Impact of Transparency on Infrastructure Outcomes

A Systematic Review

Study Protocol

Main title	What is the evidence of the impact of changes in the transparency of infrastructure procurement and delivery on infrastructure quality, costs, and access?
Sub title	
Review group	-
Section	PROTOCOL
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EPPI-Centre reference number	[To be completed by EPPI-Centre]
Month/year of publication	[To be completed by EPPI-Centre]
This report should be cited as...	-
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Review Group **(with institutions)**	-
Advisory group **(with institutions)**	-
Conflicts of interest (if any)	None
Acknowledgements	-

1. Background

1.1 Aims and rationale for review

The role of infrastructure in the growth of economy and poverty reduction has been widely recognized (see, for instance, Calderon and Serven, 2004; Cook, 2005). Recognising this link, many developing countries have initiated various measures to increase investment in the infrastructure sector. These investments have been delivered through private sector investment and enhanced competition as countries realised the limitations of the sustainability of exclusively state owned infrastructure. It is in the last two decades that there has been this shift in the delivery of infrastructure services worldwide.

The role of transparency in the infrastructure sector assumes importance given the capital intensity of the sector and other opportunities for extracting rents. The infrastructure sector is among those that are very susceptible to corruption because of large capital outlays, large construction costs, asset specificity, and natural monopoly characteristics, which provide large scale opportunities for rent seeking. It has been estimated that in developing countries the financial costs of corruption in infrastructure investment and maintenance might equal $18 billion a year (Kenny, 2006). Estache and Trujillo (2009) also indicate that corruption is an important problem to deal with in infrastructure.

Transparency will play an important role in the reduction of corruption (Johnston, 2005; Klitgaard, 1991; Rose-Ackerman, 1999). By bringing in more accountability and predictability, it is felt that transparency can also play an important role in improving the efficiency levels of infrastructure. The aim of this study is to systematically review the available evidence on the impact of changes in levels of transparency or corruption on infrastructure outputs. It is expected that the conclusions from this review would strengthen the capacity for evidence informed decision making in infrastructure development.

1.2 Definitional and conceptual issues

There are several commonly used definitions for transparency. The WTO defines transparency as the degree to which trade policies and practices, and the process by which they are established, are *open* and *predictable*. Transparency International indicates that transparency can be defined as a principle that allows those affected by administrative decisions, business transactions or charitable work to know not only the basic facts and figures but also the mechanisms and processes. UNCITRAL (2008) also indicates that *competitive* conditions and using *objective criteria in decision making* can have an impact on transparency. Ohashi (2008) provides a working understanding of the concept when he states that replacing discretionary and opaque practices with a *rule based practice* leads to an increase in transparency.

While the definitions above suggest that procedural transparency and operational transparency are most significant, there have been incremental additions that have broadened it. Geraats and Eiiffinger (2002) indicate that transparency has 5 different dimensions consisting of political, economic, procedural, policy, and operational transparency. While some dimensions are more important than others in some sector specific interventions, it is when all of these come together that they are able to make an impact on outcomes. For example, procedural transparency and policy transparency are important in Ohashi's context of public procurement. However, in contexts where there is no political transparency, increasing procedural transparency does not always lead to better outcomes in terms of access, quality and affordability.

In order to address the various dimensions of transparency, the World Bank (2001) suggested that transparency results from *predictability* (reducing the cost of

uncertainty) and *simplification* (reducing information costs), in the context of a professional bureaucracy, an enlightened government as well as a strong civil society, all participating actively and behaving under the rule of law. Many studies that examine transparency also include other conditions such as *clarity*, *autonomy*, *participation*, *accountability*, and *predictability* (Stern and Holder, 1999; Noll, 2000). The expansion of the initial dimensions of transparency has meant that it is difficult to measure transparency as it requires the fulfilment of many inter-related conditions. It has also meant that there are very few studies that have done an explicit investigation on the role of transparency (Cubbin and Stern; 2005; Bellver and Kaufman 2005).

Due to the nature of the concept transparency, the systematic review will look at interventions that are generally correlated with greater levels of transparency and their outcomes vis a vis access, affordability and quality. The interventions will be examined at two modes: one, in terms of economy-wide, macro or institutional change towards greater transparency through such measures as greater press freedom, disclosure laws, audit institutions and civil sector reform; and two, as sector and project level intervention such as private participation, regulation and reform. The corresponding outcomes would be specific to each infrastructure sector being studied. While transparency and corruption are not the same, literature indicates that transparency, inter alia, is also inversely related to the prevalence of corruption (UNCITRAL, 2008, Johnston, 2005; Klitgaard, 1991).

1.3 Policy and practice background

Transparency is emerging as an important theme for policy making, judging by the focus of international agencies on the topic. The World Trade Organization (WTO) has a working group to look at transparency. The United Nations Commission on International Trade and Law (UNCITRAL) has a strong focus on transparency. While the WTO and UNCITRAL largely focus on the issue of transparency from the perspective of international trade, the context is equally important for procurement and delivery. The relevance of the topic can also be understood from the widespread recognition received for the publications from Transparency International.

Internationally there has been a greater focus on governance contexts that promote transparency. For example, many countries have seen the establishment of anti-corruption agencies which ensure that due process is followed in awarding public contracts. Over 50 countries during the last fifteen years have enacted freedom of information legislation, while many others are to do so in the near future. Many have tightened disclosure laws especially in the light of the financial crisis since 2008. The United Nations Convention on Anti-Corruption, which came into place in 2005, requires all parties to cooperate on the prevention and criminalization of corruption.

The benefits of transparency in public procurement and other areas have been widely-accepted (OECD, 2007; Schooner, 2002). The issue of transparency is even more important in the case of infrastructure projects because of their huge capital outlays, monopoly nature, their widespread societal impact and generally long duration of contracts. It has been noted that favouritism, fraud, cronyism, patronage, embezzlement, state capture or cash bribes are all concepts commonly associated with the delivery of infrastructure services in many countries of the world, rich or poor (Estache and Trujillo, 2009). The Transparency International Global Corruption Index 2007 suggests that one third of the population are affected by corruption in utilities, which makes this as an area of significant concern for policymakers and opinion makers.

Bellver and Kaufman (2005) develop a transparency index with two components, for economic/institutional/ transparency and political transparency, which they compute for 194 countries. Their analysis suggests that there is not only enormous variety among countries, but that there are large differences in performance between economic/ institutional and political dimensions of transparency. In tune

with Johnston (Johnston, 2005, 2006), they recommend that different types of transparency reforms are warranted for different stages of political-economic development, and that much more prominence ought to be given to transparency reforms as a core component of second-generation institutional reforms.

In another study Estache et al (2009) find that according to the corruption index published by the International Country Risk Guide, average corruption levels increased 29 percent in developing countries between 1990 and 2005. The authors opine that given the empirical evidence about the important role of corruption for economic outcomes, the observed increase in the corruption index may be an important determinant of outputs in infrastructure sectors.

1.4 Research background

Transparency has increasingly been a focus area of research scholars, governments and civil society in the past decade. While most scholars would agree that transparency is associated with greater access to information, many recognise that is difficult to measure transparency in any substantive way (Kaufmann, 2003). It has also been pointed out that measures of transparency have traditionally been proxies like rule of law, good governance or corruption that are associated with transparency (Vishwanath and Kaufmann, 2003, cf. Bellver and Kaufmann 2005). In this way, transparency, governance and corruption though distinct, are inter-linked with each other.

Good governance and accountability are associated with many reform initiatives including participatory governance, declaration of assets, access to information legislation, the presence of auditors and audit institutions, citizen charters and so on. Transparency also is strongly associated with rule of law, strong institutions, free press, an independent judiciary and a vibrant civil society. Many countries have been able to reduce corruption through the publication of information that gives all stakeholders information on the due process to be followed for licenses, certificates etc. (Pope, 2005). These initiatives feed into the context in which the other interventions take place as well. A positive change in transparency implies improvement in the openness of institutions and greater voice and accountability (Kaufmann and Bellver, 2005). Good governance and accountability are seen to improve transparency, which directly impacts the quality of information available to stakeholders. This means that available information would have many attributes that include access, comprehensiveness, relevance, and quality and reliability (Vishwanath and Kaufman, 2003).

One mode of the review will be to look at all interventions that affect governance and contexts where transparency improves through changes in the institutional framework. An improvement in the governance context can improve transparency that can eventually lead to better outcomes in terms of investment in the infrastructure sector. Studies show that infrastructure investment is sensitive to a country's institutional environment; when political institutions fail to constrain arbitrary behaviour by political actors, infrastructure investors have a reduced incentive to deploy capital and the result is lowered levels of per capita infrastructure investment (Henisz, 2002; Henisz et al., 2001).

The second mode of this review would be to look at programmatic or sectoral level interventions that have an impact on transparency. This includes starting procurement initiatives that replace opaque and discretionary procedures with a transparent rule based procedure (Ohashi 2008). This mode will look at initiatives that are associated with greater transparency like e-governance programmes, deregulation, private sector participation and performance based contracting. In addition to the difficulty of measuring transparency or corruption, it must also be noted that studies on the impact of corruption in the utilities and infrastructure sector have been limited (Kenny, 2009; Estache et al, 2009). Therefore the review would seek to establish the link between interventions and levels of transparency separately using existing literature and theory and do a systematic review of the large literature that exists on the impact of interventions on outcomes.

An intervention that will be researched as a part of the systematic review is the effect of private sector involvement, by establishing the link between private sector involvement and transparency levels. Xun and Malaluan's (2008) study of privatisation in Manila showed how privatisation and increased connections by 30%, and boosted labour productivity. In contrast, Estache et al (2009) suggest that the effect of privatisation and the establishment of a regulator does not always have the expected effects in availability, access and quality. A third study by Andres and Foster (2006) of the utility sector in the context of privatisation showed no significant increase in output or prices, though there were clear improvements in service quality, labour productivity as well as distributional losses.

The presence of a regulator in the utilities sector is considered to both increase the level of transparency and the outcomes within the sector. Andres, Guash and Straub (2007) suggests that the presence of a regulator helps to reduce renegotiation, improves transparency and dissuades opportunistic renegotiation leading to better quality and lower prices for the consumer. Additionally, the long term effect of having a regulator in the electricity sector is an improvement in labour productivity as well as an increase in generation capacity of the utility and quality of electricity (Cubbin and Stern; 2005 and Estache Rossi; 2008). This has been explained in the study as occurring through an improvement in the capability of the regulator through the reduction of the asymmetry of information between the utility operator and the regulator. In other words, an increase in transparency of the operator improves outcomes over the medium to long term.

Studies suggest that greater levels of transparency in decision making processes increase the possibility that corruption is identified and tackled effectively. Therefore, a negative relationship is established between greater corruption and transparency (Vishwanath and Kaufmann 1999). In a study on corruption and efficiency, Meon and Weill (2009) find that corruption may be positively associated with efficiency in countries where institutions are ineffective. Estache and Kouassi (2002) show that corruption increases the cost of providing water in Africa. Working on a larger and more recent database, Kirkpatrick et al (2006) confirm these findings. Seim and Soreide (2009) try and estimate how performance across the utility sectors is affected by corruption. They find that in general, service delivery in the utilities functions significantly better in countries with few procedures and low levels of corruption.

Reduced corruption is generally associated with improved resource allocation, greater efficiency and economic growth (Kaufmann et al., 2005). Similarly, Vishwanath and Kaufmann find that transparency can lead to greater financial stability. Kaufmann (2003) suggests that an improvement in the rule of law in a country can significantly improve outcomes like infant mortality and literacy. Countries with high levels of transparency, effective parliamentary oversight, and high standards of corporate ethics, had a higher rate of GDP growth than in countries with lower standards of transparency, of parliamentary oversight, and corporate ethics. This is reinforced by studies that have suggested that reduced corruption is associated with greater economic growth and savings in expenditure by governments through the utilisation of transparent rule based practices (Pope, 2005).

While there are many studies on the positive impact of transparency on outcomes, there are cautionary voices also. Estache and Wren-Lewis (2008) suggest that developing countries were different due to their contexts and needed to adopt different methods to ensure positive outcomes. This was especially true in the case of access and affordability, where those with the greatest ability to pay were likely to high jack the benefits of subsidies in sectors like water and fuel. Greater transparency does not always lead to better outcomes due to the different contexts of the country. Bac (2001) suggests that greater transparency could be associated with greater corruption as a greater level of transparency reveals the key decision makers and therefore establishes incentives to establish connections for corruption. The connections effect could dominate the detection effect resulting in greater levels of corruption.

As can be seen, there is a great divergence both on the instruments on transparency as well as on the outcomes that are specific to the sector. The objective of this systematic review is to synthesize the findings from heterogeneous studies that can be relevant for the policy makers. It must be stated that while there are increasing demands for transparency in the actions of governments, companies, financial institutions and international agencies, the systematic review covers only public infrastructure projects undertaken or facilitated by government.

1.5 Objectives

1.5.1 Conceptual framework

A schematic diagram of the proposed review is given in Figure 1.1. The interventions that impact on transparency can be broadly classified under two categories, targeted sector and project specific interventions and broader interventions in the economy that are not specifically targeted towards any particular sector, but can influence the transparency levels in the economy through governance reform. Examples of the targeted interventions in infrastructure would be sector reform, regulation, grass roots participation in a specific project, etc. Examples of broader economy level interventions would be governance changes such as civil service reform, press freedom etc.

The boundaries of the study are indicated in Figure 1.1. To start with, the causal links between interventions (targeted infrastructure interventions as well as broader macro interventions) and their impact of transparency would be identified. Once the causal links have been identified, the impact of these interventions on infrastructure outcomes would be studied based on empirical evidence. Subsequently, we will use findings of the existing literature to map the linkages between infrastructure outputs and economic growth and poverty reduction.

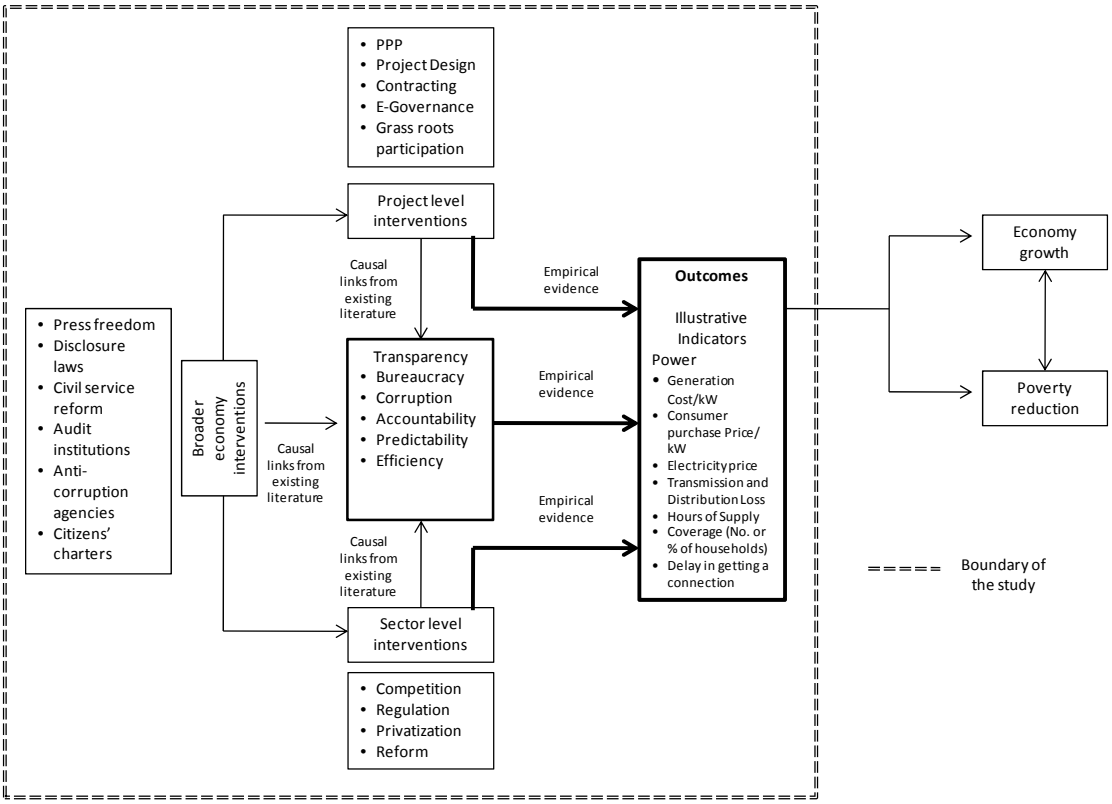

Figure 1.1 Schematic diagram of the review

1.5.2 Study questions

We aim to review empirical research on the impacts on infrastructure outputs such as quality, costs, and access arising from changes in transparency in infrastructure procurement and delivery.

We will try to answer the following questions:

- How have changes in transparency in the overall economy influenced sector and project level interventions in infrastructure procurement and delivery?
- How have changes in transparency in infrastructure projects been studied and how have their impacts been analyzed on cost, quality, and access to infrastructure services?
- What has been the impact on changes in transparency on infrastructure outputs?
- In particular, have the studies identified mechanisms underlying the relationship between changes in transparency and infrastructure procurement and delivery? What are the scope conditions on these findings?
- What do the findings suggest about mediating effects?

To the extent possible we will produce general statements about the causal chain between changes in transparency and the impacts on costs, quality, and access in the infrastructure sector. It is felt that the findings of this review would help in understanding the best frameworks to secure transparency in infrastructure.

2. Methods used in the review

2.1 User involvement

2.1.1 Approach and rationale

DFID has indicated that the objective of this review is to increase the use of evidence in policy and contribute directly to international development policy and practice. The authors of this review clearly understand this imperative and would therefore target the review to the users in policy making and practice.

The review team would exchange notes at regular intervals with the relevant policy team at DFID. It is also proposed to use the peer review process organised by the International Initiative for Impact Evaluation (3ie). It is felt that by involving the policy team at DFID and 3ie during the review would help in understanding some of the current thrusts of policy makers and help in doing a review that is more appropriate to the end users.

The review team will also seek responses from organisations that are involved in the promotion of transparency in decision making (with particular reference to the infrastructure sector). The study can be relevant to organizations (research, consulting, training etc.) that work in policy, governance and related areas. The study can also be relevant for policy making at all governmental levels – federal, state, and local.

2.2 Identifying and describing studies

2.2.1 Defining relevant studies: inclusion and exclusion criteria

Inclusion criteria: Only studies that satisfy the following criteria would be included in the review:

- Context of the study: Developing country
- Domain: Infrastructure, comprising one or more of the following segments: power; energy; telecom; ports; railways; transportation; and services such as water supply, sewerage, and solid waste management
- Studies collecting or analysing primary data on the effects of private sector involvement/ competition/ regulation/ citizen charters/ other interventions with the aim of changing transparency/ corruption
- Study year: Published or completed from the year 1995. The year 1995 has been used as a cut off as it is felt most studies relating to this topic have been conducted after that. In addition, it is felt that more recent evidence would be more relevant to policymakers
- Methodology: The systematic review would primarily focus on quantitative studies. Our trial searches have yielded a large number of hits. If we find that there are not sufficient quantitative studies that can be included in the review, we would then expand the inclusion criteria to include multi case qualitative studies

Exclusion criteria:

- Studies that do not distinguish between infrastructure and non-infrastructure sectors

- Studies that are only based on the experiences of developed countries or those that do not distinguish developed and developing countries in the analysis
- Studies that do not measure the effects on infrastructure outputs. For example the study by Guasch and Straub (2009), examines the interaction between corruption and contracts renegotiation, but does not specifically examine the effects of corruption on infrastructure outputs
- Studies that have been done or published before 1995

2.2.2 Identification of potential studies: Search strategy

A research assistant will first search all bibliographic databases. All searches recorded systematically, without selecting or marking any results. Search results will be grouped by the sources through which they were identified (with keyword/topic combinations listed), and listed with bibliographic information and abstracts (where applicable). The search strategy for identifying the studies for inclusion in the review would be as follows:

- Bibliographic databases: EBSCO, Science Direct, SpringerLink, Wiley Blackwell, Emerald, JSTOR, EconLit, Scopus, PAIS International, SSRN, Social Science Citation Index, Proquest, JOLIS, BLDS, IDEAS, TRISonline and ELDIS
- Manual back-searching in bibliographies of identified studies and journals
- Websites: World Bank, Asian Development Bank, African Development Bank, Inter American Development Bank, Transparency International, Construction Sector Transparency Initiative, GSDRC, Freedom House, United Nations Office of Drugs and Crime (UNODC), Global Integrity, Global Witness, Group of States against Corruption, NORAD, OECD, Research4Development, TRACE International.
- Citation searches of key authors such as Estache, A., Guasch, J.L., Davies, J., Kaufmann, D., Kenny, C., and Wallsten, S.
- Reference lists in the papers authored by the above key authors would also be scanned to identify the studies for inclusion in the review.
- Materials produced by other sources, such as Transparency International, Construction Sector Transparency Initiative, Freedom House, United Nations Office of Drugs and Crime (UNODC), World Bank Institute, Global Integrity, Global Witness, Group of States against Corruption, NORAD, OECD, TRACE International.
- Hand-searching of key journals, including Utilities Policy, World Bank Economic Review, World Development, IDS Bulletin, Journal of Public Economics, Water Policy, Journal of Regulatory Economics, Journal of Development Economics, Economic and Political Weekly.
- In addition to the above, we will also use Google Scholar to search for potential studies using the same key words that was used to search the bibliographic databases and websites. It will also be used on a citation search of key authors.
- Reaching out to our personal network to identify any recent studies that we might have missed.

Searches of these sources will be limited so as to identify studies that were conducted or published from (and including) 1995. While there are merits in not imposing a time restriction on searches, the older studies are likely to

have less applicability to current situations especially with regard to the policy front. A brief literature review also revealed that most studies on transparency and governance have taken place in the past ten years. Choosing 1995 is a conservative way of ensuring all relevant studies are captured. We will include studies that have been published or translated to English. As most of the relevant research is in English, it should be fairly inclusive. EPPI-Reviewer software would be used to keep track of studies found during the review.

2.2.3 Screening studies: applying inclusion and exclusion criteria

Inclusion and exclusion criteria will be applied successively to (i) titles and abstracts and (ii) full documents. If there is any doubt over the content at this stage, the team will include the study the full paper. Full papers or reports will be obtained only for those studies that meet the criteria or where we have insufficient information to be sure. These reports will be entered into a second database. The inclusion and exclusion criteria will again be applied to the full reports and those that do not meet these initial criteria will be excluded from the review.

2.2.4 Characterising included studies

Most studies included in the review would be empirical and quantitative in nature. The studies could either be cross sectional or longitudinal in nature. However, we also plan to include high quality and well cited qualitative studies if we do not find adequate number of quantitative studies. While it would be ideal to have studies that also examine the causal links between the changes in transparency and infrastructure outputs, there are very few studies that have focused on links in the causal chain. Most studies that have been done have focused more on the outcomes, and therefore the review would comprise a significant number of such studies.

2.2.5 Identifying and describing studies: quality assurance process

It is expected that most of the studies included in the review would have been published in reputed peer reviewed journals. This would ensure a basic level of quality. In the next stage, the studies (both published papers and unpublished reports) that conform to the criteria indicated earlier would be evaluated using a suitable appraisal tool such as Campbell et al (2003).

Two members of the review team, working independently, would evaluate and select the studies for inclusion. The pairs of members, who would be using a suitable coding procedure, would then compare their evaluations and come to a consensus on those studies that would be included for the review. In order to ensure consistency, the team would go through an internal moderation phase where both members would screen the same citations and compare differences in judgements.

In case where a consensus cannot be reached, a third member of the review team will review the study. The decision would then be taken based on a simple majority, i.e., if two members agree that the study should be included then it would be included. Alternatively, if two members feel that the study would not be appropriate for inclusion, then it would not be included. Through this process, the team will come to a shared understanding of the review and if necessary, the inclusion criteria can be suitably amended.

2.3 Methods for synthesis

2.3.1 Assessing quality of studies

The quality of studies would be done by assessing the validity of research designs. The four tests (Kidder, 1981) that would be used to assess the quality of the study are as follows:

- Construct validity: Analyze whether the measures used for transparency, corruption, and infrastructure outcomes are clearly specified.
- Internal validity: Whether studies attempt to establish a causal relationship whereby certain conditions are shown to lead to other conditions, as distinguished from spurious relationships.
- External validity: How the study findings are explained in the light of existing findings in the literature.
- Reliability: Whether the procedures for data collection have been documented so that the study can be repeated with the same results.

The quality criteria that would be used to assess the papers are given in the draft coding tool in Appendix 2.4. Studies that receive a low quality rating (question 48 in the draft coding tool) would only be included in the review if we do not find adequate number of studies that have been assessed as high or medium quality. We would also highlight if studies that have been assessed as low quality are included in the review.

2.3.2 Overall approach to and process of synthesis

We propose to primarily use textual narrative synthesis for the systematic review, since it is better suited for reviews that aim to describe the existing body of literature; identifying the scope of what has been studied, and the strength of evidence available. In addition, this approach is useful in synthesising evidence of different types such as qualitative, quantitative, economic, etc (Lucas et al, 2007). Textual narrative also makes the context of the study clearer and is more likely to make transparent the heterogeneity between studies (Barnett-Page and Thomas, 2009). However, we would also try and incorporate elements of thematic analysis to reveal the commonality between studies.

The textual narrative will come out of a record maintained in a matrix similar to the one given in Appendix 2.5. This record will allow for the reviewers to quickly come at a common understanding of whether the study should be included or not as well as the learnings that can be gleaned from them for the inclusion in the textual narrative.

2.3.2.1 Selection of studies for synthesis (if not all studies that are included in the synthesis)

The studies that conform to the inclusion and exclusion criteria indicated in section 2.2.1 would be identified. The studies thus shortlisted would then be assessed for quality as given in section 2.3.1 using a suitable appraisal tool.

2.3.2.2 Selection of outcome data for synthesis

The review would synthesize the outcome data on infrastructure outcomes pertaining to cost, quality and access. Various outcome indicators that have been found during the trial searches are summarized in Table 2.1.

Table 2.1 Sector wise of outcome indicators on cost, quality, and access

Costs	Quality	Access
Electricity and Power		
• Generation Cost/kW • Consumer purchase Price/ kW • Rate of Return • Electricity price for households • Electricity price for industry	• Transmission and Distribution Loss • Hours of Supply • Delay in obtaining an electrical connection • Power loss • Service standards	• Coverage (No. or % of households) • Delay in getting a connection
Telecom		
• Price of local phone call • Residential prices • Commercial prices • Installation costs	• Technical loss • Availability • Telephone subscribers per employee • Telephone faults	• Population coverage (No. of telephone subscribers per thousand) • Delay in getting a connection
Water Supply, Sewerage and Sanitation		
• Project completion time • Project completion cost • Cost per litre • Willingness to pay • Price per litre	• Technical loss • Availability • Number of water supply failures(hours, days)	• Population coverage (percentage of population with access to improved water sources and sanitation)
Roads		
• Cost per km • Project completion time • Project completion cost • Tariff structure • User charge per km • Project completion time • Operational maturity	• Concrete Roads	• Length of road network • Road Passenger kilometres per capita per year
Railways		
• Project completion time • Project completion cost • Cost per km • Freight cost per tonne • Passengers cost km	• Service • Congestion	• Length of rail network • Rail passenger kilometres travelled per capita per year

2.3.2.3 Process used to combine/ synthesise data

The review proposes to use a matrix approach (see for example Marin, 2009) to combine and synthesize the findings. A summary table as given in Appendix 2.5 will be used by both reviewers to summarise the findings of each of the studies. The framework that has been given in the Appendix allows for the reviewers to use the studies to arrive at an understanding of the summary findings of each study. Such an analysis would ensure that differences in type of infrastructures, dimensions of transparency, outcomes are accounted for and explained in the review. In addition, the features of textual narrative synthesis method would also help in accounting for heterogeneity.

2.4 Deriving conclusions and implications

The conclusions and implications would be derived directly from the synthesis of the findings in the studies included in the review. The team would first discuss

among themselves the conclusions that emerge from the review. Such conclusions would then be substantiated in the light of the findings in the existing literature by a process of analytical generalization (Yin, 1984). In addition, a senior member of the study group would do an internal review of the conclusions before the draft report is sent to DFID.

3. Time Frame

Finalisation of the Research Protocol	August 18th, 2010
Searches for published, unpublished studies	Through October 8th, 2010
Preparation of first draft	October 20th, 2010
Submission of first draft to 3ie	October 30th, 2010
Submission of final report	December 30th, 2010

4. Statement Regarding Conflict of Interest

The authors are not aware of any conflict of interest, financial or otherwise, that may influence the objectivity of this review.

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Appendices

Appendix 1.1: Authorship of this report

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Appendix 2.1: Inclusion and exclusion criteria

Inclusion criteria: Only studies that satisfy the following criteria would be included in the review:

- Context of the study: Developing country
- Domain: Infrastructure, comprising one or more of the following segments: power; energy; telecom; transportation; and urban services such as water supply, sewerage, and waste management
- Studies collecting or analysing primary data on the effects of privatisation/ competition/ regulation/ citizen chargers/ other interventions with the aim of changing transparency/ corruption
- Study year: Published or completed from the year 1995
- Methodology: Quantitative and empirical studies

Exclusion criteria:

- Studies that do not distinguish between infrastructure and non-infrastructure sectors
- Studies that are only based on the experiences of developed countries or those that do not distinguish developed and developing countries in the analysis
- Studies that do not measure the effects on infrastructure outputs. For example the study by Guasch and Straub (2005), examines the interaction between corruption and contracts renegotiation, but does not specifically examine the effects of corruption on infrastructure outputs
- Studies that do not explicitly include transparency or corruption as one of the factors or variables

Examples of study to be included:

Estache, Goicoechea, and Trujillo (2009). In this paper, the authors measure the impact of corruption on performance and the interaction between corruption and reform policies, in the energy, telecommunication, and water sectors. The empirical results indicate that introduction of reform has not always had the expected effects on access, affordability or quality of services. The authors indicate that corruption leads to adjustments in the quantity, quality, and price of services consistent with the profit maximizing behaviour of monopolies.

Kenny (2009). In this paper, the author seeks to provide evidence on the robustness of the relationship between corruption and utility outcomes. Results from a simple set of regression analyses that link various corruption measures with utility outcome measures indicate that only four of these 28 regressions support a theorized relationship between corruption measures and utility outcomes.

Examples of studies to be excluded:

Chong and Lopez-de-Silanes (2004). In this paper the authors have analyzed the impact of the privatization of state-owned enterprises in Latin America. The findings of the paper are based on the analysis of 110 firms in Latin America. While the discussion focuses on the impact of corruption on the outcomes of privatization, the results are presented for all the firms in the sample, and does not distinguish between infrastructure and non-infrastructure firms.

Seim, and Søreide (2009). In this paper, the authors explore the relationship between bureaucratic complexity (a measure of transparency) and corruption, and the performance of utilities. The results indicate considerable variation in the performance of the utilities across countries. The authors hypothesize that corruption plays an important role in explaining this observed difference in performance. While the paper directly focuses on the review question for this study, the study would be excluded from this review because the cross country regressions used in the paper does not distinguish between developing and developed countries.

Appendix 2.2: Search strategy for electronic databases

The following electronic databases would be searched to shortlist studies that can be assessed for inclusion in the review.

Bibliographic databases: EBSCO, Science Direct, SpringerLink, Wiley Blackwell, Emerald, JSTOR, EconLit, Scopus, PAIS International, SSRN, Social Science Citation Index, Proquest, JOLIS, BLDS, IDEAS, TRISonline and ELDIS

Websites: World Bank, Asian Development Bank, African Development Bank, Inter American Development Bank, Transparency International, Construction Sector Transparency Initiative, Freedom House, GSDRC, United Nations Office of Drugs and Crime (UNODC), Global Integrity, Global Witness, Group of States against Corruption, NORAD, OECD, Research4Development, TRACE International.

Search criteria:

- Publication date: Post 1995

Search keywords: Terms that would be used to search the electronic databases and websites are given in Table A2.2.1

Table A2.2.1: Indicative list of terms for forming search phrases

Transparency terms	Infrastructure terms
Transparency	Infrastructure
Corruption	Utilities
Regulation	Energy
Competition	Roads
Reform	Water
Performance based contracts	Power
Rule based decision making	Solid Waste Management
Bureaucracy	Railways
Renegotiation	Water Supply
Efficiency	Sewerage
Predictability	Ports
Bribes	Highways
Governance	Traffic Network
Accountability	Sewerage
Participatory Governance	Telecom
Openness	Transportation
Decision- making	
Policy making	

As a part of the exercise, we have run some trial searches on Science Direct, Springer Link and EBSCO. The summary of results is given in Table A2.2.2.

Table A2.2.2: Hits from trial searches

Keyword (s)	Databases Searched (including total number)	Total number of articles found
Infrastructure and Transparency	Science Direct, Springer Link, EBSCO	31,538
Infrastructure and Transparency and Corruption	Science Direct, Springer Link, EBSCO	1,464
Infrastructure and Transparency or Corruption	Science Direct, Springer Link, EBSCO	20,516
Infrastructure and Transparency or Corruption or Accountability	Science Direct, Springer Link, EBSCO	21,703

The output list from the databases after the searches would first be assessed using the inclusion and exclusion criteria (Section 2.2.1 of the protocol) and next for quality and robustness (Section 2.3.1 of the protocol) to determine their inclusion in the review.

Appendix 2.3: Journals to be hand searched

In addition to the electronic databases, the following journals would be hand searched as the scope of these journals directly relate to the topic of this review.

- Utilities Policy
- World Bank Economic Review
- World Development
- Journal of Public Economics
- Water Policy
- Journal of Regulatory Economics
- Journal of Development Economics
- Economic and Political Weekly
- IDS Bulletin

Appendix 2.4: Draft Coding Tool

Section I: Study Aims and Rationale

		Tick Relevant	Details
1	What are the broad aims of the study? *(Please write in authors' description if there is one. Elaborate if necessary, but indicate which aspects are reviewers' interpretations. Other, more specific questions about the research questions and hypotheses are asked later.)*	☐ Explicitly stated ☐ Implicit ☐ Not Stated/ Unclear	
2	Was the study informed by, or linked to, an existing body of empirical and/or theoretical research? *(Please write in authors' description if there is one. Elaborate if necessary, but indicate which aspects is reviewers' interpretation.)*	☐ Explicitly stated ☐ Implicit ☐ Not Stated/ Unclear	
3	Do authors report how the study was funded?	☐ Explicitly stated ☐ Implicit ☐ Not Stated/ Unclear	
4	When was the study carried out? *(State the year the authors have staged. If not, give a 'not later than' date by looking for a date of first submission to the journal, or for clues like the publication dates of other reports from the study.)*	☐ Explicitly stated ☐ Implicit ☐ Not Stated/ Unclear	
5	What are the study research questions and/or hypotheses? *(Research questions or hypotheses operationalise the aims of the study. Please write in authors' description if there is one. Elaborate if necessary, but indicate which aspects are reviewers' interpretations.)*	☐ Explicitly stated ☐ Implicit ☐ Not Stated/ Unclear	

Section II: Study Identification

		Tick and give details where relevant	
6	Identification of report (or reports)	☐ Website ☐ Citation ☐ Contact ☐ Hand search ☐ Electronic database ☐ Unknown	
7	Status	☐ Published ☐ In press ☐ Unpublished ☐ Not known	
8	Linked reports	☐ Not linked ☐ Linked ☐ Not known	
9	Please specify the countries in which the study was carried out.		

Section III: Study Policy or Practice Focus

		Details
10	What is/are the topic focus/foci of the study?	

11	What is/are the setting(s) of the study?	

Section IV: Programme or Intervention description

		Tick Relevant	Details
12	If an intervention is being studied, does it have a formal name?	☐ Not applicable (no programme or intervention) ☐ Yes ☐ No ☐ Not stated/ unclear	
13	Aim(s) of the intervention	☐ Not stated ☐ Not explicitly stated (Write in, as worded by the reviewer) ☐ Stated (Write in, as stated by the authors)	
14	Has the study stated the causal pathways or theory of change for the intervention?	☐ Not stated ☐ Not explicitly stated ☐ Stated	

15	How long has it been since the intervention was implemented?	☐ Not stated ☐ Not applicable ☐ Unclear ☐ > 2 years ☐ 2-5 years ☐ < 5 years	
16	Nature of intervention *(You can tick more than one where appropriate.)*	☐ Not stated ☐ Unclear ☐ Project level ☐ Sector level ☐ Macro level	

Section V: Results and Conclusions

		Tick and Give Details where Relevant
17	What are the results of the study as reported by the authors? *(Before completing data extraction you will need to consider what type of synthesis will be undertaken and what kind of 'results' data is required for the synthesis.)*	
18	What do the author(s) conclude about the findings of the study?	

19	What are the limitations of the study?	☐ Not stated ☐ Not explicitly stated ☐ Stated	

Section VI: Study Method

		Tick Relevant	Details
20	Study Timing *(Please indicate all that apply and give further details where possible.)*	☐ Cross-sectional ☐ Longitudinal ☐ Any other	
21	When were the outcome measures in relation to the intervention *(Use only if the purpose of the study is to measure the effectiveness or impact of an intervention. If at least one of the outcome variables is measured both before and after the intervention, please use the 'before and after' category.)*	☐ Not applicable (not an evaluation) ☐ Before and after ☐ Only after ☐ Other ☐ Not stated/unclear	
22	What is the overall design and method of the study? *(Please tick all relevant.)*	☐ Quantitative ☐ Qualitative ☐ Both ☐ Other	

Section VII: Methods – Data Collection

		Tick and give Details where Relevant
23	Which methods were used to collect the data? *(Please indicate all that apply and give further detail where possible.)*	

24	Details of data collection instruments or tool(s). *(Please provide details including names for all tools used to collect data, and examples of any questions/items given. Also, please state whether source is cited in the report.)*	☐ Explicitly stated ☐ Implicit ☐ Not stated/ unclear	
25	Do the authors' describe any ways they have addressed the repeatability or reliability of their data collection tools/methods?	☐ Explicitly stated ☐ Implicit ☐ Not stated/unclear	
26	Do the authors describe any ways they have addressed the validity or trustworthiness of their data collection tools/methods?	☐ Explicitly stated ☐ Implicit ☐ Not stated/unclear	

Section VIII: Methods - Data Analysis

		Tick Relevant	Details
27	Which methods were used to analyse the data?	☐ Explicitly stated ☐ Implicit ☐ Not stated/unclear	
28	Do the authors describe strategies used in the analysis to control for bias from confounding variables?	☐ Yes ☐ No ☐ Not applicable	
29	Do the authors describe any ways they have addressed the repeatability or reliability of data analysis? *(e.g. using more than one researcher to analyse data, looking for negative cases*.)	☐ Yes ☐ No ☐ Not applicable	

30	Do the authors describe any ways that they have addressed the validity or trustworthiness of data analysis? (*e.g. internal or external consistency, checking results with participants. Have any statistical assumptions necessary for analysis been met?)*	☐ Yes ☐ No ☐ Not applicable	
31	If the study uses qualitative methods, were the findings of the study grounded in/ supported by the data? *(Consider whether:* **enough data are presented to show how the authors arrived at their findings* **the data presented fit the interpretation/ support the claims about patterns in data* **the data presented illuminate/ illustrate the findings* **(for qualitative studies) quotes are numbered or otherwise identified and the reader can see they don't come from one or two people.)*	☐ Well grounded/ supported ☐ Fairly well grounded/ supported ☐ Limited grounding/ support	
32	If the study uses qualitative methods, consider the findings of the study in terms of their breadth and depth *(Consider 'breadth' as the extent of description and 'depth' as the extent to which data has been transformed/ analysed)* ** A range of issues are covered* **The perspectives of participants are fully explored in terms of breadth (contrast of two or more perspectives) and depth (insight into a single perspective)* **richness and complexity has been portrayed (e.g. variation explained, meanings illuminated)* **There has been theoretical/ conceptual development.)*	☐ Good/Fair breadth, but little depth ☐ Good/ fair depth but very little breadth ☐ Good/ fair breadth and depth ☐ Limited breadth or depth	

CRITICAL APPRAISAL QUESTIONS

Section IX: Quality of Study – Reporting

		Tick Relevant	Details
33	Is the context of the study adequately described? *(Consider your previous answers to questions on study aims & objectives.)*	☐ Yes ☐ No	
34	Are the aims of the study clearly reported?	☐ Yes ☐ No	
35	Is there an adequate description of the methods used in the study to collect data?	☐ Yes ☐ No	
36	Is there an adequate description of the methods of data analysis?	☐ Yes ☐ No	
37	Do the authors avoid selective reporting bias? *(e.g. do they report on all variables they aimed to study, as specified in their aims/research questions?)*	☐ Yes ☐ No	

Section X: Quality of Study – Methods

		Tick Relevant	Details
38	Are there ethical concerns about the way the study was done? *(Consider consent, funding, privacy, etc.)*	☐ Yes, some concerns ☐ No	
39	Were potential users of the research appropriately involved in the design or conduct of the study?	☐ Yes, a lot ☐ Yes, a little ☐ No	
40	Was the choice of research design appropriate for addressing the research question(s) posed?	☐ Yes ☐ No	
41	Have sufficient attempts been made to establish the repeatability or reliability of data collection methods or tools?	☐ Yes, good ☐ Yes, some attempt ☐ No, none	

42	Have sufficient attempts been made to establish the validity or trustworthiness of data collection tools and methods?	☐ Yes, good ☐ Yes, some attempt ☐ No, none	
43	Have sufficient attempts been made to establish the repeatability or reliability of data analysis?	☐ Yes ☐ No	
44	Have sufficient attempts been made to establish the validity or trustworthiness of data analysis?	☐ Yes, good ☐ Yes, some attempt ☐ No, none	
45	To what extent are the research design and methods employed able to rule out any other sources of error/bias which alternative explanations for would lead to the findings of the study?	☐ A lot ☐ A little ☐ Not at all	
46	How generalisable are the study results?	☐ Very specific (limited generalisability) ☐ Widely generalisable	
47	In light of the above, do the reviewers differ from the authors over the findings or conclusions of the study? Please state what any difference is.	☐ Not applicable (no difference in conclusions) ☐ Yes	
48	What is the overall quality of the study? *(taking into account all the quality assessment issues)*	☐ High (quality) ☐ Medium (quality) ☐ Low (quality)	

Appendix 2.5: Format for summarizing the review studies

Paper	Analysis	Unit	Number of units	Period	Causal links to transparency			Measurement of transparency, if any	Transparency dimension	Sector	Outcome measured as	Finding
					Project	Sector	Macro					
Name of paper	Statistical Case-based Both	Country Sector Project			Grass roots partici-pation Contr-acting	Competi-tion Regul-ation	Legislation Civil service reform	Transparency indicators Governance indicators	Accountability Corruption Bureaucracy etc.	Multi (results not disaggregated) Water and sanitation Electricity Telecom Transport Energy Other	Access: coverage expansion Access: aggregate growth in use/supply (per capita) Affordability: Tariff reduction Quality: service continutiy Efficiency: loss/fault reduciton Efficiency: Bill collection Efficiency: labor productivity	+: posiitive impact -: negative impact 0: inconclusive n/d: not done