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## DESIGNING FOR CHANGE: FLEXIBILITIES IN INFRASTRUCTURE PPPs

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**Abstract** Public-Private Partnerships (PPPs) are potentially important contributors to the effort to deliver the infrastructure and services required for India's sustained, inclusive growth. They are also, however, complex organizational arrangements for collaboration in the face of new information, changing circumstances, and potential differences in partners' objectives. Institutional design for the next generation of PPPs will be challenging. This paper focuses on one important dimension for design: increasing projects' flexibility, or their ability to cope with and extract value from new information and changing circumstances. We lay out a spectrum of "flexibilities," ranging from clauses that allow transactional terms to adjust to observable changes in circumstances, to real options embedded in technology and/or contracts, to bounded renegotiation. Each of these approaches has been used in practice and we briefly describe their application in India and elsewhere. The final sections discuss some of the challenges of implementing flexibility in PPPs in India, including the need to build public legitimacy for ex-post changes in contracts as well as build capacity to anticipate and map project risks ex-ante. It will not be easy to build these aspects of the institutional environment for PPPs, but both trust and foresight are important for broader good governance.

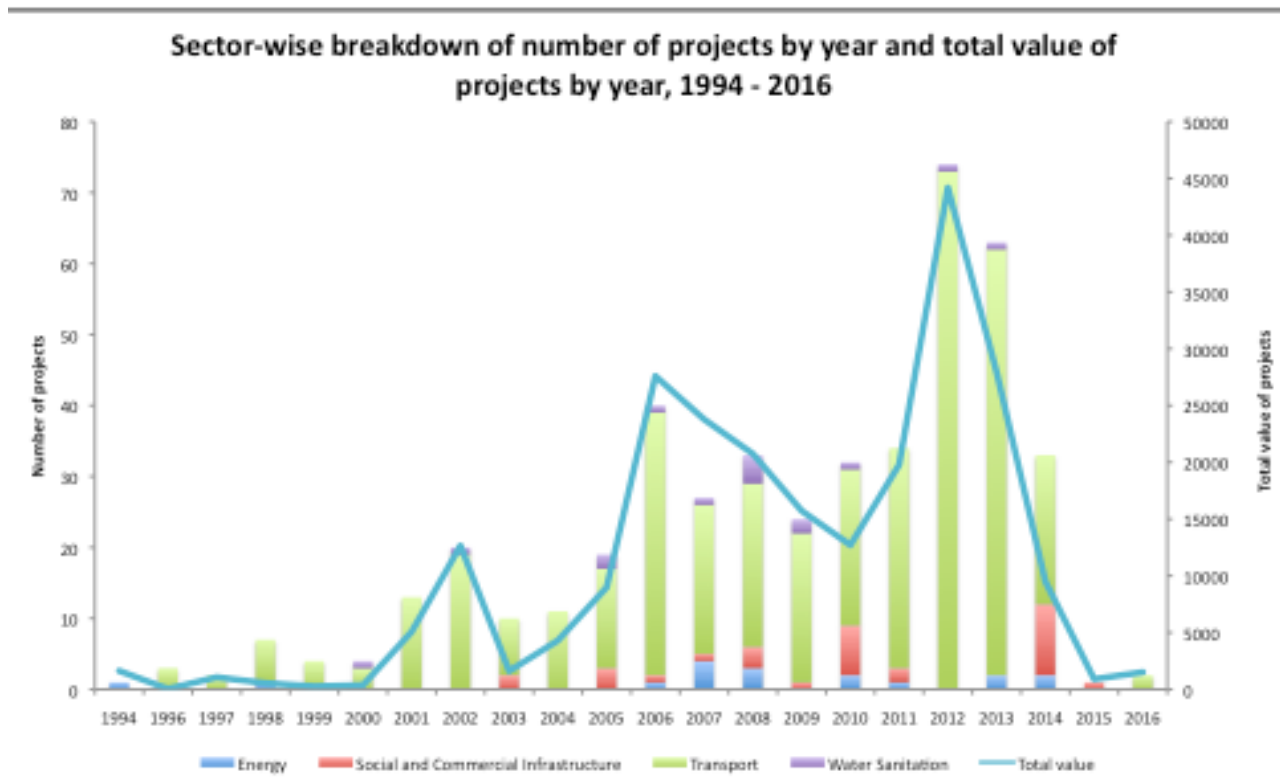
### **Key Messages for Policymakers**

- The past decade and a half of experience shows that flexibility is essential for India's next generation of PPPs. Changes in the project environment and discovery of new information during implementation have led to stalled projects, with cascading effects for the overall PPP programme.
- There is a spectrum of flexibilities that can and have been built into PPP projects in India and abroad to make them more robust to negative surprises and better able to capture value from positive surprises. These include:
  - *Adjustabilities* - defined changes in the terms of trade that are a specific function of changes in the project environment.
  - *Real Options* - opportunities to revise certain parts of the contract or the project technology in limited ways that become available at certain trigger points.
  - *Negotiated Settlements* - opportunities to renegotiate specified parts of contracts through a pre-agreed process.
- Implementing flexibilities more widely in Indian PPPs will require:
  - Building capacity for advanced modeling of project economic, political, technology, and other risks through focused training programs. There are a variety of standardized tools available for analyzing project outcome spaces; these will have to become part of the standard PPP preparation process.
  - Developing a typology of typical candidate flexibilities that are likely to be required in various sectors. These should be cautiously integrated into model contracts and standard templates to establish a baseline for legitimate mid-project restructuring, while keeping in mind the effect of standardized contracts on the overall risk burden borne by the government in its portfolio of projects.
  - Developing recruitment and appointment norms for minimizing conflict of interest while harnessing technical expertise for bounded renegotiation.

**SECTION 1: Introduction**

Over the past two decades, India has embarked upon an ambitious program of developing infrastructure through Public Private Partnerships (PPPs), contractual relationships between the public sector and private firms to finance, design, develop, and/or operate infrastructure meant for general public use. More than 1400 projects across a variety of sectors have been initiated over the past two decades, with just over 900 underway now.<sup>3</sup> (Figure 1)

**Figure 1**



Note: Year of project is unavailable for 973 infrastructure projects.

PPPs are potentially important contributors to the infrastructure and services that are foundations for India’s sustained, inclusive growth. Much of the public discussion on PPPs has focused on their importance for sharing the burden of financing infrastructure between public and private sector, but this is just one of the many potential advantages. PPPs also share risk between public and private groups and, in doing so, harness a wider spectrum of risk mitigation and management capabilities than public or private could bring to bear on their own. Partnerships are also potentially more capable of absorbing process and technology innovations than traditional public

<sup>3</sup> Database on PPP projects from Government of India, Ministry of Finance, Department of Economic Affairs - <https://infrastructureindia.gov.in/search>, accessed July 14, 2015. “Underway” means under construction in or in operation under an ongoing contract.

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procurement. PPPs' focus on contracting on outcomes rather than inputs<sup>4</sup> (as in traditional procurement) both encourages and enables new approaches to delivering infrastructure and services.

The PPP program in India, however, has not been without challenges. The private sector has at times bid opportunistically and optimistically, leading to unrealistic plans that have little chance of being fulfilled as per the contract. Other times the public sector has overcommitted and been unable to fulfill its sovereign obligations such as providing land or right of way. Both public and private partners have rushed into projects without the due diligence to ensure a sound implementation plan and commercial case. Distressed projects have emerged, and renegotiations have been sought (Dachs, 2014). Failure to resolve these conflicts quickly leads to project delays, significant penalties, and ultimately investment sunk in an unusable asset. These developments have raised concerns about financial sector exposure to PPPs in distress as well as the growth of implicit off-budget liabilities for state governments. An August 2015 India Ratings and Research Report found that that accounting for stressed infrastructure loans currently treated as performing could more than double the infrastructure assets requiring restructuring and/or liquidity.<sup>5</sup>

Bidding and implementation of projects have also slowed as developers and financiers seek to limit further exposure and work through projects in distress. Private firms and investors have also grown more skeptical, as evidenced by the lukewarm reception to recent PPP proposals in the transportation and other sectors. There was no bidder for 16 of the roads contracts tendered by the National Highway authority, for example, and the officials are looking abroad for bidders for the second phase of the Jaipur metro.<sup>6</sup>

Moving past these challenges to launch a new round of PPPs will require various changes in PPP design, enabling policies, and, importantly, deepening capacity to structure and manage projects through their entire lifecycles. The new regime needs to discourage a headlong rush into unviable projects and unworkable arrangements, but also ensure that partnerships have adequate support to be stable in increasingly volatile times. It is difficult to disentangle the effects of "bad luck" in the economic and political context from the consequences of poor project structure, but India's PPP trajectory does make it clear that PPPs and the PPP regime need to be designed to survive change.

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<sup>4</sup> Hart (2003) and Grimsey and Lewis (2004) argue that the bundling of design/construction and subsequent operation is one of the defining features of PPPs relative to traditional procurement.

<sup>5</sup> India Ratings & Research (2015). "Indian Banks: The INR1trn Shortfall from Distressed Corporates," August 6, 2015. Available at <https://www.indiaratings.co.in/upload/research/specialReports/2015/8/6/indra06Ind.pdf>, [Accessed August 12, 2015.]

<sup>6</sup> S.N. Sharma (2015). "What ails India's PPP model and why it doesn't bode well for Modi government's infrastructure push," *Economic Times* July 5, 2015. <http://economictimes.indiatimes.com/news/economy/infrastructure/what-ails-indias-ppp-model-and-why-it-doesnt-bode-well-for-modi-governments-infrastructure-push/articleshow/47940200.cms>

This paper lays out some approaches to increase projects' **flexibility**, or their ability to cope with and extract value from new information and changing circumstances.

Flexibility is important for PPPs everywhere. Projects themselves are often technologically challenging. Partnerships between for-profit private organizations and public entities with sovereign authority and social accountability are fundamentally complex organizational arrangements that need to be managed over their life cycle in order to produce anticipated outcomes. There are always surprises, both good and bad. Contracts may seek to prescribe rights and responsibilities in all conceivable scenarios, but are inevitably incomplete. They cannot describe specific actions for all possible realizations of the future – natural events (e.g. climate change, natural disasters such as earthquakes, etc), market evolution (changes in interest rates, financial stability), political (change in government as well as the regulatory and legal environment), technical (introduction of new technologies that enhance efficiency) and industry-related changes (changes in demand or patterns of competition). It is often unclear and impossible to predict which of these changes will afflict a project at what time and to what extent (Williamson, 1979). Preparing for all contingencies, even just gathering information to characterize all possibilities would be prohibitively expensive.<sup>7</sup>

Flexibility is particularly important in India today, a setting with ongoing technological change, a complex and fragmented federal political environment, and substantial uncertainty exacerbated by limited data availability. An oft-heard refrain from practitioners - both within the public and private sectors - is that the time devoted to project preparation is often limited and inadequate to fill gaps in baseline information. 'Information discovery' about the actual costs of land acquisition, scope and cost of the physical asset to be built, and/or actual demand for the asset happens during the project and has the potential to fundamentally affect project economics. Dealing with these surprises is also complicated by the political environment and rising public distrust – deviations from initial plans and differences between parties have to be resolved in ways that are ostentatiously neutral. The same climate of distrust also constrains the politically viable range of risk allocations – arrangements that look reasonable and equitable ex-ante can backfire if they lead to apparent windfalls later.

Section 2 defines flexibilities in greater detail. In particular we describe three types of flexibilities and discuss Indian and international experiences for each. These types are:

1. *Adjustabilities*, which are defined changes in the terms of trade that are a specific function of changes in the project environment. Fuel price pass-through in electricity, for example, is an

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<sup>7</sup>See Lessard and Miller (2001) on the range of uncertainties; Hart (2003) and Williamson (1979) on incompleteness of contracts.

adjustability: the price of power sold changes as a function of the input price. Least present value of revenue concessions, in which the concession remains in force until a particular value is reached rather than terminating at a specific date are another example of what we can an adjustability: the end date is a function of the cumulative revenue. Adjustabilities are the simplest form of flexibilities.

2. *Real Options*, which are opportunities to revise certain parts of the contract or the project in limited ways that become available at a certain trigger point. (Dixit and Pindyck, 1994) Such options in infrastructure projects can be built into technology or described in contractual terms. (de Neufville et al, 2002) These are distinct from adjustabilities in that project stakeholders have the right, but not the obligation, to unilaterally effect pre-defined changes to the project arrangement. Maintaining these options – keeping the possibility of change open – may require additional initial investment.
3. *Negotiated Settlements*, which are bounded opportunities to renegotiate contracts. The boundaries may include a specific trigger point being required to open negotiations, a pre-specified process for negotiations, a limited set of terms that can be renegotiated, and/or a cap on the monetary value of amendments. The option to renegotiate as part of a standard course of a contract rather than move from partnership to dispute creates flexibility in settings where a formulaic response to new information or new conditions is not possible to specify in advance. It is distinct from both adjustabilities and Real Options in that it requires participation of both parties to the contract.

Flexibilities, in essence, allow for rebalancing the roles, responsibilities and incentives of parties within the original set of covenants, structures and agreements, subject to clearly laid out boundaries on the choices that can be made and process to be followed. The boundaries are as important as the opportunities to re-open the contract – open-ended clauses such as “client and concessionaire may act in the best interests of the project...” found in some real estate PPPs have led to paralysis.

Section 3 illustrates how this approach to project structure and management could benefit India with examples of how flexibilities have been implemented to limit downside risk and allow for capturing of value from upside circumstances. Flexibilities in PPPs provide several well documented advantages, including allowing projects to adjust and sustain over their lifespan as well as enabling faster absorption of cutting-edge technologies. The ability to sustain projects and avoid worst-case scenarios for contingent liabilities is especially important for India. Dachs (2014) estimates potential contingent liabilities of as much as 1,40 lakh crore in roads and well over 44,000 crore for major ports alone. We illustrate flexibilities’ potential usefulness for India through hypothetical examples of how project trajectories could have differed if flexibilities had been built in.

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Section 4 discusses considerations for expanding the use of flexibilities in India. We discuss potential trade-offs between flexibilities and other PPP regime design goals such as cost revelation, efficiency, and risk sharing. The second part of the section discusses contextual considerations, including, in particular, the types of capacity required for designing flexibilities and approaches to building this capacity.

The paper concludes with suggestions on how to integrate the ‘flexible arrangements’ paradigm in the present day PPP policy and institutional context in India. This paper focuses on flexibilities that can be built into projects and programs rather than a more general institutional overhaul of the PPP context in order to be readily applicable.

## **2. Flexibilities: Definitions & Examples**

There is a spectrum of approaches to flexibility, some of which are already in use in India. It is also important to note that the basic structure of a PPP as an ongoing partnership allows for more flexibility than traditional procurement because obligations can be specified in terms of the extent and quality of services delivered by the project when it is operational rather than just qualities that can be observed at the time of purchase. Alternative Procurement methods such as those based on Bills of Quantities (BoQ) or Engineer-Procure-Construct contracts are one-time transactions that have to specify the exact characteristics of the good/service to be exchanged at the time of the transaction. PPPs can avoid this level of detail and rigidity as well as the challenges of measuring and verifying less visible attributes of a good/service by holding the partners to particular standards in the future – as long as those performance standards can be clearly defined and credibly measured. An EPC procurement contract for roads, for example, may specify exactly which materials and construction approach to be used (inputs) as a way to ensure that the road will later have the desired characteristics. A PPP, on the other hand, can be based on the desired characteristics and leave the operator to evaluate and choose new designs, materials and technologies. The design approaches discussed here expand this inherent flexibility.

**Adjustabilities** are well-specified pairs of observable events and corresponding changes in the transaction structure. They are useful for (a) sustaining contracts through variations in the contract environment that are relatively well understood in advance as well as clearly observable and verifiable; and (b) coping with new information that is revealed over the course of the project. They allocate these risks between parties clearly in the beginning of the contract, ideally allowing each to plan hedging strategies that strengthen their ability to keep their commitments as circumstances change. Observability of the events that trigger changes in the transaction terms is an important feature distinguishing adjustabilities from contractual forms such as cost-plus arrangements that also create flexibility but pose additional risks of opportunistic behavior.

This class of flexibilities is relatively easy to implement and is often used in existing PPP concessions in India. Indexing toll rates to indices such as the Wholesale Price Index (WPI) is a relatively common arrangement in Indian road PPPs for instance. The exact nature, magnitude, and timing of shifts in prices may be unknown and difficult to predict, but the distribution of possible WPIs is reasonably clear and there are other opportunities for parties to hedge against project risks through secondary markets. The corresponding clause can be clearly specified, and the adjustments happen automatically.

Milestone-contingent dates are another potentially useful adjustability in India. Project completion and commercial operation dates are often at risk in projects due to uncertainties in land acquisition, environmental clearances and financial closure. Hard-coding milestone and completion dates into the concession agreements creates incentives for both parties to meet the dates, but it also creates arbitrary lines for breach of contract and disputes. Missing one deadline can cascade into multiple points for dispute. Contingent effective dates in the contract - tying the commercial operations date of a project (COD) to an earlier set of milestones, for example - reduce this rigidity (Pellegrino et al, 2013). The COD is automatically adjusted if there is any delay in meeting the earlier milestones. Such strategies have been applied in the Indian context - several projects in the Madhya Pradesh Roads Development Program feature exemplars of the use of contingent effective dates.

Outside of these examples, other adjustabilities exist that have been implemented in other parts of the world but have not gained much traction in India yet. One example of this class of adjustabilities is the use of the Least Present Value of Revenue (LPVR) mode of PPP procurement and its consequent concession agreements (Engel et al, 1998; 2006). Several South and Latin American countries such as Chile have experimented with this model. Under this mode, bidders are expected to specify an expected revenue stream over the course of a pre-specified project duration. The revenue stream for each bidder is then discounted at a pre-specified and common discount rate to arrive at the most competitive bid - i.e. the bid where this discounted present value of revenues is the lowest, thus minimizing annuity payments from the government or tolls paid by road users. Once the project is awarded, the duration of the concession is then automatically adjusted forward or backwards until the actual present value of revenues received matches the present value of revenues estimated at the bidding stage by the selected concessionaire. Here again the adjustment is automatic - should traffic volumes be higher than expected such that the expected present value of revenue is realized prior to the expected concession duration, the concession is automatically closed. On the other hand if demand has been overestimated compared to actual traffic volumes, the duration of the concession is automatically extended year-on-year from the expected completion date until the estimated present value figure for toll revenues is reached.



Adjustabilities triggered by new information are also relevant in the Indian context given the extent of learning that takes place after the project has started. The information base for projecting local economic conditions, traffic, and site-specific construction costs remains relatively weak and projects are often prepared quickly. There are often differences between data in the Detailed Project Reports (DPRs) on which the projects are tendered and conditions discovered at the project sites. Concessions can then allow for changes in overall contract price within a fixed band in the event of new information being discovered during the course of the project. This again is not uncommon in India. In a recent water supply PPP project in Mysore where the private operator was expected to rehabilitate, operate and maintain the network financed by payments from the municipality over time, the contract automatically allowed for an increase in capital expenditure of up to 10% of the originally stipulated amount, in recognition of the fact that the operator might, in the process of rehabilitation, discover additional costs or connections to be made, that may not have been included in the original project documents prepared by consultants prior to the bid process.

Adjustabilities do not erase the risks in a project – one party (public, private, or customers) still has to bear extra fuel costs, toll variation, financing costs of a longer construction period, or the consequences of changing the project scale – but they do clarify the allocation of risks from the start and allow each to prepare. This clarity adds most value to the project only when the range of variation in the environment is understood and hedgeable – when the party bearing the risk can do something to limit its impact. Extra time at the end of a concession period increases return on equity even as it creates a cash flow problem for the concessionaire, for example, but the availability of a clear commitment rather than a nebulous breach of contract may allow for financial engineering to reduce concessionaire risk.

In some cases, the range of variation must also be limited for the adjustability to make sense. For instance, to take the LPVR example discussed above, the adjustments to the contract are effective if the deviation between actual and predicted traffic projections falls within a narrow band (say an increase or decrease of 10%). In such cases, the contract completion date can be advanced or delayed by a few years while allowing the private investor to recoup their investments as planned. On the other hand, if traffic volumes are say, only a fraction of what was estimated, then the contract will have to be extended over an inordinate time period, which may not be practically feasible. Furthermore, diminishing present values of revenues over time periods in the distant future, coupled with increased maintenance costs might lead to a situation where the private operator is unable to ever arrive at present values of revenues that meet their expectations prior to the start of the project. Indeed, in practice, LPVR contracts in Latin America contain both upper and lower bounds of contract durations, thereby preventing shortening or extension of concessions beyond these bounds. Therefore when the timing, nature and scope of the uncertainty affecting a project cannot be narrowly bounded, one must turn away from adjustabilities and move towards incorporating 'Real Options' as mechanisms for flexibility.

## **Real Options**

Moving along the spectrum of flexibility, Real Options represent the “right but not the obligation to take some course of action that may be advisable either if there is some unfortunate turn of events or some new opportunities.” (De Neufville et al, 2006).

As in the case of adjustabilities, Real Options are tied to specific uncertainties and also define specific pathways or processes of execution. However, in contrast to adjustabilities, Real Options are not automatically exercised every time there is an opportunity. There is a greater element of discretion involved in the timing and execution of Real Options and choices are available on how to proceed. Real Options can themselves be of two types – passive and active (Gil, 2007). Active safeguards (or options) often involve some amount of initial investment in physical execution in order to incorporate the option, while passive safeguards involve design work without physical execution.

### *Active Options*

Options can be designed to accommodate uncertainty about demand. De Neufville et al (2006) provide an example of a growth option in the context of a multi-story parking garage. Assuming that current demand is only for three stories but is projected to grow, the private investor can choose to build all six stories at once. However, if demand predictions are not met, the investor is left with unutilized capacity and a consequent financial shortfall. An alternative is to initially develop a three-storied structure to cater to current demand, but design and construct the parking garage to accommodate three additional floors if required. The developer then retains the ‘option to expand’ (Trigeorgis 1995) based on actual demand trends, and can add floors at a later date if parking demand increases. If not, the developer is insured against over-investment and unused capacity.

This flexibility is not free. The cost of staging the construction is likely to be much higher than the cost of constructing the entire structure all at once. Further, in case the demand for parking does not increase in the future, the cost of strengthening the initial structure is equivalent to a sunk investment. Real Options thus require two additional design considerations at the time of the initial contract: first, whether the real option is valuable enough to include in the project terms; and second, how its costs and the value created by the option are to be allocated. We discuss the capacity building implications of this in section 4.

Options can also be designed to allow changes in the operational regime. One of the more well-known cases of the use of active options is the development of a bridge across the river Tagus in Portugal. While the bridge was initially used for vehicular traffic, the lower platform of this bridge

was later used for rail traffic. By designing the bridge to accommodate both types of traffic (which involved an increase in the initial capital cost of the bridge), the owners were able to exercise their 'option to switch' the use of the bridge, to provide better rail connectivity (Gesner and Jardin, 1998) when traffic conditions indicated that this would be a more effective use of the bridge. In all of these cases, an initial upfront investment in flexible design resulted in an option that could be exercised later on in the project to accommodate changing circumstances in travel and demand.

Such operational flexibilities are often implemented through the use of modular designs. Modular designs often cost more than integrated designs, but retain the advantages of being able to add or modify modules. Modular designs are also more transparent. Thus in situations where an existing operator in a PPP concession may be replaced, the new operator is more likely to be able to manage a modular asset effectively than an integrated one. Gil (2007) reports the use of a number of active options or safeguards in airport expansion programs in the UK. For instance, for an extra investment of 1 Million GBP, Multi-Access Ramp Stands were installed to service either one large aircraft or 2 small aircrafts, to insure against changes in the mix of aircrafts that an airline service provider may choose to have in the future. Similar design investments were made for baggage storage and reclamation capacities to ensure that the airport operators could meet their performance standards (and therefore their contractual obligations) even in the face of changing demand and transshipment patterns. The Berwick Hospital Project in Victoria, Australia followed a similar approach of designing hospital spaces and IT systems to enable the public partner (Southern Health) to meet its service criteria, but also allow the private partner (Progress Health) to offer new services as well as integrate in-patient, ambulance, and community services in the future (Grimsey & Lewis, 2007).

There are several sectors in India where incorporating flexibility in PPPs through modular design could have significant impacts. Take for instance the case of developing desalination plants through PPPs. The PPP based desalination plant set up in Minjur, Tamil Nadu, one of the first of its kind, provides water for a commercial rate of Rs. 48/kL. There are at least three kinds of long-term uncertainties that can affect the performance and cost-efficiencies of desalination plants – the quality and composition of the water intake for desalination, the demand for water, and changes in desalination technologies, particularly changes in the membranes (Voutchkov, 2012). Over the years there has been a steady reduction in the cost of membrane technology for desalination. Designing such plants in a modular fashion that allows for technology replacement as more effective designs emerge (retrofitting filtering technology in this case), could bring down the overall costs of the PPP, offering potentially reduced rates on desalinated water to consumers. It could also serve as a buffer against an increase in the cost/quality of inputs or changes in demand.

While the examples listed here primarily focus on the engineering design of infrastructure, these options are tightly linked to the circumstances of the concessions that surround these projects. To the extent that the expectations from the concessionaire are outcome oriented and viewed as

fixed rather than negotiable, there is a greater likelihood that the concessionaire will invest in active options to manage risks of non-performance. For instance, if aircraft turnaround time is the performance indicator that the private airport developer is asked to optimize, they are more likely to invest in flexible stands for quick turnaround of different kinds of aircrafts. On the other hand, if the contractual requirements specify the nature of the asset, then there is likely to be a tilt towards designing integrated structures (for instance, if the contract calls for having six stories of parking available at all times irrespective of the demand). Developers are also more likely to invest in active options when their ability to demand a renegotiation by pulling political strings or threatening hold-up is lower.

### *Passive safeguards*

Passive safeguards or options are another set of real options wherein upfront investment may not be needed. Many such options can be contractual in nature. For instance, in cases where capital and O&M costs are higher than expected and where revenues are lower than expected due to unanticipated changes in demand patterns, price escalation, delayed receipt of land etc, a series of options can be envisaged that when exercised can provide some recourse to the concessioning authority or the concessionaire. For instance, in line with the discussion on active options, the operator may be allowed to dynamically contract or expand the capacity of the project based on market conditions (Trigeorgis, 1996; Zhao et al, 2004). This could involve reducing the number of operational lanes on a road, or reducing the operational area of a port or an airport with a view towards optimizing on O&M costs without incurring performance penalties.

Alternatively, the operator may also be allowed as an option to defer the payment of concession fees or agreed upon shares of revenues, if such fees are involved in the PPP, to ensure financial stability of the project. Such options can be ring-fenced by limiting the total period of deferred payments over the lifecycle of the project or placing a cap on the maximum payment that can be deferred to ensure that the private operator does not unnecessarily withhold payment, but exercises such options judiciously in times of need. Such options may have been helpful in projects such as the Delhi Airport (DIAL) PPP where a post-award increase in scope necessitated the introduction of a controversial Development Fee to allow the private operator to recoup their extra investment. While it may not be possible to eliminate such a fee, coupling this strategy with an option to defer payments into the future may have allowed for a reduction in the development fee charged, negating some of the controversy's that followed. A more in-depth discussion on valuing options in the DIAL project is presented in section 3.

Refinancing and sale of PPPs may also be a potential strategy to resuscitate distressed projects. Concessionaires can create options to access cash reserve funds in the event of an inability to meet their obligations at an interim stage of a project. Governments in turn can retain options to infuse grants and subsidies, often convertible to equity at a deferred date as ways in which to step

into projects. The Tirupur Water Supply PPP project is a case in point. The New Tirupur Area Development Company Limited (NTADCL) that was awarded the project had some options to exercise in the contract in terms of recourse to funds for debt service payments in the event of a water shortage, failure to recognize sufficient revenue and so on. During continued operations of the project however, the demand for water has continued to stay well below expectations leading to a number of ad-hoc interventions that have been undertaken over the years. These interventions include government infusing capital into the project, the terms of financing being modified and so on. In the absence of a framework to modify the project arrangements, these interventions have led to a number of protracted negotiations with investors followed by court cases. By embedding flexibility into the project through the use of well-defined options for refinancing that can strategically be exercised, the process of operating the Tirupur water supply project might have been less controversial.

Another set of options that might provide flexibility to projects are options to step in or step out of a project. Some forms of these options already exist in many concessions – for instance lenders have the option of replacing the concessionaire if they fail to meet performance and debt service obligations. However, the gamut of such options can be expanded to introduce conditions where government agencies can proactively step into projects, or ways by which private developers can step out. Take the case of the Chennai-TADA toll road for instance. Land acquisition has been a key issue in this project and there have been considerable difficulties in acquiring contiguous parcels of land for the development of this road. As a result there have been delays in construction, cost overruns and dissatisfaction among road users. The relationship between the land-granting authority and the concessionaire has become extremely tenuous and a notice of termination has been filed. Options in the project whereby the government could have proactively stepped in and taken ownership of this project in this case, where it was clear that the complexity of land acquisition was greater than that faced on average, could have helped prevent the acrimonious dispute settlement process that the project is currently undergoing.

This discussion on options is meant to be illustrative rather than exhaustive. Like adjustabilities, options embedded in the project ‘come alive’ at pre-identified trigger points. However unlike adjustabilities there is no guarantee that the options will be exercised immediately or at all, nor is it possible to predict the effect of exercising the option a-priori. Options offer a bounded range of choices that project stakeholders can creatively access. For instance, in the case of a growth in demand for parking in the example mentioned earlier, the developer may decide to build one, two or three extra stories. These choices in turn may lead to various levels of profitability or loss. Similarly, in the case of contractual options, the extent to which a concession fee payment may be deferred may not be deterministically specified, but can be a choice variable exercised by the party holding the option.

Options thus offer a multiple-choice template for actions that can be taken to improve the project value in certain eventualities. However, in some cases, such templates may also be difficult to prescribe. In such cases, moving further down the flexibility spectrum, Negotiated Settlements may offer the possibility of minimizing project loss or restructuring to capture more upside value.

### **Negotiated Settlements**

Negotiated Settlements are responses to uncertainties that affect projects, and are therefore also triggered at specific points. However, these represent cases where a formulaic settlement is not possible to formulate, and where a choice space is also difficult to define. The alternative is therefore to specify a mechanism within the contract by way of which the project can adapt. Normally this mechanism takes the form of a committee with a specific set of qualifications that is constituted at a particular time in the project in response to a pre-determined trigger, which then has the mandate to change a finite set of arrangements on a project within a set of boundary conditions.

Take, for example, several PPPs in the roads sector in India where there is a mismatch between the expected traffic volumes and projected ones at the time of bid. On the one hand, there are a number of cases where the overall demand for a stretch of road has been overestimated. However, a more nuanced distinction must also be made. There are also systematic differences in traffic volumes in specific road-user segments and there are cases where there are increases in the number of smaller axial vehicles, at the cost of larger axial vehicles. The net effect of this is that there is a loss in revenue to the private operator since tolls on larger axial vehicles are much larger than on smaller axial vehicles. This is a scenario that can potentially be balanced by variable changes in toll rates (a greater increase in toll rates for smaller axial vehicles as compared to larger ones when toll rates are revised). However the methodology for increasing toll rates across each category cannot be pre-specified, and cannot be approved prior to a complete investigation into the ability of users to pay, the economic gains from the project and so on. Such procedures can best be implemented by specific committees - a toll review committee in this case – whose existence is triggered at a specific revenue shortfall point, and whose constitution, powers and mandate are clearly written into the project agreements. The use of committees for dispute resolution is not new. There are several examples of projects that have had such toll review committees – one of India's early road PPPs –Vadodhara Halol Toll Road – is but one case in point of such systems that have existed on PPPs for several years.

Dachs' (2014) review of renegotiation processes covers established international practices well. We mention them here as part of our flexibility framework in order to place them in context of other options for flexibilities and to reiterate the importance of identifying all such committees and systematically specifying the rules that govern them as part of project concessions.

We have discussed three points in a spectrum of approaches that can provide flexibility to PPP projects and allow them to adjust in the face of a changing environment and uncertain information. Table 1 below provides a brief comparison of these approaches.

**Table 1: A comparison of Flexibility Typologies**

	<b>Adjustability</b>	<b>Real Options</b>	<b>Negotiated Settlements</b>
<b>Pre-Specified Triggers</b>	Yes	Yes	Yes
<b>Determinant of new arrangement after use of flexibility.</b>	Formulaic solution is possible	A range of potential choices can be listed	A decision must be made that is contingent on the specifics of the situation
<b>Implementation Mechanism</b>	'If-Then' type clauses in the contract	Procurement processes that provide signals/scope for developer to embed technology options.  Clauses that allow one party to make a bounded modification of contract arrangements	Clauses that necessitate the constitution of a committee with specific powers.
<b>Use of Discretion</b>	No	Yes (unilateral)	Yes (bilateral)
<b>Example</b>	Changing concession end-dates based on the Present Value of Revenue collected.	Deferring concession fee payments	Toll review committees to adjust toll regimes

### *Choosing Flexibilities*

Thinking systematically about flexibilities is critical to designing sustainable PPP arrangements. Essentially, project designers must identify key risks and uncertainties on projects and then decide as to whether these risks can be addressed through direct risk mitigation, the use of adjustable clauses, incorporating Real Options, or resorting to Negotiated Settlements. Each of these forms of flexibilities has a distinct means of shifting the initial risk equilibrium. Adjustabilities do not reduce risks within the contract, but they make the division of risk transparent and thus encourage and enable each party to hedge against the risk in their larger set of operations. The value of transparency depends on the means that each party has to hedge against risks through their choice of a portfolio of projects, investment in financial hedges, or other means. Active Real

Options allow one or both parties to truncate the distribution of risk, generally for a monetary price to be paid during construction for more flexible designs. Passive Real Options also truncate the distribution of risks by allowing roles to change under damaging circumstances, but at the cost of encouraging moral hazard by softening the consequences of negative outcomes. They are best used when the outcomes are completely beyond the control of both parties. Renegotiation similarly bounds risk by allowing for change of roles, but the cost of this change to each party is only clear as renegotiation unfolds – the process delays the payment for risk mitigation. This ability to push costs down the road can reduce pressure to proactively reduce risks and renegotiation thus should be seen as a last resort when other means of reducing risk are not feasible.

The relative advantages of flexibilities also depend on the nature of the uncertainty. If for instance, the demand for services is fairly certain but can vary slightly, adjustable clauses such as using the Least Present Value of Revenue mechanism for project procurement and governance may be an appropriate strategy. If on the other hand, the variability in demand is expected to be high, then a Real Options strategy of allowing the developer the option to defer their concession fee, or allowing them the option to develop adjoining land parcels as an alternate source of revenue may be appropriate solutions to be incorporated into the project covenants. In cases of extremely high volatility of demand, these solutions may also be inappropriate, and the recourse to a committee to resolve the issue of toll or rights may be the preferred solution. The various kinds of flexibilities that can be incorporated into projects are therefore complementary and a particular uncertainty may be addressed by more than one type of flexibility.

### **3. The Gains from Flexibilities**

The previous section introduces and defines the broad categories of flexibilities that may be available to policy-makers as they design PPP projects. However, there are other practical considerations that must be answered prior to implementing flexibilities on projects: Do flexibilities add value to projects and if so to what extent? Has the impact of using flexibilities been systematically studied in projects in India and abroad? What are the consequent findings? This section attempts to answer some of these questions by looking at specific instances of the use of flexibility in PPP projects.

Of the three types of flexibilities, Adjustabilities and Negotiated Settlements have been far more popular than the use of Real Options in India. This may be due to their relative simplicity. However, there are significant advantages to incorporating Real Options into projects and thus a case for investing in these more complex designs. The examples in this section mainly focus on Adjustabilities and Real Options. Dachs (2014) offers an in-depth treatment of Negotiated Settlements for PPPs and the cases he discusses will not be repeated here.



As de Neufville and Scholtes (2011) have shown, Real Options enhance project value by enabling a wider range of responses to variation in the project context. As a result, private developers, lenders and investors may be able to reduce the financial 'risk buffers' that they put into their analysis of projects in the face of options in the contract. This may in turn lead to more rational and responsive bids. Cruz and Marquez (2013) also note that there is empirical justification for the notion that contractual flexibility through real options enhances project NPV and that the consequent benefits are shared by both the public and private sector. The basic principle here is that flexibilities affect the timing of expending resources on a project, and ensure that such resources are delivered when their impact on the project is highest, leading to a creation of value on the project.

Al Misnad (2014) illustrates this mechanism at work with an analysis of flexibility in desalination PPPs undertaken through Build-Own-Operate-Transfer (BOOT) arrangements in Qatar. The developer is tasked with financing and building the desalination plant under different scenarios, two of which are described here. In one scenario the developer is expected to develop the plant to generate a fixed supply of water irrespective of demand. In another, the developer develops a fixed minimum capacity, but then retains the option of adding more capacity (in fixed units) on to the plant based on demand for water. Contractually as well, two regimes are considered. In the first, the government enters into an agreement with the developer to buy water at an agreed upon rate, and also agrees to pay the developer an additional capacity payment based on the difference between the quantity of water that the plant is geared to supply, and the quantity of water actually bought by the government agency. In the second contractual regime, there is no 'Take or Pay' agreement, and the developer bears the market risks themselves. By developing a very simple simulation that incorporates changes in input costs and volatility of demand, the study shows that allowing for flexibility in expansion and paying for water bought in addition to payment on additional capacity can lead to a decrease in public expenditure by 36% compared to the case of developing the plant to fixed capacity followed by a rigid contract. In effect, by paying for additional capacity only when that capacity is required and by not asking for availability that is in excess of current demand, governments are able to time their payments better, thus increasing value in such projects.

Alonso-Conde et al (2007) study the Melbourne CityLink Project – a large automated toll road – and the impact of two specific flexibilities: an adjustability that allows the private developer to defer their concession fee payments until the end of the contract in case their internal rate of return for a notional equity investor at any stage is less than 10%, and a Real Option for the concessioning authority to step in and close the concession if the internal rate of return crosses 17.5%. With regards to the adjustability described here, the private developer will re-start paying the concession fee if the rate of return crosses 10% at a subsequent time period, but the magnitude of the payments will be governed by a different formula such that some portion of previous payments not made will be deferred to the end of the project. Once again by estimating

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variations in costs and traffic demand and by developing Monte-Carlo based simulations, the paper shows that the value generated by these flexibilities is close to \$450 Million – more than 10% of the overall cost of the project (which was \$4061 Million). This again represents the financial gains of being able to time payments differently while also avoiding windfall profits.

Sakhrani and de Neufville (2014) study the Delhi Airport PPP undertaken by Delhi International Airport Limited (DIAL). Using the trends in data available from the first few years of operations of the airport, the paper develops a model whereby different future regimes for interest rates, operating expenses, aircraft movements and passenger traffic are dynamically simulated till the year 2036. An active real option of increasing the capacity by 20% by building a new runway between 2021-2030 based on whether traffic demand overshoots capacity is then evaluated. The analysis indicates that under the present contracting regime that is being implemented in DIAL, there is only a 30% chance that the final NPV of the project will be positive from the perspective of the private developer. On the contrary, when the active option is exercised, the possibility of the NPV being positive jumps to 70%.

Kruger (2012) explores the value added by such Real Options on capacity expansion in roads in Sweden. By taking the example of a two-lane highway and providing the operator with a variety of options – maintain two lanes, increase to three lanes at any point during the concession, increase directly to four lanes, increase to three lanes initially and then to four lanes – the study demonstrates the value of a deferred investment plan as opposed to mandating an expansion from two to four lanes directly, in cases of volatile traffic demand.

Other such examples abound across sectors. Cruz and Marques (2013) study a Hospital PPP in Portugal. Here, the private developer builds and operates the hospital and receives payment directly from the government in relation to the demand for various services – inpatient, ambulatory and emergency services (the patients themselves are charged very little). On comparing a rigid hospital design plan with a more flexible one where the developer can ‘switch’ or change the capacity of ambulatory vs in-patient services or vice versa in relation to demand, the NPV of the flexible scenario is shown to be two and a half times greater than that for the inflexible scenario (33 Million Euros as compared to 13 Million Euros on an initial investment of around 45 Million Euros). Again this is the effect of being able to adequately cater to different categories of demand by allowing for the option to ‘switch’ between different categories. Geltner and De Neufville (2012) study the Songdo Business District in Korea and analyze the impact of timing the ‘what to build’ and ‘when to build’ decisions with respect to demand and real estate prices and find that a flexible development strategy leads to the generation of almost twice as much value as a tightly master-planned and sequenced approach. Chiara et al (2007) show the advantages of the government securing a minimum amount of revenue on road PPPs in the USA, whilst simultaneously bounding and providing an option to developers on when these guarantees can be redeemed.

These examples show that Adjustabilities and Real Options create tangible value, that they can be applied across sectors, and that they can be applied within the Indian PPP context to the benefit of the types of projects that are currently in distress. However, the incorporation of such flexibilities must merit careful consideration in order to capture the positive value created by flexibilities while avoiding creating new possibilities and incentives for opportunistic behavior (discussed below). Flexibility might also only delay the onset of a problem and might not avoid it. For instance, the use of contingent effective dates in contracts prevents projects from being locked in to unreasonable delivery dates. However, even if the opening of a project is legitimately delayed, there are still financial obligations relating to this delay that must be borne by some party to the project. In such cases, a nested or combinatorial set of interdependent flexibilities may have to be used to ensure adaptability of the project.

Flexibilities often create value, but this value may not be equitably distributed. The presence of flexibility along with complementary covenants in the concession that specify triggers for availability of the flexibility and the bounds within which they can be exercised can ensure value generation as well as equitable value distribution. Chiara et al (2007) show for instance in their analysis of governments securing a minimum amount of revenue on toll projects that such guarantees are best limited to the early portion of the concession period. The value of the flexibility that was to accrue to the private operator in the Melbourne CityLink project could have been moderated by lowering the threshold for the private sector to step in, or by allowing for a redistribution of this value to society through a lowering of tariffs.

This discussion shows that careful thought must be given to institutional, project and contract design when incorporating flexibilities. We discuss conceptual and practical considerations for implementation in Section 4.

#### **4. Implementing Flexibilities – Considerations**

Flexibilities are not a panacea for poor PPP design. They provide a structured way for projects to adjust to change as well as clarity about which party will be responsible for absorbing the costs of change. They allow the contract to be updated rather than obviated when new information or downside risk is realized. They provide a mechanism for the partnership to capture the value of positive surprises. They normalize renegotiation as part of the partnership rather than a breakdown of a contract.

They do not, however, guarantee that a better option than project termination actually exists. The assignment of Adjustabilities does not mean the both parties will be able to provide consistent service in spite of changes the project context. Dachs (2014) for example, notes that one of the issues with more recent transport projects in India has been that most of the risk was allocated to

the private sector and that it was not able to handle this risk. The real option to switch to a new operating model does not guarantee that this new approach will be the right one to keep the project going. The possibility of renegotiation does not guarantee that a settlement will be reached.

Flexibilities increase the importance of anticipating and describing the range of potential variation and new information that will be revealed over the course of the project. They depend on a deep knowledge of the technologies and business models involved in providing infrastructure and services. They are also most useful when there are no other “informal flexibilities” due to asymmetric bargaining power or unspoken political compacts competing in the background. The sovereign’s ability to banish a private party or a private party’s ability to hold up the public partner are the ultimate “flexibilities” for any given project, even if they are costly in the long run.

This first part of this section discusses potential trade-offs from implementing flexibilities; the second and third discuss some practical considerations for implementation in India.

### *Potential trade-offs*

Flexibilities may induce moral hazard and reduce the incentives for technology and process innovations that reduce the impact of change in infrastructure and service business models. The knowledge that the other party will bear the brunt of change (Adjustabilities) or that renegotiation will be possible may reduce incentives for either or both parties to mitigate risk, prepare for extreme events, and use all means available to hedge and disperse risk.

Avoiding this possibility for Adjustabilities requires PPP designers to understand the potential actions that each party can take to affect risk and assign responsibility for adjusting to change accordingly. A contract that eliminates the consequences of demand variation for a health services provider, for example, eliminates that provider’s incentives to maintain standards, adjust to changing health-care practices, or otherwise take steps to make sure it is competitive. An adjustability that reduces the impact of a macroeconomic shock beyond the provider’s control, on the other hand, would make more sense.

Reducing the potential for moral hazard for real options and renegotiation is more complex. In the case of real options, the initial design must not only take each party’s ability to affect risk into account, but also ensure that the party that is insured pays the cost of the insurance. For renegotiation, the weight of reducing moral hazard falls on the renegotiation process. It must still be seen as a second-best alternative to taking actions that keep the original contract viable.

Building flexibilities into contracts can also lead to adverse selection. Contracts with renegotiation, for example, provisions will be more attractive to firms that believe that they can or actually are able to influence the renegotiation in their favor. Doubts about neutrality of renegotiation may

also lead the flexibilities to be seen as not only ineffective for reducing risk, but actively creating new risks that negatively affect the developer. Companies with political connections might thus be more likely to seek contracts with renegotiation built in, while international companies without local contacts and bound by home country anti-corruption rules might be put off by contracts with the possibility of mid-stream renegotiation.

The renegotiation process must be well insulated in order to avoid this possibility. Stakeholders must also be well-informed about the technology and business models for the project under renegotiation. Many analysts have pointed out the possibility of the private firm gaining an informational advantage over the public sector over the course of project operation and using this to exaggerate costs in future discussions.<sup>8</sup>

Real options, on the other hand, might effectively select for larger firms that have the ability to actually exercise the options on hand. This is not necessarily “adverse” selection, but it does create entry barriers for newer, leaner, firms who may increase the level of competition in the sector.

In cases where the future costs of operation and adjusting to changes in project circumstances are likely to be opaque, real options are likely to be preferable to renegotiation since each party exercises them on the basis of its own information. These too, however, need to incorporate knowledge of business models in order to avoid mismatched incentives. AlMisnad (2014) for instance shows that the flexibility to expand desalination capacity can lead to demand not being met as the developer chooses to delay expansion for personal profit. Kruger (2012) also concurs by showing that roads may incur congestion costs if the decision to expand is not taken in a timely manner. Depending on who bears these costs, the government may well find it worthwhile to ‘kill the real option’ and demand expansion. Alonso Conde et al (2007) in their discussion of the Melbourne CityLink PPP discuss a scenario where more than 90% of the \$450 Million of value that is created through the use of flexibilities is ‘captured’ by the private sector and not by the public more generally.

Finally, flexibilities can be expensive and controversial ways of preparing for future change. The costs of active real options, for example must be compared against the cost of gathering the information required to either eliminate or reduce uncertainty about future demand and operational models. This is particularly important when the uncertainty is due to lack of information about the current context (e.g. number of water connections or number of displaced people to be accommodated in housing) rather than uncertainty about the future trajectory of technology change or economic conditions. In the first case, the relevant information is knowable for a price, in the second it is not.

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<sup>8</sup> Chong, Huet, and Saussier (2006), Chong, Huet, Saussier, and Steiner (2006), Vickerman (2004) for example.

Active Real Options, especially those related to technology, are particularly problematic to implement. Since they involve upfront investment, questions arise as to who bears these costs and how the consequent value that is created can be distributed. From a procurement point of view, different sets of flexibilities might lead to different cost structures, and the most optimal set of flexibilities might not necessarily represent the lowest initial cost. For procurement regimes that are driven on a low-cost basis, selecting flexible designs might prove to be difficult. One solution for addressing this issue and moving away from a low-cost procurement regime is to adopt a methodology of 'Competitive Dialogue' that is often used in countries such as the UK and New Zealand. Under this procedure, a set of capable bidders are shortlisted using traditional pre-qualification criteria, and one-on-one discussions are held with each to tease out the most innovative design and solution for the project. A final project brief is then generated which is put out for a restrictive tender featuring the pre-selected organizations. In this manner, private developers may be encouraged to incorporate flexibilities into the project.

The cost of flexibilities should also be weighed against the cost of rebidding as new information is discovered. Material breaches may occur when the project scope is substantially changed post-award, and conditions are created where the possibility exists that other bidders may have been able to offer optimal solutions, unless it can be shown that the cost of rebidding may have been high enough to offset such efficiency gains (EU, 2014). The use of flexibilities must therefore guard against material breaches of this kind.

*Key issue: PPP Capacity*

Implementing flexibilities in PPPs requires building three sets of capacities that presently seem to be in short supply in India: first, the ability to characterize uncertainty and risks over the lifetime of a project; second, deep and impartial understanding of globally available technologies, their costs, and business models for providing infrastructure and services considered for PPPs; and third, the legitimacy to allow both public and private parties to PPPs to occasionally receive outsized awards for their participation.

The first two capacities will require active participation by the sectoral ministry in designing the contract and reviewing bids. Evaluating effect of Adjustabilities, Real Options, and Renegotiation possibilities on project risks and scenarios requires a deep understanding of available technologies, innovation in the sector that may produce new competing technologies, as well as current and future market dynamics. Sectoral ministry involvement is particularly important in evaluating the costs and benefits of real options and determining whether the additional investment will actually generate options to respond to the kinds of changes that may come up over the project lifecycle.

The move from public sector provision of infrastructure and services, with its ability to adjust to new circumstances unilaterally within an agency, to partnerships for which the trajectory of the project must be characterized from the beginning has been a stumbling point for PPPs in the past (Seddon and Mahalingam, 2013; Seddon and Singh, 2012). Designing flexibilities poses the additional requirement of evaluating multiple *trajectories*. To understand the extent to which, say, a multi-access ramp should be built or a limit on government guarantees should be specified will involve an understanding of the uncertainties present on the project, some amount of data on the probability space of future states and the use of stochastic modeling techniques such as Monte-Carlo simulations. Such non-deterministic techniques can be used to understand the expected present values of project cash flows under uncertainty and thereby specify the kind of flexibilities that are likely to create value in this case.

The availability of independent experts for assessing flexibilities and serving on renegotiation committees may also be a constraint on implementing flexibilities in some sectors. Regulatory bodies already face challenges in finding individuals with sufficient and current industry expertise but without links to industry that may create actual or perceived conflicts of interest. There are few detailed studies of regulatory staffing in India, but those that do exist<sup>9</sup> find that regulators depend heavily on retired IAS officers, staff deputed from public sector incumbents, and consultants for expertise. In other cases, regulatory bodies appear to be staffed to ensure independence at the cost of expertise (e.g. by eminent persons outside of the sector). Similarly, NTDP (2014) emphasizes the limited availability of transport expertise in India, potentially affecting the sector that has been one of the largest areas for PPPs in the past and potentially in the future. Expertise in project and financial restructuring also appears to be in short supply.<sup>10</sup>

In the absence of individual neutral experts, it will be important to structure the renegotiation process to limit appearance of arbitrary influence. One possibility is to ensure diverse representation within committees and require a supermajority or unanimity for decisions. It may also make sense to set up renegotiation processes more like courts to allow for competing representation of facts from parties with known divergent interests rather than assume that a single group will find and weigh all relevant information.<sup>11</sup>

In this setting, it will be important to consider other ways of obtaining expertise and ensuring as well as demonstrating its independence. Learning by doing, starting by implementing flexibilities in smaller projects that are part of a larger class of similar infrastructure investments, is one

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<sup>9</sup> Dubash and Rao (2008) in electricity, echoed by Pollit and Stern (2011)'s comparative study; Thiruvengadam and Joshi (2012) on telecommunication.

<sup>10</sup> Figures from Nair (2015). "Turnaround specialists helping banks revive stressed assets," *Mint* August 12, 2015. Available at <http://www.livemint.com/Companies/Tc2if25ooRt8loQ4gCX2RL/Turnaround-specialists-helping-banks-revive-stressed-assets.html> [Accessed 12/08/2015]

<sup>11</sup> Dewatripont and Tirole (1999) outline the circumstances in which competing advocates lead to greater information revelation than disinterested fact-finders.

approach. The smaller size reduces the financial and other impacts of mistakes in flexibilities, while the existence of a larger class of projects allows for controlled comparison of outcomes between projects that have flexibilities embedded in them and those that do not. Roads concessions are one area where experimentation is already effectively happening through variation in state approaches. Flexibilities for larger marquee projects should refer to international experience and, if possible, seek advice from individuals involved in structuring and reviewing those particular projects to assess the transferability of lessons to the Indian context.

Finally, flexibilities can be challenging to initiate in a polarized climate in which all decisions are under scrutiny by domestic and international actors that seize on any hint of favoritism toward private interests on the one hand, or arbitrary state intervention on the other. The dangers that scrutiny pose for flexibility and discretion are well documented across various policy domains from innovation policy (Breznitz & Ornston, 2013) to infrastructure (Harris, 2003). MCAs and other forms of established, sanctioned, routines for decision-making and allocation of Adjustabilities and real options could be important for establishing legitimacy, subject to the costs and limitations outlined above.

As highlighted earlier, given the complexity in identifying and implementing flexibilities, capacity building is a necessary prerequisite. Several capacity building programs on PPPs have been undertaken over the years, particularly in the public sector. While the content has ranged from providing a general understanding appreciation of PPPs to discussions on potential risks and risk mitigating strategies, the pedagogy has been largely experiential and qualitative in nature. In order to build capacity on working with flexibilities, participants need to be exposed to quantitative tools, the use of spreadsheets for project evaluations, developing Monte Carlo simulations and working with mathematical models that treat uncertainty<sup>12</sup>. The pedagogical approach must also involve exercises and assessments in addition to instruction to ensure that these complex concepts are learnt and not merely taught. In other words, the focus of such training programs should go beyond providing participants from the public sector with an appreciation of flexibility, to developing skills that allow them to model flexibilities themselves, and thereby provide innovative suggestions to models developed by other stakeholders.

Organizations such as the LBS National Academy of Administration that conduct regular training programs for officers in the Indian government, as well as departments and ministries such as the Ministry of Finance, and the Department of Personnel Training that organize programs related to PPPs should consider including these topics among their core modules. While some amount of external assistance may initially be required, the capacity to teach these topics can be easily inbuilt. At levels of government where there be a lack of capacity in understanding mathematical

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<sup>12</sup> Considerable teaching material on this topic already exists – MIT for instance has a website – <http://ardent.mit.edu> with excellent teaching material that can be easily adapted.



concepts, departments may identify personnel with the capability to engage in mathematical modeling to engage in focused training programs. Finally, it is also imperative that the private sector be formally exposed to flexibility modeling techniques and that such tools and methods are also taught in business schools and in institutes of national importance such as the IITs. Crossover from these institutes into government services will enhance capacity within government to quantitatively engage with flexibilities.

*Key Issue: Use of Model Contracts/Standardization*

Model Concession Agreements (MCAs) can be used to standardize a menu of flexibilities for PPP design. They could be used to guide the inclusion and assignment of Adjustabilities, for example, for classes of projects that are relatively similar and involve similar opportunities for both private and public partners to hedge the risks that they are assigned. Risks created by adjustabilities based on wider market changes (e.g. in fuel price, exchange rate) will affect all projects in a sector in similar ways. Public and private capacities to hedge against these changes is also likely to be uniform across projects – private firms will all have access to the same kinds of financial hedges, while public partners will have similar administrative and financial opportunities to handle changes in the transaction terms. Adjustabilities that are based on revelation of demand are also amenable to standardization. The extent of uncertainty about demand may vary from project to project with the quality of information available but the implications of unexpected demand outcomes for the project economics are likely to be similar across projects delivering particular types of infrastructure. The criteria for assigning adjustabilities to public or private parties could also be standardized in a checklist format. Project evaluation could, for example, include assessment of degree of control the party has over maintaining profits in the face of new context, access to financial hedging, degree of private information each party has to anticipate risk.

It may also be useful to standardize a menu of active Real Options for technologies where the costs and benefits of modularization are well understood and unlikely to vary significantly across project settings. The benefit-cost case for the use of the Real Option, however, would have to be evaluated on a project-specific basis, since the value of the initial investment in keeping options open depends on the likelihood that a course correction will be desirable. The option to add additional stories to a parking garage, for example, might be valuable in a setting with uncertainty about future demand, but not worthwhile in a setting for which demand is relatively predictable. The cost-benefit assessment could also be routinized for project evaluation through development of new risk assessment tools.

Renegotiation processes such as the protocol for selecting negotiators and experts, the time frame, and the ground rules for dialogue are particularly important to standardize at least at the state level if not nationally. Renegotiations will inevitably involve some discretionary decision-making that will reallocate value between the public and private sector and come under scrutiny.

Close adherence to a common process will help insulate participants from accusations of favoritism. It will also increase the likelihood that the renegotiation processes are viewed as credible and neutral and thus unlikely to contribute to adverse selection. The boundaries for renegotiation – the parts of the contract that are up for renegotiation and those that are not – may require more customization if the projects face idiosyncratic risks.

Table 2 summarizes some of the pros and cons of using standardized contracts across projects.

**Table 2: Pros and Cons of Model Contracts**

	Pros	Cons
Standardization	Reduces capacity required – guidelines substitute for individuals’ expertise. Standard Operating Procedures can be source of legitimacy	Creates correlated failures across portfolio of projects – if standard design is faulty, all projects fail together.
Customization	Allows for experimentation Diverse set of arrangement reduces risk	Can appear arbitrary and be mistaken for special deals

The menus of “model flexibilities” and risk assessment tools, however, would need to be thoroughly evaluated before using them for large-scale PPP programs. Standardization across projects creates the risk of a portfolio that is too big to fail – as can be seen with the use of MCAs in the roads sector in the past. Dachs (2014) notes that,

“The Model Concession Agreement has a very aggressive risk profile in terms of transfer of risks, especially demand risk. This perception of risk transfer is problematic because the risks simply become disputes when they materialize. When combined with the aggressive bidding referred to above, they also seem to have rolled up into system-wide problems, where the government may be forced to resolve or unwind contracts with some form of bail-out rather than see a number of projects fail with significant losses to lenders.” (p. 14-15)

In order to understand the types of flexibilities, particularly Real Options that may be available to projects, it may be pertinent to first think of organizing a series of sector-specific roundtable discussions involving experts with in-depth technical, legal and managerial knowledge in the domain of PPPs, to deliberate upon the kinds of flexibilities and options that may be available in each sector. As a second step, these candidate flexibilities could be prioritized based on the ease with which they can be defined and exercised, as well as the potential impacts that they can have on a project. For instance, designing modular desalination plants that allow for ongoing membrane

replacement is likely to be a flexibility that is easy to implement, and yet creates high value. On the other hand, acquiring excess land to allow a private developer to expand the number of lanes on a road project might be a far more difficult flexibility to include within a project, given the challenges that India currently faces with regards to land acquisition. Such categorization of flexibilities could serve as a 'first-pass' to creating a list of potential flexibilities that can be considered on projects.

Beyond this however, it is important to note that project-specific discussions need to be undertaken in order to decide which flexibilities will be included in the project, and whether the range of variability in the particular case qualifies these flexibilities to be modeled as adjustments, options or negotiated settlements. These discussions also need to be quantitative in nature, where combinations of flexibilities are modeled and their impacts simulated on the financial model of the project, in order to understand the benefits of the flexibility relative to its costs. It is also imperative that a wide variety of stakeholders – government representatives, financiers, sponsors, consultants etc be present at these discussions to ensure that a wide variety of ideas are generated.

## **5. Conclusion: Making Flexibilities Work in India**

Indian PPP contracts have evolved over time in the way that they have allocated risks, rights, and responsibilities across public and private sectors. The public sector absorbed much of the risk in early contracts in order to attract early partners, but appears to have shifted to a more aggressive stance in the mid-2000s. Anecdotal evidence<sup>13</sup> across sectors suggests that not only did new contracts shift various risks back to the private party, but the terms of contracts also become more rigid and specific about what actions could be taken to respond to new information or changes in the operating environment. This shift may have been a response to perceptions that the private sector had been taking advantage the project structuring, or perhaps it reflected a new public sector confidence in its ability to demand performance and avoid liabilities. As Dachs (2014) notes, it could also have been a consequence of casual and widespread use of model documents. Whatever the reason for the shift, it has been accompanied by defaults, delays, and requests for open-ended renegotiation of projects as circumstances change and the original plans became unviable.

There are some signs that the pendulum is shifting back toward a more cooperative, flexible approach. We have mentioned the use of flexibilities, particularly Adjustabilities in recent times for national and state programmes. We have also heard great willingness to explore further opportunities for dialogue, cooperation, and creative solutions to recouping value from stalled

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<sup>13</sup> We have yet to see a systematic coding and analysis of risk-sharing and rigidity in contracts across sectors in India. We are seeking funding to undertake such an analysis but have not yet done so.

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projects, from public officials, corporate leaders, and financiers alike. Adversarial, off-contract negotiations benefit no one, least of all the households and businesses whose everyday opportunities and costs are affected by infrastructure bottlenecks. Many with whom we have interacted feel that their hands are tied by the current climate of distrust, in which cooperation can be mistaken for corruption.

With this paper, we hope to spark a more concrete discussion about a way out of this bind, a way to let the pendulum swing further toward more flexible PPPs that are not only more careful in allocating risks between parties but also open possibilities for constructive collaboration in updating the partnership as circumstances change. We hope that greater attention to learning from the kinds of flexibilities being implemented around the world and a concerted effort to formalize rules and procedures for including flexibilities will lead to a greater legitimacy for the use of (bounded) discretion.

Bringing flexibilities into India's PPPs will not be easy. The same challenges that have always affected PPPs – the need to plan ahead, in detail, for various scenarios; to anticipate and shape behavior; to understand the dynamics of the infrastructure project and industry; and to weigh the costs of ignorance and invest in information accordingly – affect PPPs with flexibilities. And it will not be fool-proof. Flexibilities can also open up even more possibilities for opportunistic behaviour and adverse incentives in PPPs. They are, in the end, an easing of pressure, an easing of the constraints designed in the beginning to keep public and private effort focused.

Nevertheless, flexibilities are essential for opening up the space for partnerships to adjust in the face of change and discovery, to limit losses and seize value from the kinds of projects that India needs to succeed in order to support its ongoing development. A critical analysis of potential flexibilities and ways by which they can be implemented is a necessary requirement for every PPP. Flexibilities are necessary.

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