization level-reforms- current
    - Code: System Building
- Sub-category: Dimensions of capacity
    - Code: Attitude/motivation/appreciation
    - Code: Leadership-vision
    - Code: Financial dimension- autonomy/decision making/role of ULBs
    - Code: Policy
    - Code: Background of capacity building

Category: CD process/CD interventions

- Sub-category: formal and overt process
    - Code: Recruitment- staffing/accountability
    - Code: Trainings- attitude/roles of ULBs/sufficient staffs/constant process
    - Code: Trainings- technology advancement
    - Code: Trainings- Timing/System building
    - Code: Trainings- Exposal
- Sub-category: informal and hidden process
    - Code: Networks- cooperation/politics/motivation/organizational structure
    - Code: Communication- alignment of capacity between levels of government
    - Code: Involvement to project implementation
    - Code: Institutional restructure/reforms/e-government
    - Code: Provision of enabling environment

- To analyze the hypothesis codes, multiple query functions in Nvivo were used (Figure C-3, C-4, and C-5):
    1) Matrix Coding Query creates a matrix of nodes based on search criteria (QSR, 2014).
    2) Word Frequency Query lists the most frequently occurring words in sources and visualizes the results in a word cloud, tree map or cluster analysis diagram (QSR, 2014).
    3) Coding Query gathers all the coding at any combination of nodes (QSR, 2014).

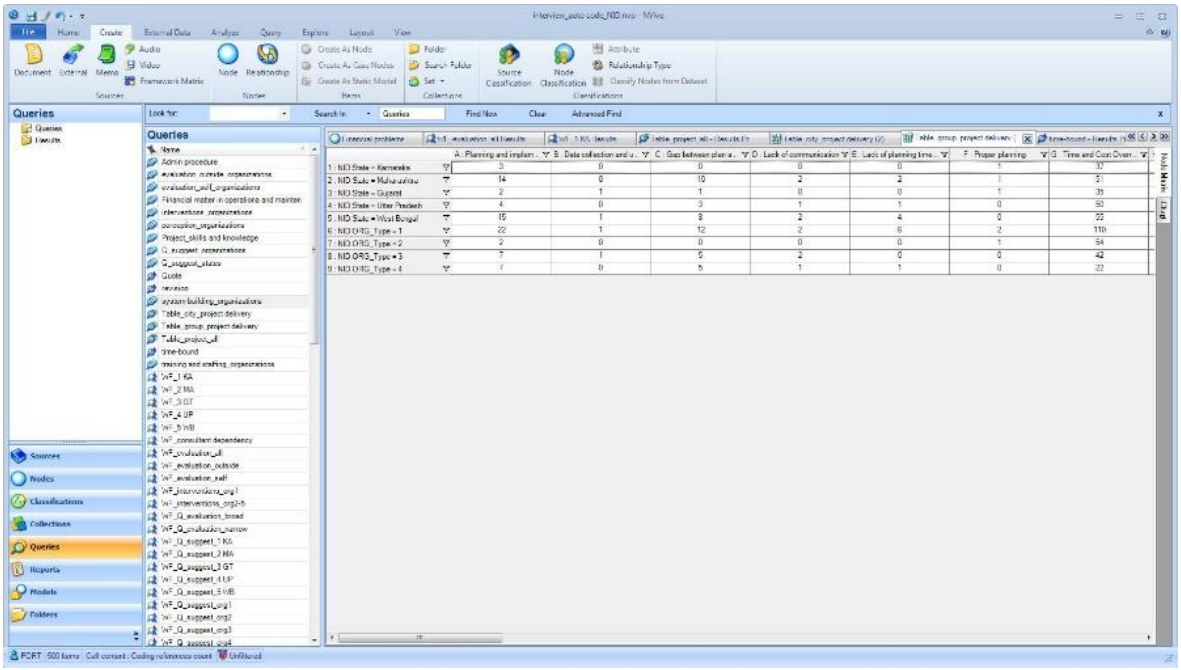

Figure C-3 Example of Matrix Coding Queries

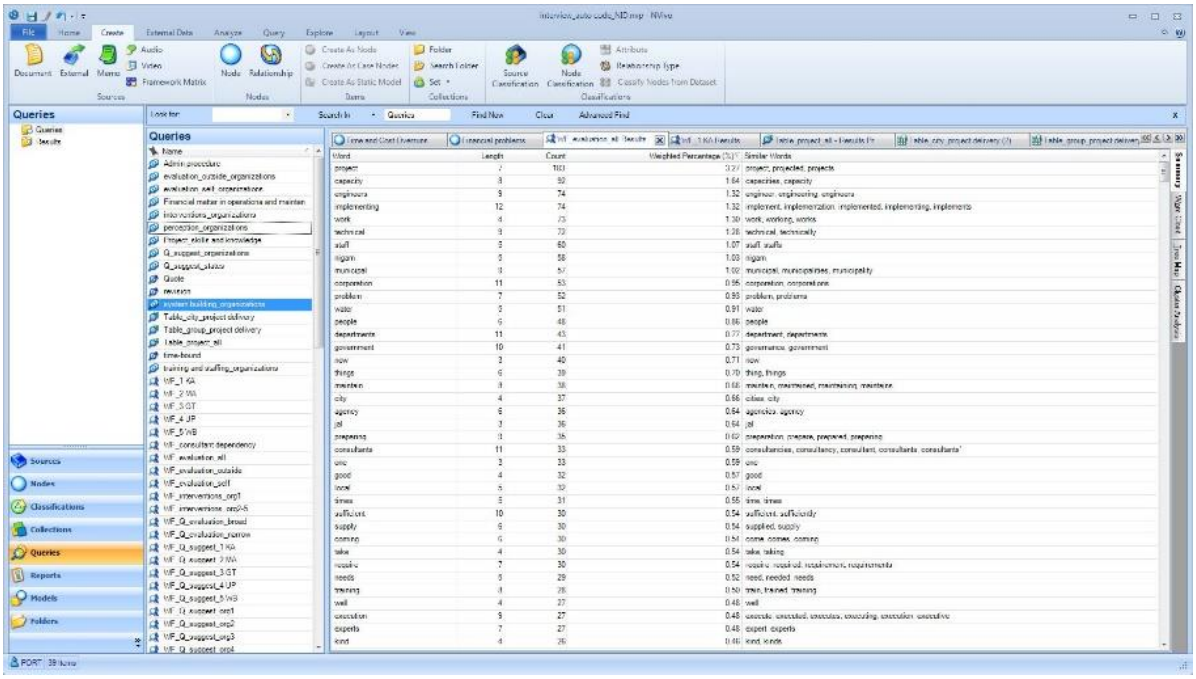

Figure C-4 Example of Word Frequency Queries

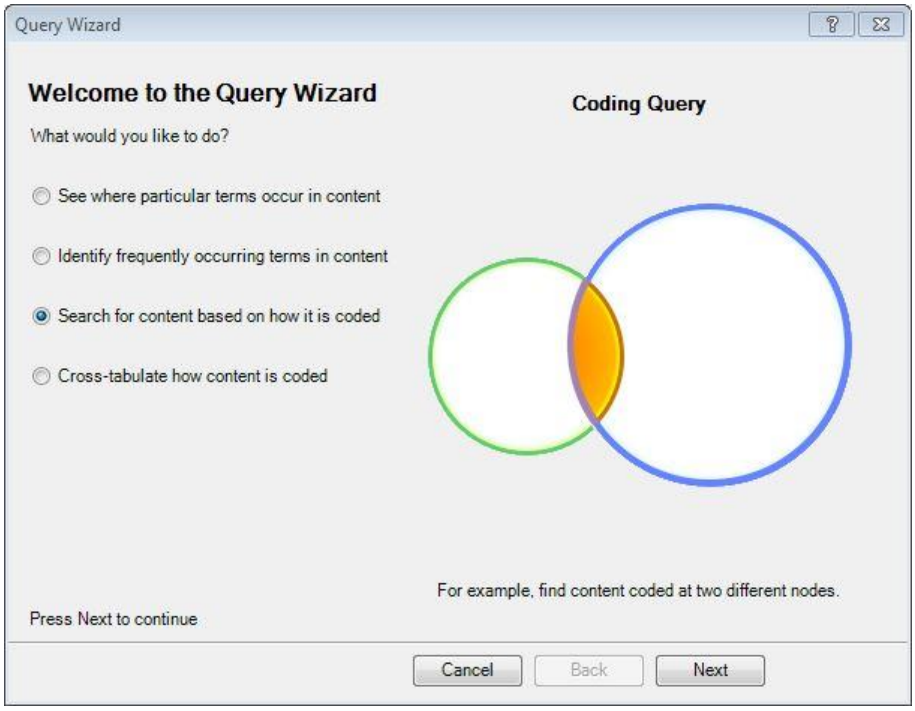

Figure C-5 Example of Coding Queries

C.3 CHAPTER 6: SECOND CYCLE CODING

Pattern coding

Pattern coding is a way of grouping meaningful units of analysis into a smaller number of themes or constructs, and identifies an emergent theme, configuration, or explanation (Saldaña, 2009).

- The pattern codes were mainly used for Section 6.2.1.
- A category of the structural codes was used for the pattern coding and analyzed node-by-node (Figure C-6 and C-7): Question~ problems on project delivery.
- Themes of the pattern coding were developed based on project delivery process: 1) Programming, 2) Planning/Design, 3) Implementation/Construction, and 4) Operation/Maintenance, and based on the themes, the pattern codes were analyzed.

- Pattern codes:

Category: Programming

- Subcategory: Timeframe
  - Code: Time-bounded
  - Code: lack of preparation/guidelines
- Subcategory: Competition
  - Code: Sanction-oriented
  - Code: Ignorance of anticipated hurdles

Category: Planning/Design

- Subcategory: Gaps between plan and reality
    - Code: No time/no field survey
    - Code: Lack of local linkage/dependence on consultants
    - Code: Unrealistic plan
- Subcategory: Design changes
    - Code: Land acquisition
    - Code: Opposition
    - Code: Court cases
    - Code: Utility shift
    - Code: Permission procedures

Category: Implementation/Construction

- Subcategory: Tendering process
    - Code: Tender conditions
    - Code: Lack of supply
    - Code: Availability of good contractor
- Subcategory: Contract management
    - Code: Lack of local knowledge
    - Code: Not workable site situation
    - Code: festival/monsoon
- Subcategory: Bureaucratic system
    - Code: Time gap between DPR preparation and sanction
    - Code: lengthy administrative procedures for each approval
- Subcategory: Financial management
    - Code: Financial constraints – lowest quotes
    - Code: Unrealistic scheduled rates
    - Code: Fund release
    - Code: Cost escalation
    - Code: Cost escalation- reform agenda

Category: Operation/Maintenance

- Subcategory: Institutional setup
    - Code: Lack of staffs/institutional setup
    - Code: Evasion of responsibility
- Subcategory: Financial problems
    - Code: Financial burden
    - Code: low cost recovery
    - Code: State government policy (West Bengal)

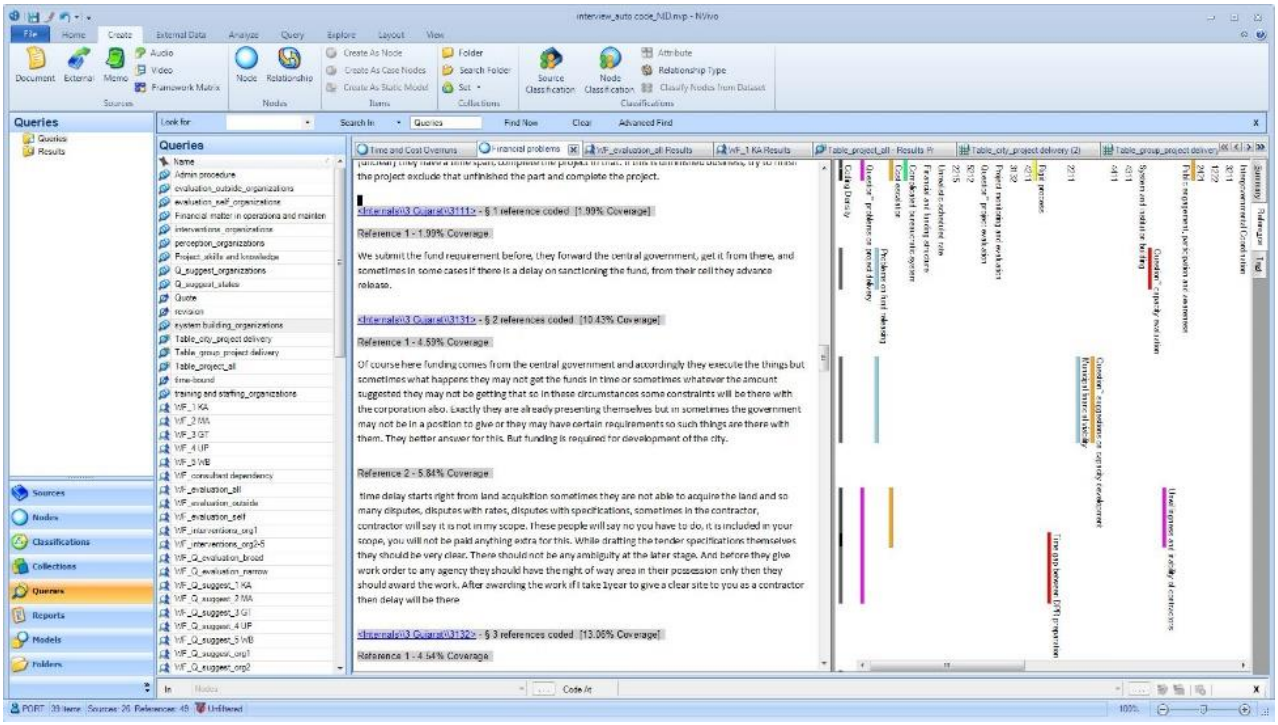

Figure C-6 Example of Code Reviews

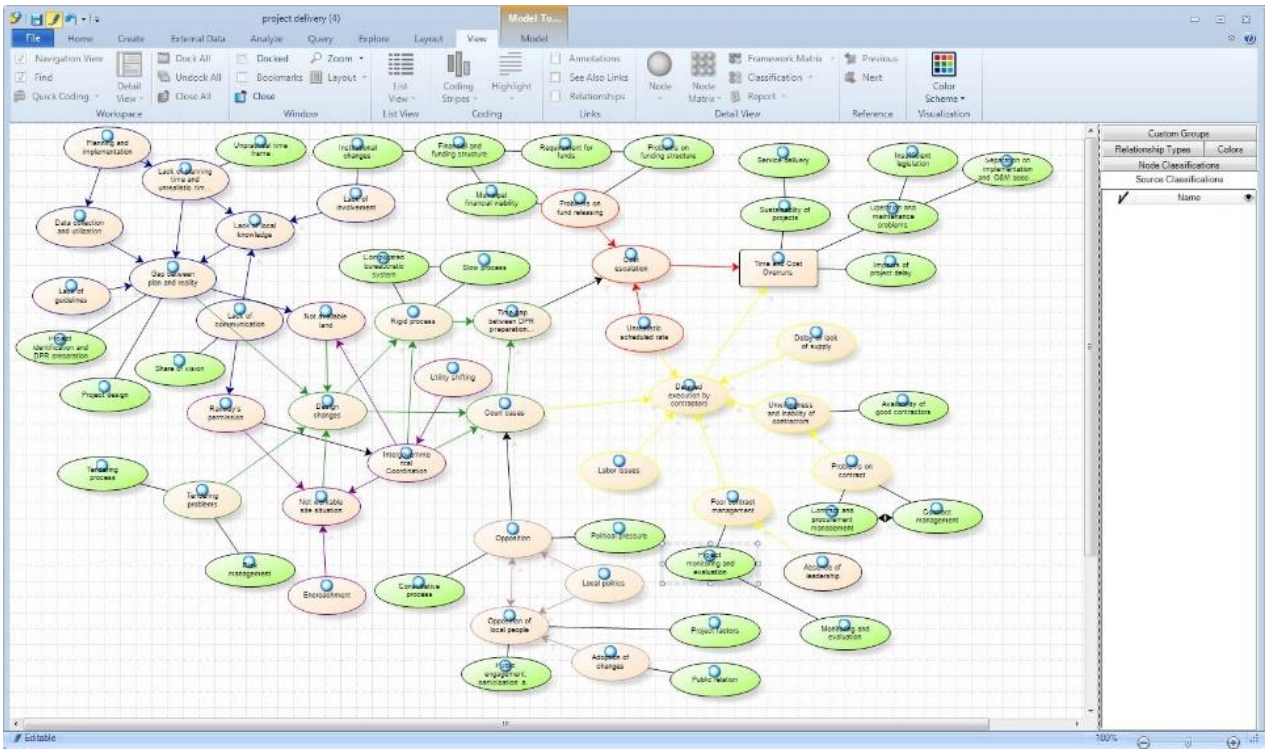

Figure C-7 Example of Code-based Models

Theoretical coding

Theoretical coding systemically links all categories and subcategories with the central category that has explanatory relevance or captures the phenomenon of interest (Saldaña, 2009)

- The theoretical codes were mainly used for Section 6.2.2 and 6.2.3.
- All categories of the structural codes were used.
- Themes of the theoretical coding were developed based on the capacity factors at different levels identified in Chapter 3: 1) Enabling Environment, 2) Organization/Network, and 3) Individual/Project.
- Based on the themes, tables with capacity levels and project delivery stages (see Table 6-1 and 6-2) and a theoretical diagram (see Figure 6-3) were created and the theoretical codes were analyzed.

- Theoretical codes:

Category: Identified capacity factors in project delivery

- Subcategory: Enabling environment
  - Code: Governance/accountability
  - Code: HR supply/supply of qualified contractors/suppliers
  - Code: Economic factors/supply of materials
  - Code: Socio-cultural factors/corruption
  - Code: Politics/political pressure
- Subcategory: Organizational Level
  - Code: Devolution
  - Code: Organizational development strategy
  - Code: Lack of staff
  - Code: Financial viability
  - Code: Communication/information
  - Code: Leadership
- Subcategory: Individual Level
  - Code: Skills and knowledge
  - Code: O&M- rigid process/lack of skills /lack of staffs
  - Code: Attitude and mindset
  - Code: Ownership and motivation
  - Code: Experience

Category: Relationship between capacity and performance

- Subcategory: Programming
  - Code: Vision sharing- short-term vs. long term approach
  - Code: Perspective changes
  - Code: Comprehensive approach
- Subcategories Planning/design
  - Code: Trial and errors
  - Code: Alternatives
  - Code: Pilot projects
- Subcategories Implementation/construction
  - Code: Communication and learning
  - Code: Public Awareness
- Subcategories Operation/maintenance

- Code: Sustainability of project
- Code: Partnership
- Code: Subsidiaries

- Subcategory: Relationship between capacity and outcomes

C.4 EXCERPT REPRESENTATION

Excerpts were edited and represented based on the following principles:

1) to fix grammatical errors;
2) to eliminate repeated sentences and words;
3) to eliminate an example provided by the respondent to support the key argument, unless the example was essential to understand the key argument;
4) to connect or complete sentences; and
5) to clarify meanings.

The excerpt below provides an example that was heavily edited and represented based on the above principles.

Excerpt included in Section 5.2.3.1 in relation on CD as motivation

… [2] In the major cities, you should have to go for the modern technologies. … [2] [3] They [other people] [5] don't want to take any risk … and they are fixed in that [old] [5] mode. Now, we want to bring people [out of] [1] that mode, [and have them] [4] [5] start taking challenges. … [2] [3] Capacity building means we have to motivate … [2] to take [a] [1] challenge [and] [4] … [2] to try [new] [5] techniques whenever we come across [them] [1]. … [2] [3] We have changed all that. We are going for the latest technologies available (Interview 2211).

[principle number] included.

Original transcript of Interview 2211

Now in a city like [City X] everywhere the vehicles are moving. So we should change the technology. Though it is expensive but time has come. In the major metros in the major cities you should have to go for the modern technologies which should keep your city as well as keep on doing the work. In the Greenfield in the brown field there is a difference involved. You cannot say that the, both the methods are working, in a city like [City X] where people are moving. I cannot close the roads for more than 24 hours, but still we have ruthlessly been closing the roads. See how much the poor fellow suffers. So why don't we adopt the good methods. Roads industry have done the new technology. We are saying that we won't be doing conventional concrete. On the existing good quality roads, we are doing, we do ultra, white thin topping. It's a new technology that we have taken. In 7 days of time I can open the road. Good quality road, nice one, sustainable up to 20 years. They don't want to take any risk, they don't want to take any challenges, they are fixed in that mode. Now we want to bring people from that mode, start taking challenges, start taking the risk. We have to keep them motivated. Capacity building means we have to motivate, we have to take challenge we

have to try it out more and more techniques whenever we come across. Today we want to create some changes. We will do some pilots. We will do the pilot, we will pay for it, see the performance, observe it, and then take it up. In case of the roads 2008, we did a trial patch. We moved the traffic for 1 year. [unclear] 100 km of city road, we are doing with the technology, out of 200. Now members of commission has taken the decision. He said full city road should be done like this. Complete the road in 7 days of time, open for the traffic. People get good roads, good footpath. In water supply we also made lot of changes. Sewage, we are bringing in the new technologies. We have changed all that. We are going for the latest technologies available.

Excerpts highlighted in grey.

Reference Source:

QSR. (2014). NVivo 10 Getting Started Guide: QSR International Pty Ltd.
Saldaña, J. (2009). *The coding manual for qualitative researchers*. London; Thousand Oaks, Calif.: Sage.

APPENDIX D CASE SELECTION FOR QCA

D.1 PROJECT MATRIX

Table D-1 Project Matrix of Implementing Agency Type and Project Sector

(Date: as of Sep. 2013)

City	Implementing Agency	Number of Completed Project				Number of Sanctioned Project			
		Water	Transport	Others	Total	Water	Transport	Others	Total
KA1	ULB		7		7	4	9		13
	Non-ULB	3	14		17	11	14		26
	Total	3	21		24	16	23		39
KA2	ULB					2			2
	Non-ULB		2		2	2	3	2	7
	Total		2		2	4	3	2	9
MA1	ULB	3	2		7	4	7		11
	Non-ULB								
	Total	3	2		7	4	7		11
MA2	ULB	4	1		5	7	1		8
	Non-ULB								
	Total	4	1		5	7	1		8
MA3	ULB	3			3	5		1	6
	Non-ULB								
	Total	3			3	5		1	6
GT1	ULB	4	3		7	8	4	1	13
	Non-ULB								
	Total	4	3		7	8	4	1	13
GT2	ULB	10	10		22	12	13	1	26
	Non-ULB								
	Total	10	10		22	12	13	1	26
UP1	ULB								
	Non-ULB	1			1	2		2	4
	Total	1			1	2		2	4
UP2	ULB								
	Non-ULB	1			1	6			6
	Total	1			1	6			6
UP3	ULB					1			1
	Non-ULB	1			1	6			6
	Total	1			1	7			7
WB1	ULB								
	Non-ULB	2			2	7	2		9
	Total	2			2	7	2		9
WB2	ULB	1			1	8		1	9
	Non-ULB	12	2		14	32	16		48
	Total	13	2		15	40	16	1	57
5 States	ULB	25	23		52	51	34	4	89
	Non-ULB	20	18		36	66	35	4	105
	Total	45	41		90	117	69	8	194

D.2 SELECTED CASES

Table D-2 Project Level Information

(Date: as of Mar. 2014)

ID	Approved Cost	Date of Project Approval	Total ACA Commitment (Central Share)	Date of Last ACA Released	ACA Released till date	Utilization as per Mar'14 QPR	% of work cmpl. (Physical Progress)	Date of Completion (Planned)	ULB or not	Sector	water-related sector or not	GOI released	Cost overruns (Cmpl.)	Estimated Cost at Completion	Estimated cost overruns (incmpl.)	Cost overruns	Time b/t project approval and last installment
KA101	2,113	Aug-07	739	Mar-11	666	3,554	cmpl.	cmpl.	0	7	0	18.7	68.2			68.2	1316
KA103	8,468	Aug-07	2,964	Mar-11	2,667	9,980	cmpl.	cmpl.	0	7	0	26.7	17.9			17.9	1316
KA104	5,058	Aug-07	1,770	Sep-11	1,593	6,144	cmpl.	cmpl.	0	7	0	25.9	21.5			21.5	1476
KA105	2,224	Aug-07	778	Jul-11	700	3,068	cmpl.	cmpl.	0	7	0	22.8	38.0			38.0	1440
KA106	2,656	Aug-07	929	Mar-11	836	3,984	cmpl.	cmpl.	0	7	0	21.0	50.0			50.0	1316
KA107	3,812	Aug-07	1,334	Mar-11	1,201	5,306	cmpl.	cmpl.	0	7	0	22.6	39.2			39.2	1316
KA108	1,245	Nov-06	436	Mar-11	392	1,693	cmpl.	cmpl.	1	2	0	23.2	36.0			36.0	1582
KA113	1,756	Nov-06	615	Dec-12	553	1,936	cmpl.	cmpl.	1	2	0	28.6	10.3			10.3	2216
KA114	890	Dec-06	311	Mar-11	280	1,391	cmpl.	cmpl.	0	7	0	20.2	56.3			56.3	1568
KA115	1,226	Dec-06	429	Mar-11	343	1,583	cmpl.	cmpl.	0	3	1	21.7	29.1			29.1	1574
KA116	1,370	Dec-06	480	Aug-12	432	1,248	cmpl.	cmpl.	0	3	1	34.6	-8.9			-8.9	2090
KA117	4,361	Jan-07	1,526	Jul-11	1,374	4,561	cmpl.	cmpl.	1	2	0	30.1	4.6			4.6	1647
KA118	5,045	Jan-07	1,766	Mar-11	1,589	4,216	cmpl.	cmpl.	1	2	0	37.7	-16.4			-16.4	1523
KA120	3,008	Jul-07	1,053	Jun-12	948	3,124	98%	Mar-15	1	2	0	30.3		3,188	6.0	6.0	1797
KA121	2,158	Jul-07	755	Dec-12	680	1,960	cmpl.	cmpl.	0	2	0	34.7	-9.2			-9.2	1978
KA122	1,874	Jul-07	656	Mar-11	590	2,599	cmpl.	cmpl.	0	2	0	22.7	38.7			38.7	1344
KA123	3,810	Jul-07	1,333	Mar-11	1,200	6,980	cmpl.	cmpl.	0	2	0	17.2	83.2			83.2	1344
KA124	2,544	Jul-07	890	Jul-11	801	2,673	cmpl.	cmpl.	1	2	0	30.0	5.1			5.1	1468
KA125	2,782	Sep-07	974	Mar-11	876	4,370	cmpl.	cmpl.	0	2	0	20.1	57.0			57.0	1295
KA126	1,501	Sep-07	525	May-13	473	1,979	cmpl.	cmpl.	0	1	1	23.9	31.9			31.9	2070
KA128	1,555	Nov-07	544	Sep-11	490	1,497	cmpl.	cmpl.	0	7	0	32.7	-3.7			-3.7	1378
KA129	6,132	Nov-07	2,146	Jul-11	1,932	7,962	cmpl.	cmpl.	0	7	0	24.3	29.9			29.9	1342
KA130	12,517	Jan-08	4,381	Jul-13	3,943	10,230	72%	Sep-14	0	1	1	38.5		14,208	13.5	13.5	2008
KA132	2,487	Jan-08	870	Jul-11	783	2,743	cmpl.	cmpl.	1	2	0	28.6	10.3			10.3	1293
KA133	2,261	Jan-08	791	Jan-13	712	2,575	95%	Jun-14	1	2	0	27.7		2,711	19.9	19.9	1824
KA134	2,285	Jan-08	800	Jul-11	720	2,039	cmpl.	cmpl.	1	2	0	35.3	-10.7			-10.7	1293
KA135	13,657	Oct-08	4,780	May-13	4,302	16,274	94%	Sep-14	0	3	1	26.4		17,313	26.8	26.8	1667

ID	Approved Cost	Date of Project Approval	Total ACA Commitment (Central Share)	Date of Last ACA Released	ACA Released till date	Utilization as per Mar'14 QPR	% of work cmpl. (Physical Progress)	Date of Completion (Planned)	ULB or not	Sector	water-related sector or not	GOI released	Cost overruns (Cmpl.)	Estimated Cost at Completion	Estimated cost overruns (incmpl.)	Cost overruns	Time b/t project approval and last installment
KA136	8,789	Oct-08	3,076	May-13	2,768	8,398	85%	Sep-14	0	3	1	33.0		9,880	12.4	12.4	1667
KA202	8,526	Oct-07	6,821	Mar-11	6,139	11,240	cmpl.	cmpl.	0	7	0	54.6	31.8			31.8	1246
KA203	21,717	Feb-08	17,373	Jul-13	15,636	19,999	73%	Mar-15	0	2	0	78.2		27,397	26.2	26.2	1973
KA204	9,220	Mar-08	7,376	Feb-13	6,638	10,125	98%	Mar-15	0	3	1	65.6		10,331	12.1	12.1	1803
KA205	2,783	Dec-08	2,226	Jan-14	1,552	2,208	88%	Sep-14	1	8	1	70.3		2,510	-9.8	-9.8	1868
KA206	38,460	Dec-08	10,000	Mar-12	9,000	11,517	90%	Sep-14	1	1	1	78.1		12,797	-66.7	-66.7	1179
KA207	2,270	Jul-09	1,176	Dec-13	1,058	1,554	cmpl.	cmpl.	0	7	0	68.1	-31.5			-31.5	1607
MA101	8,613	May-06	4,307	Mar-11	4,306	18,231	cmpl.	cmpl.	1	1	1	23.6	111.7			111.7	1780
MA102	10,314	Aug-06	5,157	Jun-11	5,157	13,474	cmpl.	cmpl.	1	6	0	38.3	30.6			30.6	1761
MA103	9,996	Sep-06	4,998	Aug-12	4,998	9,202	84%	Jun-14	1	1	1	54.3		10,954	9.6	9.6	2181
MA104	9,778	Sep-06	4,889	May-12	4,892	9,391	cmpl.	cmpl.	1	4	1	52.1	-4.0			-4.0	2076
MA107	661	Feb-08	331	Mar-12	331	1,247	89%	Jun-14	1	2	0	26.5		1,402	112.0	112.0	1480
MA108	726	Feb-08	363	Jun-11	363	776	cmpl.	cmpl.	1	2	0	46.8	6.9			6.9	1201
MA109	782	Feb-08	391	May-12	391	1,020	cmpl.	cmpl.	1	2	0	38.3	30.5			30.5	1544
MA110	3,649	Aug-08	1,825	Mar-13	1,639	3,555	cmpl.	cmpl.	1	6	0	46.1	-2.6			-2.6	1676
MA111	17,747	Jan-09	8,874	Feb-14	7,986	28,356	cmpl.	cmpl.	1	1	1	28.2	59.8			59.8	1840
MA201	2,325	Dec-06	814	Dec-09	814	3,570	cmpl.	cmpl.	1	7	0	22.8	53.6			53.6	1119
MA202	7,118	Jan-07	2,491	Dec-09	2,491	9,789	cmpl.	cmpl.	1	3	1	25.4	37.5			37.5	1088
MA203	9,239	Jan-07	3,234	May-11	2,910	13,890	cmpl.	cmpl.	1	1	1	21.0	50.3			50.3	1589
MA204	11,659	Jan-07	4,081	May-11	3,673	15,494	cmpl.	cmpl.	1	1	1	23.7	32.9			32.9	1575
MA205	14,957	Apr-07	5,235	Mar-12	4,711	21,868	95%	Jun-14	1	4	1	21.5		23,019	53.9	53.9	1788
MA207	4,179	Feb-08	1,463	Dec-12	1,317	4,443	90%	Jun-14	1	4	1	29.6		4,937	18.1	18.1	1761
MA208	5,789	Nov-08	2,026	Mar-12	1,824	7,077	cmpl.	cmpl.	1	1	1	25.8	22.2			22.2	1207
MA301	5,052	Nov-06	2,526	Mar-11	2,252	5,766	cmpl.	cmpl.	1	3	1	39.1	14.1			14.1	1602
MA302	14,846	Dec-06	7,423	Feb-11	6,681	15,924	98%	Jun-14	1	4	1	42.0		16,249	9.4	9.4	1525
MA303	5,430	Dec-06	2,715	Feb-11	2,443	6,732	cmpl.	cmpl.	1	8	1	36.3	24.0			24.0	1525
GT101	4,435	Feb-09	2,218	Feb-14	1,996	5,281	cmpl.	cmpl.	1	2	0	37.8	19.1			19.1	1833
GT102	4,105	Jun-06	2,053	Dec-08	2,053	5,688	cmpl.	cmpl.	1	3	1	36.1	38.6			38.6	915
GT103	10,515	Jan-07	5,257	Mar-10	5,257	13,334	cmpl.	cmpl.	1	4	1	39.4	26.8			26.8	1155
GT104	14,595	Feb-07	7,297	Jun-11	6,568	22,429	cmpl.	cmpl.	1	1	1	29.3	53.7			53.7	1566
GT105	3,099	Jul-07	1,549	Mar-10	1,549	2,553	82%	Jun-14	1	8	1	60.7		3,113	0.5	0.5	976
GT106	2,870	Jan-09	1,435	Jan-13	1,291	2,361	85%	Jun-14	1	10		54.7		2,778	-3.2	-3.2	1455
GT107	4,570	Jan-09	2,285	Nov-11	2,057	5,324	cmpl.	cmpl.	1	2	0	38.6	16.5			16.5	1035
GT108	6,056	Jan-09	3,028	Jan-12	2,725	4,633	94%	Jun-14	1	1	1	58.8		4,929	-18.6	-18.6	1092

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GT109	1,396	Feb-08	698	Mar-10	698	1,871	cmpl.	cmpl.	1	2	0	37.3	34.0			34.0	773
GT110	3,688	Feb-09	1,844	Nov-11	1,660	3,659	cmpl.	cmpl.	1	3	1	45.4	-0.8			-0.8	1005
GT111	1,968	Feb-08	984	Jun-11	886	2,720	cmpl.	cmpl.	1	2	0	32.6	38.2			38.2	1215
GT201	5,383	Mar-06	1,884	Dec-09	1,884	5,794	cmpl.	cmpl.	1	3	1	32.5	7.6			7.6	1354
GT202	1,212	May-06	424	Dec-08	424	1,259	cmpl.	cmpl.	1	2	0	33.7	3.9			3.9	941
GT203	2,955	May-06	1,034	Dec-08	1,034	2,937	cmpl.	cmpl.	1	2	0	35.2	-0.6			-0.6	941
GT204	6,922	Jun-06	2,423	Feb-09	2,423	8,623	cmpl.	cmpl.	1	4	1	28.1	24.6			24.6	959
GT205	1,135	Jun-06	397	Nov-09	397	1,507	cmpl.	cmpl.	1	4	1	26.4	32.8			32.8	1227
GT206	8,760	Aug-06	3,066	Mar-11	2,759	9,014	cmpl.	cmpl.	1	6	0	30.6	2.9			2.9	1693
GT207	5,914	Sep-06	2,070	Nov-09	2,070	7,456	cmpl.	cmpl.	1	1	1	27.8	26.1			26.1	1144
GT209	12,088	Oct-06	4,231	Nov-09	4,231	12,769	cmpl.	cmpl.	1	1	1	33.1	5.6			5.6	1108
GT210	12,283	Oct-06	4,299	Nov-09	4,299	10,650	cmpl.	cmpl.	1	1	1	40.4	-13.3			-13.3	1108
GT211	1,851	Jan-07	648	Nov-09	648	2,803	cmpl.	cmpl.	1	2	0	23.1	51.4			51.4	1019
GT212	2,144	Jan-07	750	Dec-08	749	1,963	cmpl.	cmpl.	1	2	0	38.2	-8.4			-8.4	700
GT213	1,500	Jan-07	525	Feb-09	524	2,883	cmpl.	cmpl.	1	2	0	18.2	92.2			92.2	751
GT214	1,857	Jan-07	650	Feb-09	649	2,218	cmpl.	cmpl.	1	2	0	29.3	19.5			19.5	751
GT215	2,011	Jan-07	704	Dec-08	702	1,348	cmpl.	cmpl.	1	2	0	52.1	-33.0			-33.0	700
GT216	1,670	Jan-07	585	Dec-08	584	1,800	cmpl.	cmpl.	1	2	0	32.5	7.8			7.8	700
GT217	1,513	Jan-07	530	Feb-09	530	1,873	cmpl.	cmpl.	1	2	0	28.3	23.8			23.8	751
GT218	5,013	Jan-07	1,755	Jan-12	1,753	5,687	cmpl.	cmpl.	1	2	0	30.8	13.5			13.5	1831
GT219	3,681	Feb-07	1,288	Jun-11	1,160	3,932	cmpl.	cmpl.	1	4	1	29.5	6.8			6.8	1586
GT220	10,692	Feb-07	3,742	Jun-11	3,368	11,131	cmpl.	cmpl.	1	4	1	30.3	4.1			4.1	1586
GT221	10,472	Jan-08	3,665	Sep-11	3,299	8,904	cmpl.	cmpl.	1	1	1	37.0	-15.0			-15.0	1350
GT223	23,541	Nov-08	8,239	Jan-13	7,414	21,676	83%	Jun-14	1	4	1	34.2		26,116	10.9	10.9	1509
GT224	7,731	Nov-08	2,706	Mar-12	2,435	7,351	cmpl.	cmpl.	1	4	1	33.1	-4.9			-4.9	1207
GT225	11,672	Jan-09	4,085	Feb-14	3,677	9,018	75%	Jun-14	1	8	1	40.8		12,024	3.0	3.0	1848
UP101	3,084	Mar-07	1,542	Mar-12	1,388	2,175	80%	Jun-14	0	8	1	63.8		2,718	-11.9	-11.9	1834
UP102	2,162	Oct-07	1,081	Mar-10	1,081	2,162	cmpl.	cmpl.	0	4	1	50.0	0.0			0.0	887
UP103	8,271	Feb-08	4,135	Jun-11	3,722	8,270	90%	Jun-14	0	3	1	45.0		9,189	11.1	11.1	1201
UP104	19,592	Jul-09	9,000	Mar-12	8,100	19,313	70%	Jun-14	0	4	1	41.9		27,590	40.8	40.8	962
UP201	5,624	Mar-07	2,812	Oct-11	2,531	5,602	cmpl.	cmpl.	0	8	1	45.2	-0.4			-0.4	1674
UP202	27,095	Oct-07	13,547	Mar-12	12,193	30,845	89%	Sep-14	0	3	1	39.5		34,657	27.9	27.9	1599
UP203	19,088	Dec-07	9,544	Jun-11	8,588	19,084	84%	Jun-14	0	4	1	45.0		22,720	19.0	19.0	1279
UP204	14,196	Oct-08	5,050	Dec-13	4,492	12,250	85%	Jun-14	0	4	1	36.7		14,412	1.5	1.5	1874

ID	Approved Cost	Date of Project Approval	Total ACA Commitment (Central Share)	Date of Last ACA Released	ACA Released till date	Utilization as per Mar'14 QPR	% of work cmpl. (Physical Progress)	Date of Completion (Planned)	ULB or not	Sector	water-related sector or not	GOI released	Cost overruns (Cmpl.)	Estimated Cost at Completion	Estimated cost overruns (incmpl.)	Cost overruns	Time b/t project approval and last installment
UP205	37,779	Jan-09	18,889	Mar-12	17,001	35,559	79%	Sep-14	0	3	1	47.8		45,012	19.1	19.1	1145
UP301	23,623	Aug-07	11,812	Mar-10	11,811	23,570	cmpl.	cmpl.	0	4	1	50.1	-0.2			-0.2	957
UP302	4,292	Mar-07	2,146	Dec-13	1,869	3,038	75%	Jun-14	0	8	1	61.5		4,051	-5.6	-5.6	2479
UP303	38,861	Sep-07	19,431	Mar-11	17,487	40,799	96%	Jun-14	0	3	1	42.9		42,499	9.4	9.4	1301
UP304	34,451	Nov-08	13,108	Dec-13	11,681	34,420	72%	Jun-14	0	4	1	33.9		47,806	38.8	38.8	1852
UP305	32,521	Dec-08	16,261	Mar-12	14,635	33,397	80%	Jun-14	1	1	1	43.8		41,746	28.4	28.4	1169
UP307	14,657	Feb-09	7,328	Oct-11	6,595	14,080	72%	Jun-14	0	3	1	46.8		19,556	33.4	33.4	976
WB101	2,878	Jun-06	1,439	Mar-10	1,439	2,878	cmpl.	cmpl.	0	3	1	50.0	0.0			0.0	1363
WB102	3,627	Oct-06	1,814	Aug-12	1,632	4,184	95%	Jun-14	0	3	1	39.0		4,404	21.4	21.4	2134
WB103	1,453	Oct-06	727	Mar-10	727	1,453	cmpl.	cmpl.	0	3	1	50.0	0.0			0.0	1244
WB201	9,693	Jun-06	3,393	Mar-12	3,053	11,612	78%	Jun-14	1	3	1	26.3		14,887	53.6	53.6	2084
WB202	1,717	Jun-06	601	Mar-10	601	1,716	cmpl.	cmpl.	0	3	1	35.0	0.0			0.0	1363
WB203	1,066	Jun-06	373	Nov-10	373	1,283	cmpl.	cmpl.	0	3	1	29.1	20.4			20.4	1604
WB205	4,558	Jun-06	1,595	Jan-12	1,436	5,889	cmpl.	cmpl.	0	3	1	24.4	29.2			29.2	2039
WB206	3,802	Aug-06	1,331	Aug-10	1,331	7,000	cmpl.	cmpl.	0	2	0	19.0	84.1			84.1	1469
WB208	4,530	Oct-06	1,586	Mar-10	1,586	4,823	cmpl.	cmpl.	0	1	1	32.9	6.5			6.5	1244
WB212	952	Feb-07	333	Mar-12	300	1,253	80%	Jun-14	0	3	1	23.9		1,566	64.6	64.6	1845
WB213	9,069	May-07	3,174	Mar-12	2,857	10,968	79%	Jun-14	0	3	1	26.0		13,883	53.1	53.1	1760
WB214	5,310	Dec-07	1,858	Mar-13	1,673	4,050	83%	Jun-14	0	2	0	41.3		4,879	-8.1	-8.1	1901
WB216	1,806	Dec-07	632	Aug-12	569	3,808	cmpl.	cmpl.	0	2	0	14.9	110.8			110.8	1705
WB217	2,607	Dec-07	912	Jan-11	912	2,607	cmpl.	cmpl.	0	3	1	35.0	0.0			0.0	1113
WB218	12,951	Jan-08	4,533	Aug-12	4,080	11,926	84%	Jun-14	0	3	1	34.2		14,197	9.6	9.6	1691
WB220	14,194	Feb-08	4,968	Nov-10	4,968	17,248	cmpl.	cmpl.	0	3	1	28.8	21.5			21.5	1000
WB221	28,033	May-08	9,812	Jan-12	8,830	31,173	cmpl.	cmpl.	1	3	1	28.3	11.2			11.2	1351
WB222	3,407	Sep-08	1,193	Jan-11	1,193	3,407	cmpl.	cmpl.	0	4	1	35.0	0.0			0.0	847
WB225	31,272	Jan-09	10,945	Feb-14	9,851	21,270	71%	Jun-14	0	3	1	46.3		29,958	-4.2	-4.2	1848
WB227	4,719	Oct-08	1,652	Jun-12	1,487	3,898	cmpl.	cmpl.	0	3	1	38.1	-17.4			-17.4	1345
WB228	2,783	Feb-09	974	Dec-12	877	2,586	cmpl.	cmpl.	0	1	1	33.9	-7.1			-7.1	1404
WB229	3,882	Feb-09	1,359	Jan-12	1,223	3,833	cmpl.	cmpl.	0	1	1	31.9	-1.3			-1.3	1078
WB233	24,970	Aug-09	8,740	Aug-13	7,866	17,523	85%	Jun-14	0	3	1	44.9		20,615	-17.4	-17.4	1455
WB236	3,480	Dec-09	1,218	Aug-13	1,096	2,596	72%	Jun-14	0	1	1	42.2		3,606	3.6	3.6	1350
Avg.	**7,943**		**3,373**		**3,095**	**8,306**			**0.53**		**0.61**	**36.0**	**20.7**	**15,645**	**15.6**	**19.1**	**1439**
Min.	**661**		**311**		**280**	**776**						**14.9**	**-33.0**	**1,402**	**-66.7**	**-66.7**	**700**
Max.	**38,861**		**19,431**		**17,487**	**40,799**						**78.2**	**111.7**	**47,806**	**112.0**	**112.0**	**2479**

APPENDIX E VARIABLE CALIBRATION

E.1 CONDITION CALIBRATION

1. State Level Information

Anticorruption

Data source: Debroy and Bhandari (2011). "Corruption in India". The World Finance Review.

http://www.worldfinancialreview.com/?p=2346 (Retrieved November 16, 2014).

- Index on respective anti-corruption effort in major states.

Table E-1 Fuzzy Scores of Anti-Corruption Efforts of States

State	1990–95	1996-00	2001–05	2006–10
Bihar	0.41	0.3	0.43	0.88
Gujarat	0.48	0.57	0.64	0.69
Andhra Pradesh	0.53	0.73	0.55	0.61
Punjab	0.32	0.46	0.46	0.6
Jammu & Kashmir	0.13	0.32	0.17	0.4
Haryana	0.33	0.6	0.31	0.37
Himachal Pradesh	0.26	0.14	0.23	0.35
Tamil Nadu	0.19	0.2	0.24	0.29
Madhya Pradesh	0.23	0.22	0.31	0.29
Karnataka	0.24	0.19	0.2	0.29
Rajasthan	0.27	0.23	0.26	0.27
Kerala	0.16	0.2	0.22	0.27
Maharashtra	0.45	0.29	0.27	0.26
Uttar Pradesh	0.11	0.11	0.16	0.21
Orissa	0.22	0.16	0.15	0.19
Assam	0.21	0.02	0.14	0.17
West Bengal	0.11	0.08	0.03	0.01

State Economy

Data source: State-wise census data (Planning Commission documents).

- Average of fuzzy-set scores of Per Capita Net State Domestic Product at Current Price and Growth Rate over 2006-2012.
- Calibration (each indicator, highest score among all states, average of all states, lowest score among all states):
  - compute: fsnsdp = calibrate(percapitansdp,137000,48360,16000).
  - compute: fsgr = calibrate(growthrate,28.9,14.2,8.0).

Table E-2 Fuzzy Scores of Economic Condition of States

	States/UTs	fsnsdp	fsgr	econ	Per Capita Net State Domestic Product at Current Prices (2013) percapitansdp (Rupee in Crores)								Growth Rate growthrate (% Growth over previous year)							
					2006	2007	2008	2009	2010	2011	2012	aver.	2006	2007	2008	2009	2010	2011	2012	aver.
1	Andhra Pr.	0.51	0.59	0.55	33,135	39,727	46,345	51,114	60,703	68,970	n/a	49,999	16.1	19.89	16.66	10.29	18.76	13.62	n/a	15.89
2	Arunachal Pr.	0.54	0.62	0.58	30,000	34,352	39,656	51,031	59,415	74,059	81,583	52,871	6.94	14.51	15.44	28.68	16.43	24.65	10.16	16.69
3	Assam	0.15	0.32	0.24	19,737	21,290	24,099	28,383	33,348	37,250	42,036	29,449	7.29	7.87	13.19	17.78	17.49	11.7	12.85	12.60
4	Bihar	0.05	0.71	0.38	9,967	11,051	13,728	15,626	18,507	22,691	26,793	16,909	21.21	10.88	24.22	13.83	18.43	22.61	18.08	18.47
5	Chhattisgarh	0.27	0.54	0.41	24,800	29,385	34,360	34,366	40,166	46,743	52,689	37,501	23.28	18.49	16.93	0.02	16.88	16.37	12.72	14.96
6	Goa	0.95	0.29	0.62	94,882	108,708	135,966	149,164	164,962	167,838	n/a	136,920	11.99	14.57	25.07	9.71	10.59	1.74	n/a	12.28
7	Gujarat	0.63	0.57	0.60	43,395	50,016	55,068	64,097	78,802	89,668	n/a	63,508	14.86	15.26	10.1	16.4	22.94	13.79	n/a	15.56
8	Haryana	0.72	0.64	0.68	49,261	56,917	67,405	82,037	95,135	109,064	n/a	76,637	16.43	15.54	18.43	21.71	15.97	14.64	n/a	17.12
9	Himachal Pr.	0.59	0.28	0.44	40,393	43,966	49,903	58,402	67,475	74,694	82,611	59,635	9.32	8.85	13.5	17.03	15.54	10.7	10.6	12.22
10	J&K	0.24	0.25	0.25	25,059	27,448	30,212	33,650	38,880	44,533	50,806	35,798	7.83	9.53	10.07	11.38	15.54	14.54	14.09	11.85
11	Jharkhand	0.15	0.27	0.21	19,789	24,789	25,046	28,223	31,993	35,652	40,158	29,379	7.98	25.27	1.04	12.69	13.36	11.44	12.64	12.06
12	Karnataka	0.56	0.48	0.52	35,981	42,419	48,084	51,386	61,073	69,051	78,049	55,149	15.18	17.89	13.35	6.87	18.85	13.06	13.03	14.03
13	Kerala	0.58	0.51	0.55	40,419	45,700	53,046	60,226	69,465	80,924	n/a	58,297	11.42	13.07	16.07	13.54	15.34	16.5	n/a	14.32
14	Madhya Pr.	0.15	0.54	0.35	19,028	20,935	25,278	28,712	32,223	37,994	43,864	29,719	14.41	10.03	20.75	13.58	12.23	17.91	15.45	14.91
15	Maharashtra	0.69	0.59	0.64	49,831	57,760	62,234	71,300	87,686	101,314	n/a	71,688	18.74	15.91	7.75	14.57	22.98	15.54	n/a	15.92
16	Manipur	0.13	0.06	0.10	21,419	23,093	24,773	27,095	29,281	32,865	36,290	27,831	5.02	7.82	7.27	9.37	8.07	12.24	10.42	8.60
17	Meghalaya	0.41	0.32	0.37	30,952	34,229	40,583	43,142	48,690	53,542	60,156	44,471	17.76	10.59	18.56	6.31	12.86	9.97	12.35	12.63
18	Mizoram	0.34	0.33	0.34	28,764	32,488	38,582	42,715	48,591	54,689	n/a	40,972	7.74	12.95	18.76	10.71	13.76	12.55	n/a	12.75
19	Nagaland	0.51	0.06	0.29	36,568	39,985	46,207	50,263	53,635	56,461	59,535	48,951	8.21	9.35	15.56	8.78	6.71	5.27	5.44	8.47
20	Odisha	0.22	0.54	0.38	22,237	27,735	31,416	33,029	38,878	41,896	49,489	34,954	17.99	24.72	13.27	5.13	17.71	7.76	18.12	14.96
21	Punjab	0.63	0.45	0.54	41,883	49,380	55,315	61,805	69,837	78,594	89,345	63,737	15.7	17.9	12.02	11.73	13	12.54	13.68	13.80
22	Rajasthan	0.24	0.67	0.46	24,055	26,882	31,279	35,254	44,709	53,735	n/a	35,986	18.65	11.75	16.36	12.71	26.82	20.19	n/a	17.75
23	Sikkim	0.69	0.95	0.82	32,199	36,448	46,983	90,749	104,506	121,440	n/a	72,054	6.43	13.2	28.91	93.15	15.16	16.2	n/a	28.84
24	Tamil Nadu	0.65	0.55	0.60	42,288	47,606	54,137	64,336	75,449	84,496	94,720	66,147	19.99	12.58	13.72	18.84	17.27	11.99	12.1	15.21
25	Tripura	0.33	0.17	0.25	29,081	31,111	35,587	39,815	45,087	50,175	55,004	40,837	9.05	6.98	14.39	11.88	13.24	11.28	9.63	10.92
26	Uttar Pr.	0.09	0.36	0.23	16,013	17,785	20,422	23,671	26,741	30,051	33,520	24,029	12.6	11.07	14.83	15.91	12.97	12.38	11.54	13.04
27	Uttarakhand	0.61	0.66	0.64	35,111	42,619	50,657	62,764	72,217	79,940	90,843	62,022	19.26	21.38	18.86	23.9	15.06	10.69	13.64	17.54
28	West Bengal	0.39	0.52	0.46	27,823	31,567	35,487	41,039	48,592	55,222	63,530	43,323	12.55	13.46	12.42	15.65	18.4	13.64	15.04	14.45
29	A&N islands	0.7	0.37	0.54	53,778	61,430	69,177	79,396	85,741	93,075	n/a	73,766	20.16	14.23	12.61	14.77	7.99	8.55	n/a	13.05
30	Chandigarh	0.91	0.07	0.49	97,568	102,980	108,486	117,371	130,461	140,073	n/a	116,157	14.8	5.55	5.35	8.19	11.15	7.37	n/a	8.74
31	Delhi	0.93	0.59	0.76	83,275	95,241	111,756	129,746	150,653	175,812	n/a	124,414	15.33	14.37	17.34	16.1	16.11	16.7	n/a	15.99
32	Puducherry	0.81	0.05	0.43	68,673	74,201	79,306	96,860	105,557	98,055	112,986	90,805	2.18	8.05	6.88	22.13	8.98	-7.11	15.23	8.05
All-India Per Capita NNI (04-05 base)					31,206	35,825	40,775	46,249	54,151	61,564	68,747	48,360	15.02	14.8	13.82	13.42	17.09	13.69	11.67	14.22

Supply of Human Resource

Data source: State-wise census data (Planning Commission documents).

- Average of fuzzy-set scores of Literacy rate (2011), # of Colleges per state population (million) (2010–2011), and Mean Years of Schooling of Labor Force (2007–8).
- Calibration (each indicator, highest score among all states, average of all states, lowest score among all states):
  - compute: lit_fs = calibrate(literacy,94.0,74.04,63.0).
  - compute: col_fs = calibrate(collegesperm,85.0,21.4,4.8).
  - compute: mys_fs = calibrate(mys,9.5071,6.313,4.0339).

Table E-3 Fuzzy Scores of Human Resource Supply of States

No	State	Population	Total colleges	Literacy	Colleges per MLN	Mean Years of Schooling	lit_fs	col_fs	mys_fs	hrs
1	Andhra Pr.	84,665,533	4,473	67.66	52.8	4.327	0.15	0.81	0.07	0.34
2	Arunachal Pr.	1,382,611	23	66.95	16.6	4.919	0.13	0.3	0.14	0.19
3	Assam	31,169,272	546	73.18	17.5	6.642	0.44	0.33	0.58	0.45
4	Bihar	103,804,637	1,031	63.82	9.9	4.167	0.06	0.11	0.06	0.08
5	Chhattisgarh	25,540,196	584	71.04	22.9	4.467	0.31	0.52	0.08	0.30
6	Goa	1,457,723	39	87.4	26.8	8.429	0.88	0.56	0.88	0.77
7	Gujarat	60,383,628	1,218	79.31	20.2	5.844	0.69	0.45	0.35	0.50
8	Haryana	25,353,081	1,002	76.64	39.5	6.222	0.6	0.7	0.47	0.59
9	Himachal Pr.	6,856,509	582	83.78	84.9	6.893	0.81	0.95	0.63	0.80
10	J&K	12,548,926	303	68.74	24.1	5.744	0.19	0.53	0.32	0.35
11	Jharkhand	32,966,238	161	67.63	4.9	4.535	0.15	0.05	0.09	0.10
12	Karnataka	61,130,704	979	75.6	16	5.499	0.56	0.27	0.26	0.36
13	Kerala	33,387,677	448	93.91	13.4	8.408	0.95	0.19	0.88	0.67
14	Madhya Pr.	72,597,565	1,311	70.63	18.1	4.746	0.28	0.36	0.11	0.25
15	Maharashtra	112,372,972	3,446	82.91	30.7	6.825	0.79	0.61	0.62	0.67
16	Manipur	2,721,756	73	79.85	26.8	7.783	0.71	0.56	0.8	0.69
17	Meghalaya	2,964,007	118	75.48	39.8	6.09	0.55	0.7	0.43	0.56
18	Mizoram	1,091,014	29	91.58	26.6	7.603	0.93	0.56	0.77	0.75
19	Nagaland	1,980,602	74	80.11	37.4	8.293	0.71	0.68	0.87	0.75
20	Odisha	41,947,358	874	73.45	20.8	4.726	0.46	0.47	0.11	0.35
21	Punjab	27,704,236	578	76.68	20.9	6.551	0.6	0.48	0.56	0.55
22	Rajasthan	68,621,012	1,610	67.06	23.5	4.034	0.13	0.52	0.05	0.23
23	Sikkim	607,688	18	82.2	29.6	6.071	0.77	0.6	0.42	0.60
24	Tamil Nadu	72,138,958	1,936	80.33	26.8	6.214	0.72	0.56	0.47	0.58
25	Tripura	3,671,032	29	87.75	7.9	5.994	0.89	0.08	0.4	0.46
26	Uttar Pr.	199,581,477	3,104	69.72	15.6	6.203	0.24	0.26	0.46	0.32
27	Uttarakhand	10,116,752	225	79.63	22.2	4.897	0.7	0.51	0.13	0.45
28	West Bengal	91,347,736	841	77.08	9.2	5.615	0.61	0.1	0.29	0.33
29	A&N islands	379,944	5	86.27	13.2	8.223	0.86	0.19	0.86	0.64
30	Chandigarh	1,054,686	24	86.43	22.8	8.545	0.87	0.52	0.89	0.76
31	Delhi	16,753,235	155	86.34	9.3	9.507	0.86	0.1	0.95	0.64
32	Puducherry	1,244,464	90	86.55	72.3	7.994	0.87	0.92	0.83	0.87
	All-India	1,210,193,422	25,938	74.04	21.4	6.313				

Accountability

Date source: MOA checklist (MoUD document).

- Enactment of Community Participation Law and Enactment of Public Disclosure Law.
- Calibration:
  - 0 = both not achieved, 0.5 = one achieved, 1 = both achieved.

Table E-4 City-wise Fuzzy Scores of Accountability and Devolution

No	City	Accountability			Devolution					
		Fuzzy score	Community Participation Law	Public Disclosure Law	Fuzzy score	Transfer 12 Functions	Constitution of DPC	Constitution of MPC	Transfer-City Planning Function	Transfer-Water Supply & Sanitation
1	KA1	0.0	0	0	0.2	0	1	0	0	0
2	KA2	0.0	0	0	0.2	0	1	0	0	0
3	MA1	0.5	0	1	0.8	1	1	0	1	1
4	MA2	0.5	0	1	0.8	1	1	0	1	1
5	MA3	0.5	0	1	0.8	1	1	0	1	1
6	GT1	1.0	1	1	0.6	1	0	0	1	1
7	GT2	1.0	1	1	1.0	1	1	1	1	1
8	UP1	0.5	0	1	0.2	0	1	0	0	0
9	UP2	0.5	0	1	0.2	0	1	0	0	0
10	UP3	0.5	0	1	0.2	0	1	0	0	0
11	WB1	0.0	0	0	0.8	1	1	0	1	1
12	WB2	0.0	0	0	0.8	0	1	1	1	1

Governance

Date source: interview and project implementation status report (SLNA document).

- Institutional structure.
- Calibration:
  - 1 = state where ULBs implement the JNNURM project.
  - 0 = state where multiple agencies implement the JNNURM project.

Data not utilized for the QCA (type of implementing agency and level of devolutions can explain this information).

2. ULB Level Information

Since the present study focused on the ULB's capacity, the ULB-related information was used for capacity factors at the organizational level. Even though project implementation was done by non-ULB agencies in some projects, the ULB's capacity factors (financial condition, organizational development) could affect project implementation.

Devolution (reform score)

Data source: MOA checklist (MOUD document).

- Reform agendas: transfer of 12 scheduled functions, constitution of DPC, constitution of MPC, transfer of city planning function, transfer of water supply & sanitation.
- Calibration:
  - 0 = none achieved, 0.2/0.4/0.6/0.8 = 1/2/3/4 achieved, 1= all achieved.

Devolution data included in Table E-4.

ULB Financial condition: credit rating + user charge (reform score)

Data source: credit rating report (MOUD document), MOA checklist (each ULB document).

- Average of credit rating and MOA checklist average.
- Calibration:
  - financial status = average (credit rating score, MOA checklist average).
  - credit rating score: AAA=0.95 reduced 0.05 per lowering each grade.

Table E-5 Fuzzy Scores of Credit Rating

AAA	AA+	AA	AA-	A+	A	A-	BBB+	BBB	BBB-	BB+	BB	BB-	B+	B	B-	C	D
0.95	0.9	0.85	0.8	0.75	0.7	0.65	0.6	0.55	0.5	0.45	0.4	0.35	0.3	0.25	0.2	0.15	0.1

  - MOA checklist average: rates of property tax coverage, collection efficiency, cost recovery (Water Supply).

Table E-6 City-wise Fuzzy Scores of Financial Conditions

no	City	Financial status (finan) (fuzzy score)	Credit rating		Reform MOA checklist				Reform 2013 scorecard (not used due to duplication)		
			rating	score	property tax coverage	collection efficiency	cost recovery (WS)	average	property Tax	cost recovery	average
1	KA1	0.46	B	0.25	78.5%	78.7%	42.6%	0.67	10.0	8.5	9.25
2	KA2	0.53	BBB	0.55	51.6%	61.7%	42.6%	0.52	9.5	6.0	7.75
3	MA1	0.81	AA-	0.80	59.0%	86.0%	100.0%	0.82	10.0	10.0	10.00
4	MA2	0.80	AA-	0.80	100.0%	41.8%	100.0%	0.81	10.0	10.0	10.00
5	MA3	0.78	AA-	0.80	68.0%	70.9%	90.7%	0.77	10.0	10.0	10.00
6	GT1	0.65	A	0.70	76.0%	61.3%	44.1%	0.60	9.0	7.5	8.25
7	GT2	0.57	A+	0.75	38.6%	52.9%	23.2%	0.38	9.0	9.0	9.00
8	UP1	0.61	BB-	0.35	96.0%	96.0%	66.9%	0.86	9.0	7.5	8.25
9	UP2	0.53	BB+	0.45	67.0%	57.5%	55.7%	0.60	9.0	8.5	8.75
10	UP3	0.49	BB	0.40	52.2%	77.8%	42.0%	0.57	9.0	8.0	8.50
11	WB1	0.38	BB	0.40	22.5%	70.1%	14.4%	0.36	6.5	2.0	4.25
12	WB2	0.62	A+	0.75	57.3%	54.3%	34.1%	0.49	9.0	2.0	5.50

ULB Organizational development (interview)

Data source: interview question.

- Existence of HRD Policy/cell, sufficient staffs, in-house training system.
- Calibration:
  - 0 = all no, 0.33 = 1 yes, 0.67 = 2 yes, 1= all yes.

Table E-7 City-wise Fuzzy Scores of Organizational Development Conditions

No	City	HRD Policy/cell	sufficient staffs	training system	od (fuzzy score)
1	KA1	Y	Y	Y	1
2	KA2	N	Y	Y	0.67
3	MA1	Y	N	Y	0.67
4	MA2	Y	N	Y	0.67
5	MA3	N	M	Y	0.33
6	GT1	Y	Y	Y	1
7	GT2	Y	Y	N	0.67
8	UP1	N	N	N	0
9	UP2	N	Y	Y	0.67
10	UP3	Y	N	Y	0.67
11	WB1	N	N	N	0
12	WB2	Y	N	M	0.33

Note: "M" indicates divergent answers from multiple respondents in an organization, and it was considered as "N".

3. Project Level Information

In relation to the case study findings, the ULB's capacity was related to many project factors: participation in project implementation; project size; share of project cost; and project sector were found to be closely connected to ULB's ownership, attitude, experience, knowledge, and skills.

Implementing agency (involvement of ULBs)

Data source: interview and project implementation status report (SLNA document).

- Authorized implementing agencies.
- Calibration:
  - 1 = ULB involved in implementation, 0 = parastatal or others only.

Project data included in Appendix D.2.

Approved cost

Data source: UIG project implementation status report (MoUD, GOI document).

- Approved cost.
- Calibration (each indicator, highest score among all projects, average, lowest score among all projects):
  - compute: fsapcost = calibrate(apprcost,38900,7943,600).

Project data included in Appendix D.2.

GOI share of project cost

Data source: UIG project implementation status report (MOUD, GOI document).

- Approved cost.
- Calibration (each indicator, highest score among all projects, average, lowest score among all projects):
  - compute: fsgoi = calibrate(goi,79,36,14).

Project data included in Appendix D.2.

Project sector

Data source: interview and project implementation status report (SLNA document).

- Project sector (water sector/ transportation sector).
- Calibration:
  - Sector 1,3,4,8: water = 1 / transportation = 2.
  - Sector 2,6,7: water = 0 / transportation = 1.
  - Sector 10: 1 cases – missing data.

Project data included in Appendix D.2.

Project completion

Data source: UIG project implementation status report (MOUD, GOI document).

- Status of completion.
- Calibration:
  - 1 = complete, 0= incomplete.

Project data included in Appendix D.2; Data not utilized for the QCA due to no relation to capacity.

E.2 OUTCOME CALIBRATION

Data source: UIG project implementation status report (MoUD, GOI document).

Cost Overruns

Cost overruns of completed projects = % of utilized cost against approved cost

(Utilization as per Mar 14 QPR – Approved Cost)/ Approved Cost

Cost overruns of incomplete projects = % of estimated cost at completion against approved cost (based on earned value approach)

((Utilization as per Mar 14 QPR / % of work completed) – Approved Cost)/ Approved Cost

- Calibration based on the plots (each indicator,70,5,-20):
  - compute: fscostover = calibrate(costoverrun,70,5,-20).

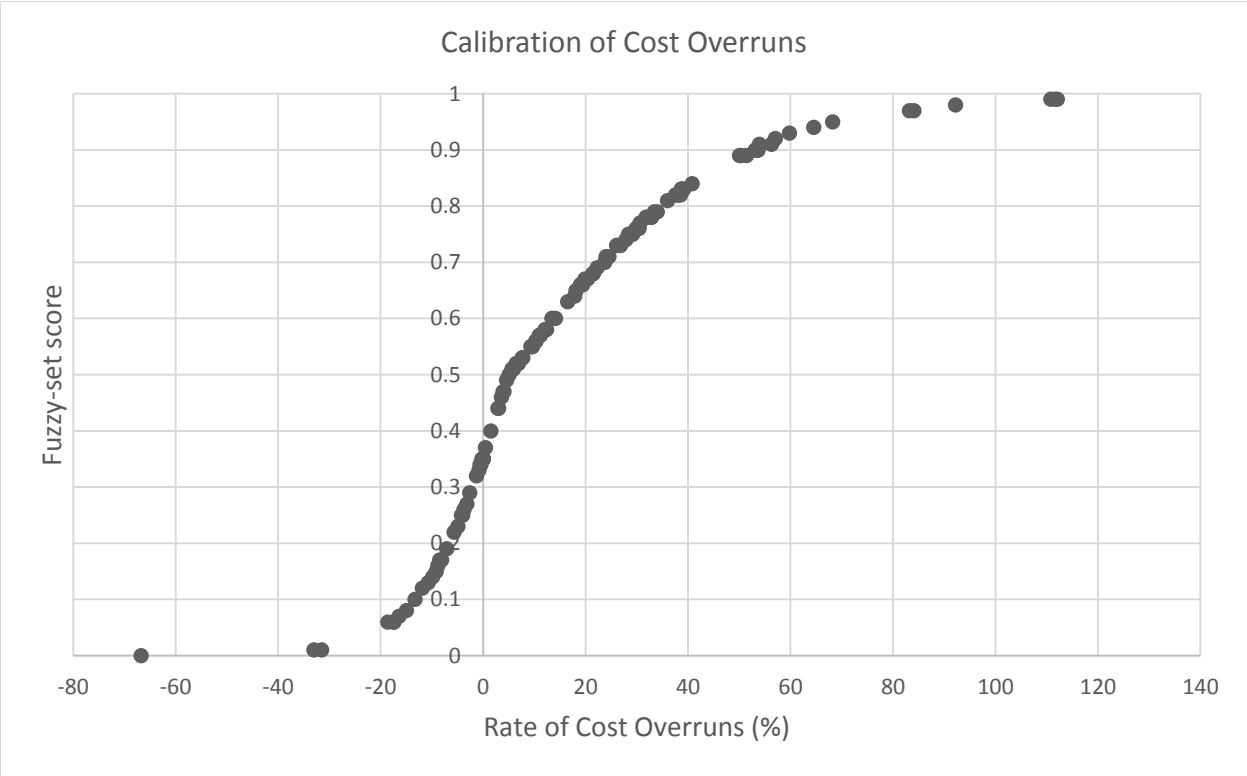

Figure E-1 Calibration of Cost Overruns

In the iterative process of calibration, necessary condition analysis, and truth table analysis, ten different set of the outcomes were created, and more than 300 models with different configurations were examined. The other sets of outcomes based on different calibrations are as follows:

1) compute: fscostover = calibrate(costoverrun,112,18,-68)
2) compute: fscostover = calibrate(costoverrun,112,10,-68)
3) compute: fscostover = calibrate(costoverrun,112,5,-68)
4) compute: fscostover = calibrate(costoverrun,112,0,-68)
5) compute: fscostover = calibrate(costoverrun,100,5,-40)
6) compute: fscostover = calibrate(costoverrun,70,10,-20)
7) 6 interval classes (based on plots, cross-over at 10): 0.0, 0.2, 0.4, 0.6, 0.8, 1.0
8) 7 interval classes (based on plots, cross-over at 15): 0.05, 0.2, 0.35, 0.5, 0.65, 0.8, 0.95
9) 8 interval classes (based on plots, cross-over at 10): 0.05, 0.2, 0.35, 0.45, 0.55, 0.65, 0.8, 0.95
10) 8 interval classes II (based on plots, cross-over at 7.5): 0.05, 0.2, 0.35, 0.45, 0.55, 0.65, 0.8, 0.95

Cost Underruns

- Negation value: 1 – fuzzy membership in cost overruns
- Calibration:
  - compute: fscostunder = 1 – fscostover

APPENDIX F RESULTS OF ANALYSIS

F.1 TRUTH TABLE

Table F-1 Truth Table of Conditions and Outcome

(arranged from the largest to the smallest cost overruns)

cases included in paths to cost overruns

cases included in paths to cost underruns

cases included in paths to both

project	costoverruns	fsco5	ulb	apcost	goi	financ	od	Devolve	accouta	hrs	econ	anticorr	water
MA107	112.04	0.99	1	0.05	0.21	0.81	0.67	0.80	0.50	0.67	0.64	0.26	0
MA101	111.67	0.99	1	0.52	0.16	0.81	0.67	0.80	0.50	0.67	0.64	0.26	1
WB216	110.82	0.99	0	0.08	0.05	0.62	0.33	0.80	0.00	0.33	0.46	0.01	0
GT213	92.2	0.98	1	0.07	0.08	0.57	0.67	1.00	1.00	0.50	0.60	0.69	0
WB206	84.11	0.97	0	0.16	0.09	0.62	0.33	0.80	0.00	0.33	0.46	0.01	0
KA123	83.2	0.97	0	0.16	0.07	0.46	1.00	0.20	0.00	0.36	0.52	0.29	0
KA101	68.22	0.95	0	0.08	0.09	0.46	1.00	0.20	0.00	0.36	0.52	0.29	0
WB212	64.55	0.94	0	0.05	0.16	0.62	0.33	0.80	0.00	0.33	0.46	0.01	1
MA111	59.78	0.93	1	0.72	0.26	0.81	0.67	0.80	0.50	0.67	0.64	0.26	1
KA125	57.04	0.92	0	0.11	0.10	0.46	1.00	0.20	0.00	0.36	0.52	0.29	0
KA114	56.31	0.91	0	0.05	0.10	0.46	1.00	0.20	0.00	0.36	0.52	0.29	0
MA205	53.9	0.91	1	0.66	0.12	0.80	0.67	0.80	0.50	0.67	0.64	0.26	1
GT104	53.68	0.9	1	0.66	0.29	0.65	1.00	0.60	1.00	0.50	0.60	0.69	1
WB201	53.57	0.9	1	0.54	0.21	0.62	0.33	0.80	0.00	0.33	0.46	0.01	1
MA201	53.56	0.9	1	0.09	0.14	0.80	0.67	0.80	0.50	0.67	0.64	0.26	0
WB213	53.08	0.9	0	0.53	0.20	0.62	0.33	0.80	0.00	0.33	0.46	0.01	1
GT211	51.42	0.89	1	0.08	0.15	0.57	0.67	1.00	1.00	0.50	0.60	0.69	0
MA203	50.34	0.89	1	0.53	0.11	0.80	0.67	0.80	0.50	0.67	0.64	0.26	1
KA106	50.02	0.89	0	0.10	0.11	0.46	1.00	0.20	0.00	0.36	0.52	0.29	0
UP104	40.82	0.84	0	0.76	0.60	0.61	0.00	0.20	0.50	0.32	0.23	0.21	1
KA107	39.18	0.83	0	0.16	0.14	0.46	1.00	0.20	0.00	0.36	0.52	0.29	0
UP304	38.76	0.83	0	0.93	0.43	0.49	0.67	0.20	0.50	0.32	0.23	0.21	1
KA122	38.69	0.83	0	0.08	0.14	0.46	1.00	0.20	0.00	0.36	0.52	0.29	0
GT102	38.56	0.82	1	0.17	0.50	0.65	1.00	0.60	1.00	0.50	0.60	0.69	1
GT111	38.21	0.82	1	0.08	0.38	0.65	1.00	0.60	1.00	0.50	0.60	0.69	0
KA105	37.98	0.82	0	0.09	0.14	0.46	1.00	0.20	0.00	0.36	0.52	0.29	0
MA202	37.53	0.82	1	0.42	0.19	0.80	0.67	0.80	0.50	0.67	0.64	0.26	1
KA108	36	0.81	1	0.06	0.15	0.46	1.00	0.20	0.00	0.36	0.52	0.29	0
GT109	34.01	0.79	1	0.06	0.52	0.65	1.00	0.60	1.00	0.50	0.60	0.69	0
UP307	33.43	0.79	0	0.66	0.68	0.49	0.67	0.20	0.50	0.32	0.23	0.21	1
MA204	32.89	0.78	1	0.59	0.16	0.80	0.67	0.80	0.50	0.67	0.64	0.26	1
GT205	32.81	0.78	1	0.06	0.21	0.57	0.67	1.00	1.00	0.50	0.60	0.69	1
KA126	31.87	0.78	0	0.07	0.16	0.46	1.00	0.20	0.00	0.36	0.52	0.29	1
KA202	31.84	0.78	0	0.51	0.79	0.53	0.67	0.20	0.00	0.36	0.52	0.29	0
MA102	30.65	0.77	1	0.56	0.54	0.81	0.67	0.80	0.50	0.67	0.64	0.26	0
MA109	30.47	0.76	1	0.05	0.54	0.81	0.67	0.80	0.50	0.67	0.64	0.26	0
KA129	29.85	0.76	0	0.32	0.17	0.46	1.00	0.20	0.00	0.36	0.52	0.29	0
WB205	29.19	0.75	0	0.20	0.17	0.62	0.33	0.80	0.00	0.33	0.46	0.01	1
KA115	29.1	0.75	0	0.06	0.12	0.46	1.00	0.20	0.00	0.36	0.52	0.29	1

UP305	28.37	0.75	1	0.92	0.63	0.49	0.67	0.20	0.50	0.32	0.23	0.21	1
UP202	27.91	0.74	0	0.86	0.56	0.53	0.67	0.20	0.50	0.32	0.23	0.21	1
GT103	26.81	0.73	1	0.56	0.56	0.65	1.00	0.60	1.00	0.50	0.60	0.69	1
KA135	26.77	0.73	0	0.64	0.21	0.46	1.00	0.20	0.00	0.36	0.52	0.29	1
KA203	26.16	0.73	0	0.79	0.95	0.53	0.67	0.20	0.00	0.36	0.52	0.29	0
GT207	26.07	0.73	1	0.30	0.25	0.57	0.67	1.00	1.00	0.50	0.60	0.69	1
GT204	24.57	0.71	1	0.40	0.25	0.57	0.67	1.00	1.00	0.50	0.60	0.69	1
MA303	23.99	0.71	1	0.26	0.51	0.78	0.33	0.80	0.50	0.67	0.64	0.26	1
GT217	23.78	0.7	1	0.07	0.26	0.57	0.67	1.00	1.00	0.50	0.60	0.69	0
MA208	22.25	0.69	1	0.29	0.20	0.80	0.67	0.80	0.50	0.67	0.64	0.26	1
WB220	21.51	0.68	0	0.65	0.27	0.62	0.33	0.80	0.00	0.33	0.46	0.01	1
KA104	21.47	0.68	0	0.24	0.20	0.46	1.00	0.20	0.00	0.36	0.52	0.29	0
WB102	21.42	0.68	0	0.15	0.55	0.38	0.00	0.80	0.00	0.33	0.46	0.01	1
WB203	20.38	0.67	0	0.06	0.28	0.62	0.33	0.80	0.00	0.33	0.46	0.01	1
KA133	19.91	0.67	1	0.09	0.24	0.46	1.00	0.20	0.00	0.36	0.52	0.29	0
GT214	19.46	0.66	1	0.08	0.29	0.57	0.67	1.00	1.00	0.50	0.60	0.69	0
UP205	19.14	0.66	0	0.95	0.70	0.53	0.67	0.20	0.50	0.32	0.23	0.21	1
GT101	19.08	0.66	1	0.19	0.53	0.65	1.00	0.60	1.00	0.50	0.60	0.69	0
UP203	19.02	0.66	0	0.75	0.65	0.53	0.67	0.20	0.50	0.32	0.23	0.21	1
MA207	18.14	0.65	1	0.18	0.30	0.80	0.67	0.80	0.50	0.67	0.64	0.26	1
KA103	17.86	0.64	0	0.51	0.22	0.46	1.00	0.20	0.00	0.36	0.52	0.29	0
GT107	16.51	0.63	1	0.20	0.55	0.65	1.00	0.60	1.00	0.50	0.60	0.69	0
MA301	14.14	0.6	1	0.23	0.55	0.78	0.33	0.80	0.50	0.67	0.64	0.26	1
KA130	13.51	0.6	0	0.61	0.54	0.46	1.00	0.20	0.00	0.36	0.52	0.29	1
GT218	13.45	0.6	1	0.23	0.33	0.57	0.67	1.00	1.00	0.50	0.60	0.69	0
KA136	12.41	0.58	0	0.52	0.40	0.46	1.00	0.20	0.00	0.36	0.52	0.29	1
KA204	12.05	0.58	0	0.53	0.89	0.53	0.67	0.20	0.00	0.36	0.52	0.29	1
WB221	11.2	0.57	1	0.88	0.26	0.62	0.33	0.80	0.00	0.33	0.46	0.01	1
UP103	11.1	0.57	0	0.51	0.65	0.61	0.00	0.20	0.50	0.32	0.23	0.21	1
GT223	10.94	0.57	1	0.82	0.44	0.57	0.67	1.00	1.00	0.50	0.60	0.69	1
KA132	10.31	0.56	1	0.10	0.27	0.46	1.00	0.20	0.00	0.36	0.52	0.29	0
KA113	10.27	0.56	1	0.07	0.27	0.46	1.00	0.20	0.00	0.36	0.52	0.29	0
WB218	9.63	0.55	0	0.62	0.44	0.62	0.33	0.80	0.00	0.33	0.46	0.01	1
MA103	9.59	0.55	1	0.55	0.78	0.81	0.67	0.80	0.50	0.67	0.64	0.26	1
MA302	9.45	0.55	1	0.66	0.60	0.78	0.33	0.80	0.50	0.67	0.64	0.26	1
UP303	9.36	0.55	0	0.95	0.62	0.49	0.67	0.20	0.50	0.32	0.23	0.21	1
GT216	7.76	0.53	1	0.07	0.38	0.57	0.67	1.00	1.00	0.50	0.60	0.69	0
GT201	7.63	0.53	1	0.26	0.38	0.57	0.67	1.00	1.00	0.50	0.60	0.69	1
MA108	6.88	0.52	1	0.05	0.68	0.81	0.67	0.80	0.50	0.67	0.64	0.26	0
GT219	6.82	0.52	1	0.15	0.29	0.57	0.67	1.00	1.00	0.50	0.60	0.69	1
WB208	6.47	0.52	0	0.20	0.39	0.62	0.33	0.80	0.00	0.33	0.46	0.01	1
KA120	5.97	0.51	1	0.12	0.32	0.46	1.00	0.20	0.00	0.36	0.52	0.29	0
GT209	5.63	0.51	1	0.60	0.40	0.57	0.67	1.00	1.00	0.50	0.60	0.69	1
KA124	5.09	0.5	1	0.10	0.31	0.46	1.00	0.20	0.00	0.36	0.52	0.29	0
KA117	4.58	0.49	1	0.19	0.31	0.46	1.00	0.20	0.00	0.36	0.52	0.29	0
GT220	4.11	0.47	1	0.57	0.31	0.57	0.67	1.00	1.00	0.50	0.60	0.69	1
GT202	3.9	0.47	1	0.06	0.42	0.57	0.67	1.00	1.00	0.50	0.60	0.69	0
WB236	3.61	0.46	0	0.14	0.61	0.62	0.33	0.80	0.00	0.33	0.46	0.01	1
GT225	3.02	0.44	1	0.59	0.58	0.57	0.67	1.00	1.00	0.50	0.60	0.69	1
GT206	2.9	0.44	1	0.52	0.32	0.57	0.67	1.00	1.00	0.50	0.60	0.69	0
UP204	1.52	0.4	0	0.65	0.51	0.53	0.67	0.20	0.50	0.32	0.23	0.21	1
GT105	0.46	0.37	1	0.12	0.85	0.65	1.00	0.60	1.00	0.50	0.60	0.69	1
UP102	0	0.35	0	0.09	0.73	0.61	0.00	0.20	0.50	0.32	0.23	0.21	1
WB101	0	0.35	0	0.11	0.73	0.38	0.00	0.80	0.00	0.33	0.46	0.01	1
WB103	0	0.35	0	0.07	0.73	0.38	0.00	0.80	0.00	0.33	0.46	0.01	1
WB217	0	0.35	0	0.10	0.47	0.62	0.33	0.80	0.00	0.33	0.46	0.01	1

WB222	0	0.35	0	0.14	0.47	0.62	0.33	0.80	0.00	0.33	0.46	0.01	1
WB202	-0.03	0.35	0	0.07	0.47	0.62	0.33	0.80	0.00	0.33	0.46	0.01	1
UP301	-0.22	0.35	0	0.82	0.73	0.49	0.67	0.20	0.50	0.32	0.23	0.21	1
UP201	-0.38	0.34	0	0.28	0.65	0.53	0.67	0.20	0.50	0.32	0.23	0.21	1
GT203	-0.62	0.34	1	0.12	0.47	0.57	0.67	1.00	1.00	0.50	0.60	0.69	0
GT110	-0.79	0.33	1	0.15	0.66	0.65	1.00	0.60	1.00	0.50	0.60	0.69	1
WB229	-1.26	0.32	0	0.16	0.36	0.62	0.33	0.80	0.00	0.33	0.46	0.01	1
MA110	-2.57	0.29	1	0.15	0.67	0.81	0.67	0.80	0.50	0.67	0.64	0.26	0
GT106	-3.19	0.27	1	0.11	0.79	0.65	1.00	0.60	1.00	0.50	0.60	0.69	
KA128	-3.73	0.26	0	0.07	0.39	0.46	1.00	0.20	0.00	0.36	0.52	0.29	0
MA104	-3.96	0.25	1	0.54	0.75	0.81	0.67	0.80	0.50	0.67	0.64	0.26	1
WB225	-4.2	0.25	0	0.91	0.67	0.62	0.33	0.80	0.00	0.33	0.46	0.01	1
GT224	-4.91	0.23	1	0.48	0.40	0.57	0.67	1.00	1.00	0.50	0.60	0.69	1
UP302	-5.63	0.22	0	0.18	0.86	0.49	0.67	0.20	0.50	0.32	0.23	0.21	1
WB228	-7.07	0.19	0	0.11	0.43	0.62	0.33	0.80	0.00	0.33	0.46	0.01	1
WB214	-8.1	0.17	0	0.25	0.59	0.62	0.33	0.80	0.00	0.33	0.46	0.01	0
GT212	-8.45	0.17	1	0.09	0.54	0.57	0.67	1.00	1.00	0.50	0.60	0.69	0
KA116	-8.87	0.16	0	0.06	0.45	0.46	1.00	0.20	0.00	0.36	0.52	0.29	1
KA121	-9.16	0.15	0	0.09	0.46	0.46	1.00	0.20	0.00	0.36	0.52	0.29	0
KA205	-9.82	0.14	1	0.11	0.92	0.53	0.67	0.20	0.00	0.36	0.52	0.29	1
KA134	-10.74	0.13	1	0.09	0.48	0.46	1.00	0.20	0.00	0.36	0.52	0.29	0
UP101	-11.86	0.12	0	0.12	0.87	0.61	0.00	0.20	0.50	0.32	0.23	0.21	1
GT210	-13.3	0.1	1	0.60	0.58	0.57	0.67	1.00	1.00	0.50	0.60	0.69	1
GT221	-14.98	0.08	1	0.56	0.52	0.57	0.67	1.00	1.00	0.50	0.60	0.69	1
KA118	-16.42	0.07	1	0.23	0.53	0.46	1.00	0.20	0.00	0.36	0.52	0.29	0
WB227	-17.39	0.06	0	0.21	0.54	0.62	0.33	0.80	0.00	0.33	0.46	0.01	1
WB233	-17.44	0.06	0	0.84	0.65	0.62	0.33	0.80	0.00	0.33	0.46	0.01	1
GT108	-18.61	0.06	1	0.32	0.83	0.65	1.00	0.60	1.00	0.50	0.60	0.69	1
KA207	-31.53	0.01	0	0.09	0.90	0.53	0.67	0.20	0.00	0.36	0.52	0.29	0
GT215	-32.99	0.01	1	0.08	0.75	0.57	0.67	1.00	1.00	0.50	0.60	0.69	0
KA206	-66.73	0	1	0.95	0.95	0.53	0.67	0.20	0.00	0.36	0.52	0.29	1

F.2 CRISP TRUTH TABLE AND CONSISTENCY CUTOFF

Table F-2 Crisp Truth Table for Cost Overruns

ulb	apcost	goi	financ	od	devolv	accouta	hrs	econ	anticorr	water	number	fsco5	raw consist.	PRI consist.	SYM consist
0	0	0	0	1	0	0	0	1	0	0	12	0	0.902	0.850	0.850
0	0	0	1	0	1	0	0	0	0	1	9	0	0.840	0.481	0.485
1	0	0	0	1	0	0	0	1	0	0	8	0	0.853	0.536	0.547
0	1	0	1	0	1	0	0	0	0	1	3	0	0.923	0.612	0.612
0	0	1	0	0	1	0	0	0	0	1	3	0	0.863	0.278	0.278
0	0	0	0	1	0	0	0	1	0	1	3	0	0.918	0.615	0.615
1	1	0	1	0	1	0	0	0	0	1	2	1	0.990	0.974	0.974
0	1	1	1	1	0	0	0	1	0	0	2	1	0.962	0.869	0.869
0	1	1	1	0	1	0	0	0	0	1	2	0	0.858	0.155	0.155
0	1	0	0	1	0	0	0	1	0	1	2	0	0.956	0.674	0.674
0	0	1	1	0	1	0	0	0	0	1	2	0	0.840	0.172	0.172
0	0	0	1	0	1	0	0	0	0	0	2	0	0.822	0.761	0.761
1	1	1	1	1	0	0	0	1	0	1	1	0	0.855	0.447	0.447
1	0	1	1	1	0	0	0	1	0	1	1	0	0.870	0.494	0.494
1	0	1	0	1	0	0	0	1	0	0	1	0	0.798	0.216	0.216
0	1	1	1	1	0	0	0	1	0	1	1	0	0.956	0.541	0.541
0	1	1	0	1	0	0	0	1	0	1	1	0	0.956	0.548	0.548
0	1	0	0	1	0	0	0	1	0	0	1	1	0.961	0.849	0.849
0	0	1	1	1	0	0	0	1	0	0	1	0	0.748	0.329	0.329
0	0	1	1	0	1	0	0	0	0	0	1	0	0.560	0.150	0.150

Table F-3 Crisp Truth Table for Cost Underruns

ulb	apcost	goi	financ	od	devolv	accouta	hrs	econ	anticorr	water	number	fsco5	raw consist.	PRI consist.	SYM consist
0	0	0	0	1	0	0	0	1	0	0	12	0	0.447	0.150	0.150
0	0	0	1	0	1	0	0	0	0	1	9	0	0.849	0.511	0.515
1	0	0	0	1	0	0	0	1	0	0	8	0	0.824	0.443	0.453
0	1	0	1	0	1	0	0	0	0	1	3	0	0.878	0.388	0.388
0	0	1	0	0	1	0	0	0	0	1	3	1	0.947	0.722	0.722
0	0	0	0	1	0	0	0	1	0	1	3	0	0.870	0.385	0.385
1	1	0	1	0	1	0	0	0	0	1	2	0	0.640	0.026	0.026
0	1	1	1	1	0	0	0	1	0	0	2	0	0.750	0.131	0.131
0	1	1	1	0	1	0	0	0	0	1	2	1	0.974	0.845	0.845
0	1	0	0	1	0	0	0	1	0	1	2	1	0.909	0.326	0.326
0	0	1	1	0	1	0	0	0	0	1	2	1	0.966	0.825	0.828
0	0	0	1	0	1	0	0	0	0	0	2	0	0.432	0.239	0.239
1	1	1	1	1	0	0	0	1	0	1	1	0	0.883	0.553	0.553
1	0	1	1	1	0	0	0	1	0	1	1	0	0.873	0.506	0.506
1	0	1	0	1	0	0	0	1	0	0	1	1	0.944	0.784	0.784
0	1	1	1	1	0	0	0	1	0	1	1	1	0.948	0.459	0.459
0	1	1	0	1	0	0	0	1	0	1	1	1	0.947	0.452	0.452
0	1	0	0	1	0	0	0	1	0	0	1	0	0.782	0.151	0.151
0	0	1	1	1	0	0	0	1	0	0	1	0	0.877	0.671	0.671
0	0	1	1	0	1	0	0	0	0	0	1	1	0.922	0.850	0.850

F.3 RESULTS OF ANALYSIS OF SUFFICIENT CONDITIONS FOR COST OVERRUNS

--- PARSIMONIOUS SOLUTION ---

- Model: fsco5 = f(ulb, apcost, goi, financ, od, devolv, accouta, hrs, econ, anticorr, water)
- Rows: 20

Frequency cutoff: 1
Consistency cutoff: 0.961404

Table F-4 Consistency and Coverage of the Sufficient Conditions for Cost Overruns (Parsimonious Solution)

	raw coverage	unique coverage	consistency
apcost*~water	0.103752	0.053486	0.933249
ulb*~econ	0.328899	0.011201	0.86408
ulb*~od	0.213106	0.006721	0.88437
ulb*apcost*~goi	0.217866	0	0.896313
ulb*~goi*financ	0.422151	0.034164	0.897055
ulb*~goi*water	0.24825	0.012462	0.884731
solution coverage: 0.509381			
solution consistency: 0.860149			

- Cases with greater than 0.5 membership in term apcost*~water: KA203 (0.79,0.73), MA102 (0.56,0.77), GT206 (0.52,0.44), KA103 (0.51,0.64), KA202 (0.51,0.78)
- Cases with greater than 0.5 membership in term ulb*~econ: UP305 (0.775,0.75), WB201 (0.545,0.9), WB221 (0.545,0.57)
- Cases with greater than 0.5 membership in term ulb*~od: MA301 (0.67,0.6), MA302 (0.67,0.55), MA303 (0.67,0.71), WB201 (0.67,0.9), WB221 (0.67,0.57)
- Cases with greater than 0.5 membership in term ulb*apcost*~goi: WB221 (0.74,0.57), MA111 (0.72,0.93), MA205 (0.66,0.91), GT104 (0.66,0.9), GT209 (0.6,0.51), MA204 (0.59,0.78), GT220 (0.57,0.47), GT223 (0.56,0.57), WB201 (0.54,0.9), MA203 (0.53,0.89), MA101 (0.52,0.99), GT206 (0.52,0.44)
- Cases with greater than 0.5 membership in term ulb*~goi*financ: MA101 (0.81,0.99), MA201 (0.8,0.9), MA202 (0.8,0.82), MA203 (0.8,0.89), MA204 (0.8,0.78), MA205 (0.8,0.91), MA208 (0.8,0.69), MA107 (0.79,0.99), MA111 (0.74,0.93), MA207 (0.7,0.65), GT104 (0.65,0.9), WB221 (0.62,0.57), WB201 (0.62,0.9), GT111 (0.62,0.82), GT201 (0.57,0.53), GT224 (0.57,0.23), GT220 (0.57,0.47), GT219 (0.57,0.52), GT218 (0.57,0.6), GT217 (0.57,0.7)
- Cases with greater than 0.5 membership in term ulb*~goi*water: MA203 (0.89,0.89), MA205 (0.88,0.91), MA101 (0.84,0.99), MA204 (0.84,0.78), MA202 (0.81,0.82), MA208 (0.8,0.69), WB201 (0.79,0.9), GT205 (0.79,0.78), GT207 (0.75,0.73), GT204 (0.75,0.71), MA111 (0.74,0.93), WB221

(0.74,0.57), GT104 (0.71,0.9), GT219 (0.71,0.52), MA207 (0.7,0.65), GT220 (0.69,0.47), GT201 (0.62,0.53), GT209 (0.6,0.51), GT224 (0.6,0.23), GT223 (0.56,0.57)

--- INTERMEDIATE SOLUTION ---

- Model: fsco5 = f(water, anticorr, econ, hrs, accouta, devolv, od, financ, goi, apcost, ulb)
- Rows: 11

Frequency cutoff: 1
Consistency cutoff: 0.961404
Assumptions:
~anticorr (absent)
~hrs (absent)
~accouta (absent)
~od (absent)
~goi (absent)
apcost (present)

Table F-5 Consistency and Coverage of the Sufficient Conditions for Cost Overruns (Intermediate Solution)

	raw coverage	unique coverage	consistency
~water*~anticorr*econ*~hrs*~accouta*~devolv*~goi*apcost*~ulb	0.038365	0.0007	0.961404
~water*~anticorr*econ*~hrs*~accouta*~devolv*financ*apcost*~ulb	0.048446	0.010781	0.969188
water*~anticorr*~econ*~hrs*~accouta*devolv*~od*financ*~goi*apcost*ulb	0.071479	0.071479	0.990301
solution coverage: 0.120624			
solution consistency: 0.981766			

- Cases with greater than 0.5 membership in term ~water*~anticorr*econ*~hrs*~accouta*~devolv*~goi*apcost*~ulb: KA103 (0.51,0.64)
- Cases with greater than 0.5 membership in term ~water*~anticorr*econ*~hrs*~accouta*~devolv*financ*apcost*~ulb: KA203 (0.52,0.73), KA202 (0.51,0.78)
- Cases with greater than 0.5 membership in term water*~anticorr*~econ*~hrs*~accouta*devolv*~od*financ*~goi*apcost*ulb: WB221 (0.545,0.57), WB201 (0.54,0.9)

--- COMPLEX SOLUTION ---

- Model: fsco5 = f(ulb, apcost, goi, financ, od, devolv, accouta, hrs, econ, anticorr, water)
- Rows: 20

Frequency cutoff: 1
Consistency cutoff: 0.961404

Table F-6 Consistency and Coverage of the Sufficient Conditions for Cost Overruns (Complex Solution)

	raw coverage	unique coverage	consistency
~ulb*apcost*~goi*~financ*od*~devolv*~accouta*~hrs*econ*~anticorr*~water	0.038365	0.009801	0.961404
~ulb*apcost*goi*financ*od*~devolv*~accouta*~hrs*econ*~anticorr*~water	0.039345	0.010781	0.962329
ulb*apcost*~goi*financ*~od*devolv*~accouta*~hrs*~econ*~anticorr*water	0.071479	0.071479	0.990301
solution coverage: 0.120624			
solution consistency: 0.981766			

- Cases with greater than 0.5 membership in term ~ulb*apcost*~goi*~financ*od*~devolv*~accouta*~hrs*econ*~anticorr*~water: KA103 (0.51,0.64)
- Cases with greater than 0.5 membership in term ~ulb*apcost*goi*financ*od*~devolv*~accouta*~hrs*econ*~anticorr*~water: KA203 (0.52,0.73), KA202 (0.51,0.78)
- Cases with greater than 0.5 membership in term ulb*apcost*~goi*financ*~od*devolv*~accouta*~hrs*~econ*~anticorr*water: WB221 (0.545,0.57), WB201 (0.54,0.9)

F.4 RESULTS OF ANALYSIS OF SUFFICIENT CONDITIONS FOR COST UNDERRUNS

--- PARSIMONIOUS SOLUTION ---

- Model: ~fsco5 = f(ulb, apcost, goi, financ, od, devolv, accouta, hrs, econ, anticorr, water)
- Rows: 20

Frequency cutoff: 1
Consistency cutoff: 0.909304

Table F-7 Consistency and Coverage of the Sufficient Conditions for Cost Underruns (Parsimonious Solution)

	raw coverage	unique coverage	consistency
goi*~financ	0.654909	0.091825	0.88948
goi*devolv	0.648376	0.097051	0.871113
~ulb*apcost*econ*water	0.148936	0.003173	0.869281
solution coverage: 0.759052			
solution consistency: 0.834171			

- Cases with greater than 0.5 membership in term goi*~financ: WB101 (0.62,0.65), WB103 (0.62,0.65), WB102 (0.55,0.32), KA130 (0.54,0.4), KA118 (0.53,0.93), UP301 (0.51,0.65), UP302 (0.51,0.78), UP303 (0.51,0.45), UP305 (0.51,0.25), UP307 (0.51,0.21)
- Cases with greater than 0.5 membership in term goi*devolv: MA103 (0.78,0.45), MA104 (0.75,0.75), GT215 (0.75,0.99), WB101 (0.73,0.65), WB103 (0.73,0.65), MA108 (0.68,0.48), MA110 (0.67,0.71), WB225 (0.67,0.75), WB233 (0.65,0.94), WB236 (0.61,0.54), GT105 (0.6,0.63), GT108 (0.6,0.94), GT110 (0.6,0.67), MA302 (0.6,0.45), WB214 (0.59,0.83), GT210 (0.58,0.9), GT225 (0.58,0.56), GT103 (0.56,0.27), GT107 (0.55,0.37), MA301 (0.55,0.4)
- Cases with greater than 0.5 membership in term ~ulb*apcost*econ*water: KA130 (0.52,0.4), KA135 (0.52,0.27), KA136 (0.52,0.42), KA204 (0.52,0.42)

--- INTERMEDIATE SOLUTION ---

- Model: ~fsco5 = f(water, anticorr, econ, hrs, accouta, devolv, od, financ, goi, apcost, ulb)
- Rows: 136

frequency cutoff: 1.000000
consistency cutoff: 0.909304
Assumptions:
anticorr (present)
hrs (present)
accouta (present)

od (present)
goi (present)
~apcost (absent)

Table F-8 Consistency and Coverage of the Sufficient Conditions for Cost Underruns (Intermediate Solution)

	raw coverage	unique coverage	consistency
water*~econ*devolv*goi*~apcost*~ulb	0.188876	0.006159	0.955619
~econ*devolv*financ*goi*~apcost*~ulb	0.237495	0.054778	0.961103
water*~econ*devolv*financ*goi*~ulb	0.208473	0.013998	0.970882
water*econ*~devolv*od*~financ*apcost*~ulb	0.115062	0.002053	0.899344
water*econ*~devolv*od*goi*apcost*~ulb	0.113009	0	0.939488
~water*econ*~devolv*od*~financ*goi*~apcost*ulb	0.089959	0.089959	0.899254
solution coverage: 0.376633			
solution consistency: 0.915608			

- Cases with greater than 0.5 membership in term water*~econ*devolv*goi*~apcost*~ulb: WB101 (0.545,0.65), WB102 (0.545,0.32), WB103 (0.545,0.65), WB236 (0.545,0.54), WB227 (0.54,0.94)
- Cases with greater than 0.5 membership in term ~econ*devolv*financ*goi*~apcost*~ulb: WB214 (0.545,0.83), WB236 (0.545,0.54), WB227 (0.54,0.94)
- Cases with greater than 0.5 membership in term water*~econ*devolv*financ*goi*~ulb: WB225 (0.545,0.75), WB233 (0.545,0.94), WB236 (0.545,0.54), WB227 (0.54,0.94)
- Cases with greater than 0.5 membership in term water*econ*~devolv*od*~financ*apcost*~ulb: KA130 (0.52,0.4), KA135 (0.52,0.27), KA136 (0.52,0.42)
- Cases with greater than 0.5 membership in term water*econ*~devolv*od*goi*apcost*~ulb: KA130 (0.52,0.4), KA204 (0.52,0.42)
- Cases with greater than 0.5 membership in term ~water*econ*~devolv*od*~financ*goi*~apcost*ulb: KA118 (0.52,0.93)

--- COMPLEX SOLUTION ---

- Model: ~fsco5 = f(ulb, apcost, goi, financ, od, devolv, accouta, hrs, econ, anticorr, water)
- Rows: 20

Frequency cutoff: 1
Consistency cutoff: 0.909304

Table F-9 Consistency and Coverage of the Sufficient Conditions for Cost Underruns (Complex Solution)

	raw coverage	unique coverage	consistency
~ulb*~apcost*goi*financ*~od*devolv*~accouta*~hrs*~econ*~anticorr	0.184677	0.022116	0.96068
~ulb*~apcost*goi*~od*devolv*~accouta*~hrs*~econ*~anticorr*water	0.16872	0.006159	0.950578
~ulb*goi*financ*~od*devolv*~accouta*~hrs*~econ*~anticorr*water	0.188317	0.013998	0.967866
~ulb*apcost*~financ*od*~devolv*~accouta*~hrs*econ*~anticorr*water	0.115062	0.002053	0.899344
~ulb*apcost*goi*od*~devolv*~accouta*~hrs*econ*~anticorr*water	0.113009	0	0.939488
ulb*~apcost*goi*~financ*od*~devolv*~accouta*~hrs*econ*~anticorr*~water	0.069802	0.069802	0.944444
solution coverage: 0.318402			
solution consistency: 0.922661			

- Cases with greater than 0.5 membership in term ~ulb*~apcost*goi*financ*~od*devolv*~accouta*~hrs*~econ*~anticorr: WB214 (0.545,0.83), WB236 (0.545,0.54), WB227 (0.54,0.94)
- Cases with greater than 0.5 membership in term ~ulb*~apcost*goi*~od*devolv*~accouta*~hrs*~econ*~anticorr*water: WB101 (0.545,0.65), WB102 (0.545,0.32), WB103 (0.545,0.65), WB236 (0.545,0.54), WB227 (0.54,0.94)
- Cases with greater than 0.5 membership in term ~ulb*goi*financ*~od*devolv*~accouta*~hrs*~econ*~anticorr*water: WB225 (0.545,0.75), WB233 (0.545,0.94), WB236 (0.545,0.54), WB227 (0.54,0.94)
- Cases with greater than 0.5 membership in term ~ulb*apcost*~financ*od*~devolv*~accouta*~hrs*econ*~anticorr*water: KA130 (0.52,0.4), KA135 (0.52,0.27), KA136 (0.52,0.42)
- Cases with greater than 0.5 membership in term ~ulb*apcost*goi*od*~devolv*~accouta*~hrs*econ*~anticorr*water: KA130 (0.52,0.4), KA204 (0.52,0.42)
- Cases with greater than 0.5 membership in term ulb*~apcost*goi*~financ*od*~devolv*~accouta*~hrs*econ*~anticorr*~water: KA118 (0.52,0.93)