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Management and financing of e-Government projects in India: Does financing strategy add value?



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Abstract How do managers structure e-government projects and address challenges of risks, lack of technical expertise, and mitigation of strategic error for preventing loss of investments? Our aim was to compare the traditional finance approach and the strategy-driven, innovative financing approaches under the PPP model, to examine their managerial value-addition. We found that e-government projects require a carefully crafted structuring strategy and that innovative financing is more suitable in facilitating flexible decision making, building core capabilities, managing and sharing project risks, providing funds needed for growth and innovation, and customising tailor-made project governance strategy. Based on our findings, we develop five theoretical propositions.

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Introduction

The adoption of information and communication technologies (ICT) in government over the last decade has grown significantly across the globe. The Global Information Technology Report (GITR) 2009–10 (World Economic Forum and INSEAD, 2010–2011)¹ has shown a positive relationship between global

competiveness and digital readiness, and has emphasised the positive relationship between per capita GDP with information technology (IT) readiness of the economy. Innovative application of ICT in government (e-Government) over the last decade has resulted in new solutions and ideas to address the complex challenges that governments face. These ICT-enabled solutions have helped governments to improve efficiency and transparency, reduce the high costs of delivery of public services, and improve government's reach to the under-served segments of society. Investments in e-Government projects across the globe are therefore growing significantly. The Lisbon Summit (2000) set the goal for making Europe the world's most competitive and dynamic knowledge-based economy. In 2003, the Russian Federation launched a federal budget of 1.43 billion rubles for financing the e-Russia

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¹ Global Information Technology Report, World Economic Forum, IMF (GITR, 2009–10).

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programme (Mimicopoulos, 2004). In Asia, Singapore has been leading in e-Government initiatives with its e-Government Action Plan I and II (eGAP I & II) to bring as many services online as possible.² In 2003, Singapore approved a US\$ 1.3 billion plan to upgrade its government services resulting in about 1600 public services being provided online. Similarly, the e-Taiwan project launched in China earmarked NT\$ 36.2 billion (US\$ 1.04 billion) for its e-Government initiative to build a fully computerised society. In future, it is expected that India and China will drive the growth in IT spending in the Asia Pacific region (Mimicopoulos, 2004).

However, as investments in e-Government projects are increasing across the globe, there are growing concerns on account of the large number of project failures, which has resulted in significant loss of major investments. The global experience shows that these investments have proved to be major challenges even in developed countries. According to the Standish Group Report (2009),³ "...32% of all projects succeeding ... delivered on time, on budget, with required features and functions". Similarly, as per Heeks (2001), one-fifth to one-quarter fall into the total failure category; one-third to three-fifths fall into the partial failure category; and only a minority falls into the success category. The large scale failure of these projects indicates fundamental management challenges in managing business and financial risks inherent in these large and complex projects.

In such a situation, the main concerns for e-Governance project managers are:

- a) How to take better investment decisions for large e-Government projects with complex and multi dimension risks so as to mitigate the risks of strategic error in preventing loss of investments
- b) How to improve the structuring of these projects so as to have an optimum mix of resources (including human, technical and financial) to maximise value derived from these investments, and
- c) How to access and secure continued project funding over a multiple year time-frame in an environment of increasing constraints on public resources.

Most of the e-Government projects across the globe (including India) adopt the traditional project financing approach where the entire project is funded through government budgetary resources and operated by the government. However, as public financial resources become scarce, other options need to be explored. Full privatisation or outsourcing of public services to the private sector is an option. This option can help in getting full project funding from the private sector service provider; however, control over the services provided, the tariff charged, and of assets moves into the hands of the private vendor which may not be in the interests of the public.

Another option of operating and funding large projects is the public-private partnership (PPP) model. The PPP Knowledge

Lab⁴ defines a PPP as "a long-term contract between a private party and governance entity, for providing a public asset or service, in which the private party bears significant risk and management responsibility, and remuneration is linked to performance". Public-private partnership models provide the flexibility of innovatively structuring financing of projects, which may involve complex transactions and arrangements. Governments across the world, including the Government of India, have policies to promote PPPs in the infrastructure sectors. In e-Government projects, the National e-Governance Plan (NeGP) approved in 2006 specified that the PPP model is to be adopted wherever feasible—mainly to enlarge the resource pool without compromising on the security aspects. These guidelines have been based on some initial successes experienced by PPPs in e-Government projects in India, mainly by state government projects, for example AP Online, the official portal of the Government of Andhra Pradesh, Kerala's community technology centres—Akshaya e-Kendras, Karnataka e-Procurement, and so on. However, PPP projects in India are still at their initial phase and it is not clear if PPP initiatives provide any real value add in addressing the challenges discussed above.

Does the source of financing (government/PPP) and the method of financing (traditional/structured) help in improving investment decision making, reducing risk, facilitating optimum structure of resources and solving the funding problem of e-Governance projects? This study explores this question and is based on an evaluation of four case studies (two with PPP approach and two with traditional financing) with the objective of examining the comparative sources of value-addition in the better management of e-Government projects, which are complex and risky, and to prevent loss of investments.

Literature review

The literature review was carried out to address three main questions through the existing body of management research and studies:

- a) What are the main objectives of and key drivers for implementing e-Government projects? Can investment and financing decisions help organisations in seeking these objectives?
- b) What are the main challenges, complexities, and constraints that make e-Government projects risky and prone to high levels of failure?
- c) Given the high risk-high return character of these projects, can a better approach to investment and financing decisions make a significant impact on the management of these complex and high risk projects?

In order to understand the main drivers and underlying objectives of implementing the e-Government concept, it is important to study the underlying theories of public sector management that aim to achieve effective governance or good governance. The viewpoint is in consonance with the public policy strategies promoted by the World Bank and other Bretton Wood institutions where "governance is basically

² "Singapore announces 1.3 bln sgd plan to boost e-government" The Edge Malaysia, July 7, 2003. http://www.europarl.europa.eu/summits/lis1_en.htm.

³ <https://www.projectsmart.co.uk/white-papers/chaos-report.pdf>.

⁴ <https://pppknowledgelab.org/guide/sections/1-introduction>.

perceived as a cooperative steering approach that should allow for participation, transparency, efficiency and responsibility, quite in accordance with rule-guided procedures in a well-established constitutional framework” (Grindle, 1997, p. 28). These views are also supported by new public management (NPM)—a new philosophy since the 1980s to revolutionise the public sector. The NPM approach encourages more market orientation in the public sector, greater cost-efficiency, focus on outcomes, improved outputs, and improved efficiency through improved management of public resources (Hood, 1991). e-Government initiatives have therefore slowly gained significance as important aspects of the national development strategies in both the developed and the developing world.

In India many e-Government initiatives have successfully improved public services such as access to land titles, certificates, social pensions, and so on. For example, a marked improvement in time efficiency in land registration in Andhra Pradesh (Bikshapathi, Rama Raju, & Bhatnagar, 2006) and obtaining land titles in Karnataka (Bhatnagar & Chawla, 2007) has been noted. Central government projects such as MCA21 from the Ministry of Corporate Affairs (MCA)⁵ has enabled 100% electronic filing, electronic payment mechanisms, use of digital signature certificates for all transactions, delivery of more than 90% of services by MCA offices within the charter defined by the Ministry, significant increase in rate of compliance i.e. more than 90% of e-filing being done by stakeholders (as against the target of 25%), total transparency for service delivery, more than 40% electronic on-line payments, and very high level of stakeholder satisfaction. Projects like Aadhaar for Citizen e-ID, Passport Sewa, MyGov, e-Office, e-District etc. are central government initiatives that have been successfully implemented across India. Similarly projects in transport and driving license, eSewa in AP, e-Gram in Gujarat, eMitra in Rajasthan, Friends in Kerala, Lokvani in UP, Bhoomi for Land Records in Karnataka, Mobile Sewa and many other projects have been successfully implemented in states across the country.

The second question relates to the main challenges, complexities, and constraints inherent in these projects. e-Government projects are not mere technology adoption projects; they involve challenges that relate to organisational transformation i.e. significant process re-engineering and organisational change management that result in new ways of working for the implementing organisations. Inadequate understanding of the risks and complexities involved in these projects has resulted in failure of hundreds of projects across the country. Some experts have referred to the India experience as the graveyard of e-Governance pilots,⁶ to refer to the situation where a large number of initial successes have failed to scale up or have not survived after initial years.

The review of management literature confirms the complex nature of these challenges as discussed below.

Asset related issues

Technical design and development

Many e-Government projects assume that the project is a “technical problem”. Research in this area confirms that adoption

of ICT in an organisation is an evolutionary process. In the management literature there are five main theories on technology adoption which aim to analyse and understand the dynamic nature of technology adoption—these are 1) Technology adoption model (TAM) developed by Davis (1989); 2) Theory of planned behaviour (TPB) from Ajzen (2011); 3) Unified theory of acceptance and use of technology (UTAUT) (Venkatesh, Morris, Davis, & Davis, 2003); 4) Theory of diffusion of innovation (DOI) (Rogers, 1995); and 5) Technology, organisation and environment framework (TOE) (Tornatzky & Fleischer, 1990). These theories bring out two main perspectives—the technology adoption life cycle and the key dimensions which impact the acceptance and adoption of new technologies. Boehm’s (1981) original waterfall model for IT systems development is the most widely accepted approach for information system development. It follows sequential steps starting with conceptualisation, followed by design, implementation, operations, and maintenance of the final system.

Information and communication technologies are one of the most fast changing technologies in the world. Most government agencies find it difficult to understand the latest changes in these technologies and are exposed to high risk of obsolescence of their IT assets. Upfront investments in IT assets expose projects to high level of risks due to delays in projects or obsolescence. These investments are sunk costs and cannot be reversed in the short term. Under the current tax rules and also due to high level of asset specificity, IT assets acquire a depreciated value of zero or close to zero within a few years. In order to meet these challenges, even the biggest multinationals prefer to outsource operations connected to IT solutions to specialised IT industry organisations. Most of the government agencies do not have the expertise or the experience to develop, operate and maintain these specialised systems. But in most of the projects, the government agencies take on the ownership as well as the responsibility to run and maintain these systems (Sapru & Sapru, 2014).

Organisation related challenges

Strong leadership and top management support is considered a critical success factor in project management (Young & Jordan, 2008). Wastell (1999) notes that information systems development (ISD) is a process of organisational change in which IT systems are designed and deployed to enable more effective operational practices. One of the major criticisms of the traditional theoretical models is their over-simplification of real-world constructs (Kaplan, 1964). The STOPE model (Bakry, 2004) recognises strategy, technology, organisations, people, and environment as the core constituents for ICT system implementations. Pardo and Scholl (2002) have built in two additional dimensions outside of the STOPE framework: operational and services. They warn that not addressing these essentials can result in “shortcuts to failure”. The use of ICTs in an organisation presents challenges relating to development and implementation of the new technology-enabled systems. Managing the technical risks and organisational challenges requires expert core capabilities within the organisation. Most government agencies do not have in-house capability and experience to manage these multiple dimensions and associated risks, and these capabilities cannot be created overnight in any organisation (Sapru & Sapru, 2014).

⁵ Source: The Department of Information Technology, Ministry of Communications and Information Technology, Government of India.

⁶ http://arc.gov.in/11threp/ARC_11thReport_Ch5.pdf.

Table 1 Challenges in managing e-Government projects.

ICT asset management	Organisation management	Process management
Technical risks	Strategic leadership	Procurement management
Asset ownership and management	Change management	Economic evaluation
Operations and maintenance	Technical project management and overall governance	Risk management

This may explain why large scale failures of IT projects have been a chronic problem.

Process related challenges

Risks in e-Governance projects are complex and multi-dimensional. Risk management and mitigation is therefore one of the most critical requirements for e-Government projects. Many governments have recognised this and provided policy and standards for risk assessment of strategic risk, financial risk, project management risk, technology risk, change management, and operational risk. Although risks in e-Government projects are recognised, most government agencies are unable to address these as they do not have the capability and experience to manage these risks. New technologies and innovations in services require improvement of skills and professionalism of the work force, collaborative interaction with customers, suppliers, and so on. The big-bang approach to technology implementation without building organisational capability and technical maturity within the organisations may prove to be a costly mistake. It is therefore important for the management to recognise the technology gaps and capability gaps and invest in both to acquire and improve upon the existing technology levels within the organisation.

e-Government projects are driven by public policy objectives and therefore cannot be evaluated only on financial criteria like revenues, cost savings, net present value (NPV) etc. However, the new public management literature argues that the scale and nature of problems in public services delivery has moved beyond the situation where the challenge can be addressed only through focus on policies and internal administrative rules. Historically, most of the e-governance projects were approved based on perception and anecdotal evidence of use of IT for better services, improved efficiency, and increased transparency. However, Gol (through Indian Institute of Management, Ahmedabad (IIMA) and the National Institute of Smart Governance) has developed the e-Governance Assessment Framework (EAF) with the specific objective to evaluate the critical aspects of these projects. The EAF has identified five main assessment attribute classes, these being service orientation, technology, sustainability, cost effectiveness, and replicability. Table 1 summarises the managerial challenges of e-Government projects.

The management challenge—Project structuring

The third question relates to the management challenge in structuring an e-Government project. In his ground breaking work *Strategy and Structure*, Chandler (1962) showed that a long-term coordinated strategy was necessary to give

structure, direction, and focus to an organisation, stating that “structure follows strategy”. Later Barney (1991) emphasised the use of strategy as assembling the optimum mix of resources, including human resources, technology, and suppliers, and then configuring them in unique and sustainable ways. Given their inherent complexities and the unique challenges of organisational transformation, e-Government projects require a suitable strategic approach that can support: a) better risk-management to address multiple and complex risks, b) better access to multiyear project finance over the project period, and c) assembling an optimum mix of resources (including technological, organisational, financial, and human resources), and configuring them in unique and sustainable ways to maximise the project’s value.

The project structuring challenge is directly related to the objective of value maximisation from the project investment. It is therefore important to identify the key sources of value addition and how these sources provide value addition in e-Government projects to the implementing agency. As per a study conducted by Mckinsey & Company and CIGREF (2009),⁷ use of ICT generates value at two complementary levels. The value in any e-Governance project is derived from:

- 1) Value from IT asset: The core ICT asset value includes tangible items such as hardware and software, as well as softer benefits such as the new processes and skills of the project implementing organisation.
- 2) Value in use: Is linked to the organisation’s core priorities, and capability to extract benefit from use of new ICT asset and technologies.

The value from the ICT asset is the amount invested in the capital asset and its depreciated cost over time. The value in use is derived from successful operation of the ICT asset, the efficiency and cost effectiveness of the operations, increased user and customer satisfaction, quality and reliability of services and products, increase in revenues/profits, financial/cost savings, improved use of resources, etc. The project structuring components as mentioned above i.e. risk management, optimum resource mix and access to finance, therefore require to be addressed carefully through an approach that strengthens both the sources of the project’s value-addition, namely i) high level of value from the ICT asset (good design, reliable hardware and software, compliance with industry standards etc.) and ii) high level of operations and maintenance of the ICT asset to deliver high quality, efficient, and cost effective electronic delivery of services. The project’s structuring approach therefore should help manage and strengthen the key components of

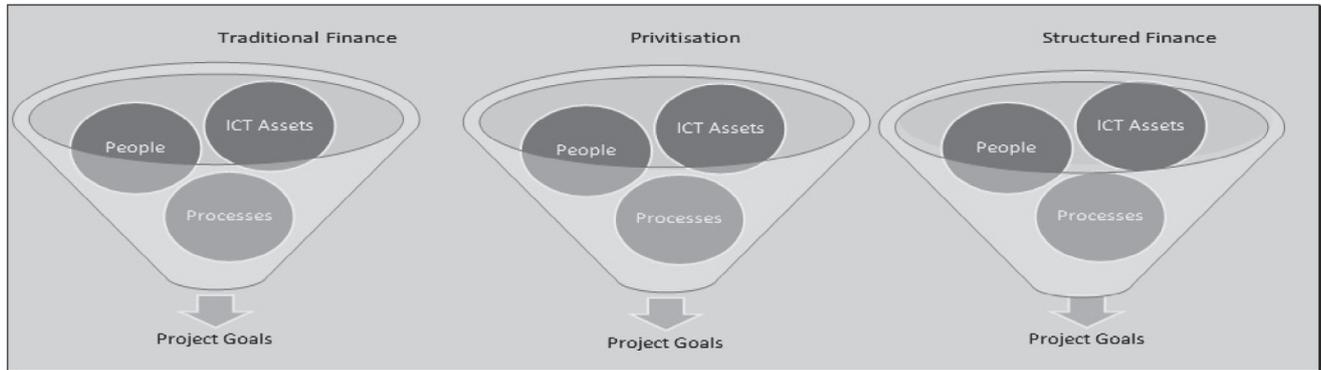
⁷ <http://www.mckinsey.com/business-functions/digital-mckinsey/our-insights/how-cios-should-think-about-business-value>.

risk management, optimum resource mix, and access to finance projects for the following: a) asset construction phase—to improve the value from the ICT asset, and b) operations and maintenance phase, to improve value in use.

Do alternative strategies result in different project structuring?

Review of the management literature shows that the three main challenges identified above—the ICT asset, the

organisational issues, and the key processes—are impacted differently under different financing approaches. In management literature, three main project financing approaches are available to project managers of e-Government projects—1) traditional financing, 2) privatisation and 3) PPP based financing approaches. Fig. 1 summarises the different ways in which the financing approaches change the structuring of the main components of an e-Government project i.e. the ICT asset, the organisation and its people, the process adopted in implementing the project, and operations of the project.



	Traditional financing	Privatisation*	PPP based financing
ICT Asset - Ownership - Technical risks - O&M	<ul style="list-style-type: none"> Asset owned by government Asset technical risk borne by government Asset operations and maintenance by government 	<ul style="list-style-type: none"> Asset owned by Private Company Technical risk borne by Private Partner Asset O&M by Private partner 	<ul style="list-style-type: none"> Asset owned by SPV or by Private Partner or shared Technical risk borne by SPV or Private Partner Asset O&M by SPV or Private partner
Organisation / People - Change Management - Strategic Leadership - Project Management	<ul style="list-style-type: none"> Government to address significant change management Government must provide overall strategic leadership Technical project management by government team 	<ul style="list-style-type: none"> Fully outsourced, limited change management in government Privatisation requires leadership at top level Technical project management is private partner’s responsibility 	<ul style="list-style-type: none"> SPV supports the government agency in managing the change management SPV led ‘ joint governance models’ requires innovative partnership Technical project management by SPV and Private partner’s experts
Processes - Risk management - Project Evaluation - Procurement Management	<ul style="list-style-type: none"> Limited risk identification and management Economic evaluation mainly on public policy principles Traditional procurement approach based on government rules (least cost approach) 	<ul style="list-style-type: none"> In-depth risk management approach Market-based / profitability evaluation based on risk and returns Market based procurement approach <p>*Not preferred because of loss of control and accountability by government</p>	<ul style="list-style-type: none"> In-depth risk assessment from both private and public policy perspective Joint evaluation address both market as well public policy objectives Innovative procurement models / flexible approaches based on customized needs

Figure 1 Alternative financing strategies and their impact on project components.

Traditionally, large government projects in developing countries are often financed primarily through public sector resources (Benoit, 1996). India is no exception. Most of the e-Government projects in India have been financed using the traditional financing approach. In India the traditional approach under government budgetary financing is governed by the Ministry of Finance's General Finance Rules (GFR) of 1965 and revisions in 2005.⁸ The GFR provides for traditional approach to financial management using budgetary control process as a tool for overall financial planning and control. Funds availability, in general, is authorised by financial sanction and the budget lapses in a period of twelve months. The GFR also defines a clear set of rules for procurement of works, goods, and services. The GFR also defines the responsibilities for contract management powers of various authorities, the conditions under which such powers should be exercised, and the general procedure prescribed with regard to various classes of contracts and assurances of government property. The GFR's Rule 160 on transparency, competition, and fairness of the procurement process mandates that all government purchases should be made in a transparent, competitive, and fair manner, to secure best value for money. As per the clause (xiv) of Rule 160, the contract should be awarded to the lowest evaluated bidder who is eligible and qualified.

However, as the pressure on public finances has increased and the need for funds for infrastructure financing is moving beyond the government's resources, the Government of India is encouraging use of private sector funds using PPPs in infrastructure. This is in line with the global experience. Benoit (1996, p. 9) has also argued that "a varying array of financing techniques needs to be developed and exploited to mobilize the private capital resources required for large infrastructure and other projects in developing countries". The second option i.e. privatisation has been supported as an approach to increase efficiency, greater specialisation and for greater incentive to produce more goods and services so as to increase customer base and hence profits. The advantage from the consumers' perspective is that much needed infrastructure assets that are beyond the fiscal capability of governmental bodies can be created with private resources. Other benefits include improved quality, faster implementation, and greater flexibility to institute, discontinue or modify a service (Khalid, Raymond, & Moreland, 2013). A government agency would face pressures due to the lack of financing allocated under government's budget, political sensitivity, and conflicting interests. Therefore as an alternative, "privatisation" has been advocated as an approach to address infrastructure related challenges in several sectors like road, power, water utilities etc. However, e-Government projects often have multiple objectives and entail the additional requirement of generating the balance between a) allocative efficiency i.e. the allocation of public resources with equity and fairness; and b) productive efficiency i.e. adding value by improving the productive, or technical, efficiency. Studies have shown that "full privatisation" has not served this public policy function (Megginson & Netter, 2001; Vickers

& Yarrow, 1988). Our focus in this study is on public-private partnerships rather than on full privatisation.

The third financing approach presents a new set of options by the PPP based approaches that potentially may offer new partnership models and innovative financing methods. This approach offers well established financing tools for developing customised solutions for risk management, capital optimisation and creation of project specific governance structures. These approaches include PPPs, public finance initiatives (PFIs) and project finance (PF). The primary drivers of these innovative financing approaches have emerged from lack of financial resources and low levels of skills and capacity within government agencies. The main benefits that PPPs are expected to generate are on-time and on-budget delivery of infrastructure assets and cost savings over their life cycles. The theoretical literature on PPPs (e.g., Bentz, Grout, & Halonen, 2001; Hart, 1995, 2003) and practitioner's guides (Ghobadian, Galleary, O'Regan, & Viney, 2004; Grimsey & Lewis, 2004; Paul, 2003) see two main sources for value-addition: one is the bundling of responsibility for building and operating infrastructure assets and the other is private in lieu of public ownership of assets. Benington (2009) has argued that public value is not created by the public sector alone and has emphasised that the role of government is to harness the powers and resources of all three sectors (the state, the market and civil society) behind a common purpose and strategic priorities in the pursuit of public value goals.

The Gol has issued Guidelines for Financial Support for PPPs in Infrastructure (vide OMs No. 1/5/2005 dated Jan 2006). e-Governance projects however were not included in these guidelines. In the year 2006, Gol approved the National e-Governance Plan (NeGP)⁹ that specified that the PPP model may be adopted wherever feasible. The PPP guidelines are seen as special approaches with more flexibility, with a new set of rules and requirements, increased fiduciary oversight, and special approval mechanisms. Similarly, in the UK, special guidelines have been approved for PPP, PFI, and PF initiatives. It is an empirical question to find out if PPP based projects result in the stated benefits.

The Gol's PPP guidelines support innovative PPP based implementation structure, typically with the intent of systematic project development with funding support seeking private sector investment and management skills so that the sponsoring authority can structure performance based service delivery, while allowing the private sector to recover the investment with appropriate returns. For example, in case of greenfield projects, options such as build, own, operate, and transfer (BOOT), BOT and the variants, concession, or lease contracts are possible. The guidelines recognise and support all three types of projects: a) revenue generating commercial projects (concession/BOOT or its variants/lease contracts); b) efficiency enhancement/cost savings projects (management or service contracts, or engineering, procurement and construction (EPC) contracts with limited period performance based O&M contracts) and c) non-revenue generating projects with high economic returns (e.g. sewerage system) for project undertaken in PPP formats based on economic returns considerations.

⁸ http://finmin.nic.in/the_ministry/dept_expenditure/gfrs/GFR2005.pdf.

⁹ <http://meity.gov.in/divisions/national-e-governance-plan>.

However, the uptake of PPP projects in the e-Government sector in India has been slow and there have not been a large number of implementations. If the policy objectives are to seek private sector funds and management skills, then it is not clear if for projects where project-funding is fully available and therefore technical skills can be procured from the market, whether PPP approaches would really matter. Another argument in the management literature regarding these financing approaches is that they merely convert the current “investment burden” to a “contingent liability” in future (as under these projects the government has to provide a sovereign guarantee to the private investors).

This study is focussed on unravelling the role of financing strategy (via the government traditional funding vs. the innovative funding under the PPP model) as a strategic tool for assembling the optimum mix of resources, including human, technology, and suppliers, and then configuring them in unique and sustainable ways. The ensuing questions that this study aims to address are—Do alternative financing strategies only provide an alternative source of finance, skills and expertise? Or do they actually impact the key factors which define the success (or failure) of e-Government projects?

Method

Research design

This study is based on the case research approach. Yin (1981, 1984) has defined case study as a research strategy that focusses on understanding the current environment within a single case study setting. Yin has emphasised two key dimensions in case study research—embedded research and replication logic. Using the embedded design concept (Yin, 1984), this study aims to study a single case study at multiple levels for an in-depth analysis of key issues. Accordingly, we have examined the key dimensions at three stages of the project’s life cycle—i) planning phase, ii) construction phase, and iii) operations phase. This allows us to understand how the project financing strategies impact the key managerial dimensions at different stages of the project to affect its success (or failure).

The study also uses the “within-case analysis” and “paired case analysis” tools for strengthening replication logic for its findings, using multiple case analyses. For both the financing strategies studied (traditional finance and PPP based structured finance), two cases each (pairs) were selected to assess the reliability of findings from one with another using a similar pattern. The pairs studied for each approach were also compared with the other for a cross-case analysis to confirm/reject similarities between the two approaches. The multi-case analysis and multi-stage embedded design have added significant depth and rigour and have helped identify the multiple perspectives in understanding how value addition occurs under the two widely different approaches in the financing and structuring of these complexes, high risk technology adoption projects. Most of the e-Government projects are regarded as high risk-high return projects. Using financial management analytical tools the e-Government project manager should use a risk-adjusted rate for calculating the NPV for risky projects. Therefore, e-Government projects with their high risks are required to be evaluated and designed with more

care and flexibility to address their unique requirements. It is important to identify and understand the different types of risk and to study how these are addressed in project design under different financial structuring approaches studied through the selected case studies.

Data collection

A uniform and standard data collection methodology was adopted in each case which included a standard questionnaire, review of project documents (to confirm and complete gaps) and key staff interviews (three or four key personnel per project). The standard questionnaire developed was based on assessment of six key dimensions that were identified from the literature review (these included the STOPE model for technology and organisational risks; the “third wave of thinking”¹⁰ for value for money (vfm); core competency theory; risk management frameworks; PPP, PFI and PF frameworks). For each of these six dimensions, important factors were identified to prepare questions on the key issues and how they were addressed by the managers as they moved ahead on major decisions at each stage of the project. For each of the six dimensions these factors and issues were identified and suitable questions built into the questionnaire for keys aspects in each dimension. Before going into the specific questions, background information on the project was collected and a project profile was developed. This helped in understanding the context of the project and the key people who could provide the relevant information for further detailed interviews and analysis. The project write-ups were shared with the key official interviewed to confirm that data collected reflected correct facts and also to re-confirm our understanding of the key issues identified.

Data analysis

The first step in data analysis for this study was based on within-case analyses. Detailed case write-ups were prepared through the data collection exercise described above. This helped in putting together all the data/information collected from various sources in one standard format. Using these write-ups, tables were prepared for the paired case to identify any similarities and differences emerging within and across the two groups. The idea was to identify any clear patterns in decisions or solutions emerging under the projects. Tables and graphs advocated under case study methodology allowed us to understand the similarities in decisions and approaches that are driven by process, policy and constraints in a particular financing approach adopted. Some dimensions occurred across all the cases irrespective of the approach followed; for example technical complexity of the ICT solution, high level of risks, large state or nationwide implementation scope, and lack of in-house skills and expertise was a common thread across all the four projects. However, the main differences emerged in terms of how these challenges were addressed and constraints were removed/mitigated across the three life cycle phases (i.e. planning, construction

¹⁰ Alvin Toffler, *Previews & Premises: An Interview with the Author of Future Shock and The Third Wave*, Black Rose books, 1987, p. 50.

and operations). The management of these dimensions has been assessed based on a three point scale, that is, scores of 1 for satisfactory, 0.5 for partially satisfactory and 0 for unsatisfactory, during each of the three phases.

The key issue therefore is not the confirmation of the concepts and problems identified through literature review, but how these are resolved using innovative approaches. This study is not about proving any approach right or wrong, but to assess the fit, relevance and workability of the approach in the specific context of e-Government projects. Replication of similar patterns within the same paired group has helped us identify some additional dimensions emerging out of these case study findings, these being for example the incentives for innovation, increased flexibility/options in decision making, and leveraging alternative financing sources to scale up using a much smaller public fund base. To begin with, the case studies were undertaken based on six key dimensions identified from the existing management literature. However, emerging insights helped us to identify five additional dimensions from the case studies. The final case analysis is therefore based on 11 key dimensions—strategic, technical, organisational, asset ownership and control, risk management, economic, project management, procurement, growth, innovation, and real options.

Case studies¹¹

Two case studies each have been selected from traditional and innovative PPP financing approaches. The full privatisation option has not been considered as e-Government Projects primarily deal with delivery of public services to citizens, businesses, and other government agencies and therefore active involvement of the concerned government agency is critical.

The cases have been selected based on three main criteria : a) the project should have completed all the three key stages, i.e. project planning and development, project construction, and project operations and maintenance, to study the impact on the full life cycle of the project; b) the project should have commenced after 2006, when Gol formally approved the PPP approach under the NeGP programme; and finally c) the projects should be able to provide all the documents and information as required in the project questionnaire. Availability of project information and documents was one of the major limitations in this study and it would be useful to extend this study to a larger number of projects as they become available. However, selecting projects that have reached operations stage helped this study identify additional important features and their impact, e.g., impact of innovations and growth during operations phase and management options for project management as the project performance stabilises.

Case study 1: Computerisation of irrigation department

This case study is about a state-wide¹² computerisation project of the irrigation department (ID) and was part of a larger

comprehensive programme of reforms in the management of the state's water resources. The project has adopted traditional project financing approach using government budgetary funds. It has been under implementation over the last five years but has not yet been successfully completed. The potential benefits of the use of effective IT infrastructure were seen as: a) effectiveness in management of the state's water resources, b) better dissemination of inter- and intra-departmental information, and c) improved efficiency of administration, such as improved revenue collection.

The ID management was keen to tap the potential of IT for improving operational efficiency and its benefits to different stakeholders. However, no attempt was made to identify and quantify any targets, both financial and non-financial. The project experienced high levels of pressure and the internal political pressure resulted in including 26 sub-systems in the scope of its IT project. The project had an approved budget allocation for IT systems under the overall reforms initiative. The size and period of budget availability became the main drivers of project design and implementation approach. The objectives, benefits, and outcomes were not expressed in measurable terms and were used mainly as a justification for the investment decision.

The project's scope and complexity resulted in the need to address a wide range of services and procedures. With multiple stakeholders and pressure groups, the project experienced problems of continuously increasing scope. Within a very short time the IT project estimates went over-budget, increased in complexity and became unmanageable over time. The ID project managers decided that its requirements were unique and they would need to develop their own customised application software. The ID's systems required development of new software for 26 separate functional modules covering organisation wide requirements for the computerised information system. The consultants developed a very comprehensive and complex technical solution with integrated systems for all the functions of the ID.

Inadequate skills and knowledge limited the capacity of the ID management and staff to understand and implement such complex projects. Failure to recruit staff and develop expertise also contributed to lack of adequate capacity within the organisation. The computer training for staff continues to be unsatisfactory and there are issues in terms of quality and content of the training programme. Lack of senior management support created new issues and coordination challenges between many units as they failed to agree and implement new computer-enabled procedures and standards. The ID's administrative traditions, rules and processes are based on decade old rules and policies which have not been amended over the last 50 years.

The primary focus of the project team in the ID was on asset ownership and control. The IT assets were purchased upfront to ensure ownership and to demonstrate quick utilisation of budgetary allocations as an indicator of project progress. However, the ID team had neither the technical capacity nor the experience to operate and maintain these assets. The project acquired and installed highly expensive and state of the art technical equipment and infrastructure. But this could not be used as the application software to run these systems was not ready even after five years.

The financing structure of the entire project was based on traditional budget based sources of fund allocation. The total

¹¹ Four case studies were undertaken as part of this research study.

¹² Name of the Indian state not mentioned to maintain confidentiality.

cost estimated for the project was INR 1470 million (USD 30 million), including the capital expenditure of INR 1090 million (USD 22 million) and operational costs for two years estimated at INR 380 million (USD 8 million). The ID management believed that the benefits from IT were both tangible and intangible but it was not sure how to get a true fix on the "value" expected from this investment. The project was decided based on key problems which the IT system was expected to solve.

The ID decided to procure each component under the project as a separate procurement package. The technical complexity of IT procurement and the large number of procurement packages became a major problem for the project. The ID had limited internal capabilities and the procurement process had to be re-advertised and repeated several times in many procurement packages. Instead of focussing on project implementation requirements, the project team was fighting problems on the procurement front.

Technical project management was inadequate. The ID hired a reputed IT firm as project management consultant. The project management consultant reported to the ID project team that was headed by an irrigation engineer. The ID treated the project as a purely technical initiative to be planned and managed by technical officials/staff. There was a lack of fit in the IT consultant's reporting levels and the IT consultant was also not part of the overall steering committee that made major project decisions. The size and scope of the ID's computerisation project lends itself to very high levels of risk that range from inability to manage such a large IT project, inability to plan for and grasp the complexities involved in complex IT projects, lack of skill for experimentation with new emerging technologies, lack of IT skills within the organisation, lack of effective leadership, inability to manage external suppliers, and lack of involvement of end-users of the organisation. No analysis was undertaken to assess the risks related to operational risk, contractual risks for equipment and services, assessment of management capability, risks related to management of organisational change, and so on. This project was an exceptional case of failure and was not able to provide any value addition even after five years in the implementation phase.

Case study 2: Computerisation of public procurement¹³

This case study relates to the computerisation of public procurement (CPP) in the State of Karnataka (GoK) with the objective of supporting state wide reforms to achieve efficiency, cost effectiveness, and transparency in public procurement. These reforms were supported by a new legislation called the Karnataka Transparency in Public Procurement Act, 1999. The project also benefitted from the state's experience of many years and the lessons emerging from various e-Governance initiatives over the last decade, e.g. Bhoomi project for the computerisation of over 20 million land records and Khajane, the online treasury computerisation project. The e-procurement project of GoK, which supports the state

government's public reform programme, became operational in late 2007. It is a fully computerised system available round the clock.

Clear strategic direction and ownership from the top management helped address the goals, enhanced transparency, accountability, reliability and responsiveness in all government procurement activities. The traditional manual procurement methods resulted in large numbers of files, records and documents stored in isolation in many office locations, making it impossible to carry out a comparative study of contracted prices. Different procurement methodologies were followed in departments creating problems and complexities such as increased chance of errors, lack of transparency, reliance on individual discretion, unhealthy bidding environment, escalation of bid prices, and non-judicious selection of supplier. The total annual procurement by the State of Karnataka was in the range of INR 70,000 million (USD 1400 million) at the start of this project. Thus, procurement efficiency and effectiveness has strategic importance for economic growth and development of the state.

After the implementation of the project, the GoK has been able to achieve significant reduction (about 40%) in transaction time, unsuccessful bidders are getting their dues back, smaller bidders (for low value bids) are also participating, and all records of transactions are now maintained online. One of the main objectives of implementing the e-Procurement system was to eliminate bidders' cartels and to promote a healthy competitive bidding environment. The e-Procurement system supports national and international bidding wherein suppliers/contractors can bid from any corner of the world.

The project has a private partner and the project's financial structure is unique. The private partner has funded the entire project cost, both capital and operational, without any funding from the state government. The GoK established a dedicated team in the project cell from its own resources, but no upfront investments were made by the government for capital or operational expenditure. The private partner raised finance from the market on the strength of different sources of revenue which formed part of the innovative revenue model. In addition to making the full project investment, the private partner was responsible for customising the system to suit the requirements of the government and for maintaining the system for a period of five years.

The GoK project team identified the following main challenges right at the planning stage: a) complex set of requirements, b) lack of standardisation in processes and document formats, c) complex technical design, and d) organisational resistance. The e-Procurement system is large and complex with many modules/sub-systems which were required to be fully integrated and coordinated to ensure that they worked together as a single integrated system. Changing the attitude and mindset of the government officials proved to be the biggest obstacle. Senior government officials were deputed to oversee the implementation of e-Procurement. The GoK established an e-Procurement cell with well-qualified and experienced resources from the market. To address the training needs of government officials and suppliers, two dedicated training facilities were established and a total of 5000 government officials and 3500 suppliers were trained. A project specific governance structure was implemented with its own set of formal and informal processes for managing the new relationship. It was decided to document the structures agreed

¹³ Vikalpa, Volume 39, No. 4, October, 2014.

upon in a procedures manual. The project had support from the highest level within the state government.

The private partner is engaged on a build-own-operate (BOO) basis with transfer (BOOT) as an option. The project is an example of collaboration and resource sharing. The e-Procurement system is hosted in the GoK's State Data Centre and the private partner holds the rights to the intellectual property (IPR) of the standard software product. The state government is the owner of all the processes, applications, and components developed in pursuance of this specific project. The project team manages the PPP contract based on pre-defined service levels agreed upon in the service levels agreement (SLAs) decided upfront as part of the contract.

The e-procurement system has brought about the much-needed standardisation as more than 65 departments have adopted the new systems. The GoK has reported significant savings (ranging from 20 to 40%), reduced travel costs, convenience in submitting bids anywhere/anytime, and strict confidentiality of price bids submitted by various bidders. The e-Procurement system has eliminated bidder cartels, reduced procurement cycle time, facilitated a healthy competitive bidding environment, enhanced bidder participation and standardised procurement methodologies. The revenue based business model has benefitted significantly with impressive growth on two counts, i.e. firstly, the number of tenders has increased from 15 in 2007–08 to 4883 in 2009–10, and secondly, the value of the tenders handled through the system has increased from INR 430 million (USD 9 million) in 2007–08 to INR 192,220 million (USD 3880 million) in 2009–10. This required proactive planning by the private partner and the government to continuously upgrade the systems to meet the special requirements of the new agencies. The number of government departments has increased from 7 to 65 in the current year and the number of suppliers has grown from 130 to a total of 9533 until August 2010.

The project has implemented technical innovation through use of "virtualisation". During our discussions with the private partner, the technical team explained that—"in the traditional manner, the vertical scalability model was bound to consume multiple CPUs and would have ended up using at least 70 servers to get the same performance". The system currently uses eight servers in all. Virtualisation has added flexibility, ease of use, and scalability and helped in containing costs. Flexibility in decision-making has been built through a unique set of options in the project, which allows the management to decide to i) purchase the e-Procurement software for the sale price quoted by the partner, or ii) decide not to purchase the e-Procurement system. In addition, the GoK has built in the right to purchase the e-Procurement solution on an outright basis, at any time during the course of the agreement.

This case illustrates the management and structuring of a government project under the PPP model using private funds. The partnership seems to have ensured smooth sailing in spite of deep-rooted institutional challenges, far reaching legal and policy reforms, inadequacies in IT infrastructure, challenges in skill-enhancing and capacity building. The PPP initiative allowed development of a unique business model where the project assumed a financially independent and free-standing initiative on the strength of its own future revenues potential.

Case study 3: Computerisation of public works department

The third case study relates to the computerisation of the Public Works Department (PWD) in a smaller and lagging state¹⁴ in India. In this case the state government had planned for implementation of major reforms and investments in infrastructure to strengthen the state's road network. The project was aimed at development of computerised platform for management decisions thereby paving the way forward for new capabilities and management tools to achieve quantum improvement in the functioning of the state's PWD department. The main objective of the PWD's management was to enhance management capacities through improved information and informed decision-making and build efficient functional systems to drastically scale-up its capacity to take on new infrastructure projects and improve its performance. The PWD commissioner emphasised to his management team that computerising the PWD's functioning in a modern way would enable public works to be delivered in a most cost and time effective manner ensuring optimum utilisation of resources.

In terms of technical solution, the PWD management team decided to have a single common platform for the functioning of all field staff as well as headquarters (HQ) staff working on the same system. This required many functional areas to be covered and the computerised system needed to cater to the functional requirements of about 325 office locations with 3000 general users and over 1300 technical staff. In addition to the PWD's own functional modules, integration needs were identified with many other systems, e.g. the State's treasury, budget and HR systems. The project, therefore, required complex technical solution architecture. The scope of the proposed computerisation project lends itself to a number of risks including the management of such a complex project, the ability to plan and grasp the complex technology involved in such projects, lack of IT skills within the organisation, and the inability to manage technical vendors of software, hardware, and networking equipment.

Since the PWD had a limited in-house capacity to manage a complex IT project, the PWD management set up a project implementation cell within the PWD, staffed with external experts. Another important initiative was the business process re-engineering in the PWD department to ensure that the new computer based systems did not operate like manual systems, and inefficiencies in the manual systems could be identified and removed in the computerised systems, and redundant processes and steps could be eliminated to achieve higher efficiency and effectiveness. The PWD decided that training of PWD staff for creating internal capacity was a very important activity and the training programme included specialised training courses for different target groups, including user training, IT technical training, and advanced training for IT managers.

The project's financial structure is based on the traditional government budgetary funding for both capital and operational expenditure. The first phase of the project funding included only expenditure for setting up computer systems in 11 office locations and included costs for a central data centre, hardware and software modules for sub-systems for

¹⁴ Name of the state is not mentioned to maintain confidentiality.

project management, project accounting, resource management, roads information management system (RIMS) and roads maintenance system (RMS). It was planned that during Phase II of the project the rest of the divisional offices would be computerised exactly on the lines of the first phase implementation. The total project cost included the cost of the pilot phase of Rs 86 million (US\$ 1.8 million) and scale up costs were estimated at Rs 779 million (US\$ 17.32 million). As a risk mitigation strategy, initially, a pilot phase was implemented to ensure a proof of concept before investment in scale-up was made. The systems were to be designed with modular capabilities to scale up to a full-scale state level system in future, as required. No financial and organisational risk assessment was carried out. Risks arising from lack of internal technical capacity were addressed by hiring the best external experts from the market for the entire project period.

Post implementation of a successful pilot project, the PWD is "stuck in the middle" as it has no funds available for state wide roll out of the new systems. The pilot project has demonstrated that an efficient management information system has the potential to enhance the PWD's capacity and provide easy access to information to all the stakeholders, leading to increased efficiency and accountability. The PWD currently has two systems running in parallel (computerised systems in 12 pilot locations and the existing manual systems), and does not have the funding to renew the consultant contracts for continued technical support. The PWD management team has made requests for additional funds to support the scale-up of the project but the state government is unable to support the request due to its own financial situation. For the last four years, the PWD management team has failed to receive any budgetary support from the state government. This case, thus, underlines the serious constraints of the traditional financing approach.

Case study 4: Common service centres project

The common service centres (CSC) project is a strategic national initiative of Government of India to establish internet-enabled common service centres through which government services can be made available to citizens in rural and remote areas. Under the NeGP formulated by the GoI, the main vision is to provide government services in an integrated manner at the doorstep of the citizens at an affordable cost. The CSC project's main objective is to establish 100,000 rural kiosks across India. These service centres would be equipped with computers, printers and Internet connectivity with the aim of providing high quality and cost-effective government services.

Implementation of a nation-wide project of this size, scope, and complexity has significant challenges. The CSC project decided to use the PPP approach to bring together a partnership-based approach between the government, the private sector, and the social sector non-government agencies. The main objectives were to a) save the huge cost to the government by leveraging the government's limited funds, b) integrate scale to achieve efficiency and reduce cost of delivery of services, and c) harness the best practices and limited resources. By January 2012, the CSC project had established 97,159 centres across all states in the country. The project has the following three levels: national, state, and

village level. At the national level the CSC project is managed by the department of IT, at the second level is an entity termed the Service Centre Agency (SCA) that is the state level operator and at the village level, each SCA has appointed a Village Level Entrepreneur (VLE). The VLEs are independent entrepreneurs who are willing to invest and operate the centres.

The CSC project has developed a complex centralised deployment architecture. This technical solution adopted by the SCA ensures that it is able to undertake centralised infrastructure management and full control over all the CSCs under its control. The technical solution for CSCs is based on an overall integrated approach where the CSC in a village is connected with the main SCA in the state, which in turn has linkages with the relevant government agencies, corporates, and content providers at the back-end. This required a complex approach using a centralised portal which allows multiple services to be delivered through Internet-based transactions, multi-language support, transaction routing, payment gateway etc.

The financial structure of the CSC project is based on private investments for the establishment of 100,000 CSCs across the country and repayment of interest and returns on investments through revenues generated by the CSC project. The cost of capital for establishment of CSCs was financed from a mix of debt and equity. Under the PPP model for the project, the government supports the CSCs with a guaranteed minimum support of Rs 3300 per month for the initial three years of operations. Field study carried out by the [Department of Information Technology, Government of India \(2006\)](#) has shown that almost 46% of the CSC centres are open seven days a week. However, electricity supply remains a problem. Although 85% of the villages are electrified, the supply of electricity in villages is poor and irregular and many CSC have not invested in power backup. In terms of investments in assets, a CSC entrepreneur has invested in an average floor area of about 146 sq. ft., and in desktops, laptops and printers. Risks in the project have been systematically studied, identified, and managed. At the beginning of the project detailed studies were carried out by professional agencies to assess the demand for government (G2C) and other private sector services (B2C) in the rural areas. The studies identified the following six revenue streams: subscription services, government services for citizens, business services for citizens, business to business services, non-network revenues (photos, forms, documents, printing etc.), and training and vocational courses.

As the revenues from the six revenue streams increase, the surplus available for appropriation between the three agencies (namely VLE, SCA and SPV) is estimated to grow significantly. The appropriation of operating surplus was assumed to be shared between the VLE, SCA and SPV in the ratio of 55:40:5. The returns against these investments are at acceptable levels as the operating incomes can range from INR 3000 to INR 10,000 per month. Many services are being offered to citizens at their doorstep. As the services through CSCs increase, VLEs are likely to make higher incomes from the CSC business. The PPP model adopted for the project shows that the concept is correct and the project can develop financially viable e-services mechanisms.

The CSC project has not been able to achieve its full growth potential due to non-availability of G2C services. Government

agencies that are supposed to provide these services have not yet computerised their back-end systems and processes. Innovations are the key to the success of the CSC operations. The CSC concept is dependent on the VLE's entrepreneurial ability and acceptability in society. The PPP model to provide financial support to the government is quite innovative but has some limitations, namely it is input-based and not output based. Although the government support is termed as "minimum revenue guarantee support", it is not based on output delivered. This fails to provide any push to increase the number and types of additional services to be delivered by CSCs. Another flaw in the PPP model envisaged for the CSCs is ineffective sharing of roles and responsibilities.

In conclusion, the CSC's PPP approach looks promising provided corrective action is taken to improve the deficiencies of the business model. A recent study of the VLEs has confirmed that they are upbeat about the CSC scheme and over 90% of the VLEs are planning to expand their CSCs. The CSC project has shown that use of structured financing approach in e-Government projects has helped the government leverage on several objectives including raising finance from the market for large national level scale-up.

Analysis and discussion

The comparative analysis of the case studies brings out the strengths and drawbacks of the two main alternatives of financing (and managing) e-Government projects—traditional financing by the government and innovative financing under the PPP model. The findings from this analysis bring insights from two main perspectives

- 1) cross-case-analysis—overall differences between the two financial structuring approaches, and
- 2) within-case analysis within project phases/activities across the life cycle phases in e-Government projects (embedded design).

The cross-case-analysis shows how some of the main features and incentives are different under the two approaches. For example, the innovative financing under the PPP model has built-in incentives for growth and innovation for the IT solution provider which directly help the project to improve revenues and recover costs. However, these incentives are missing in the government traditional system of financing, where the IT solution provider is paid in full for the IT solution after construction is complete. Once he is paid in full, there are no incentives for new ideas and innovations in the operations phase as he is not involved or does not benefit from more effective and efficient operations.

The within-case analysis shows how the same phases and project activities are implemented differently under the two approaches. For example, common dimensions like top management commitment and leadership exist under both the approaches; however, under the traditional financing approach the level of commitment and support is reduced significantly after the initial stages. This happened due to several reasons—lack of funding allocation in later stages, or transfers of original "champions", or when large procurements were completed. As project fund allocations were reduced or when funds were already committed, the interest in implementing the contractual commitments was considerably low.

Our findings show that in the PPP based strategic financing of projects, the key dimensions for the project's success have been addressed more effectively showing much higher achievement in each of the 11 key dimensions. The financing strategy adopted was therefore important, as it had significant impact on strategic management, senior level commitment, and eventual success of the projects. The findings for Pair I—traditional financing cases (Table 2)—show that in this approach several dimensions like strategic focus and commitment, asset management, and project management performed well. As these projects were large and high risk, attention from the senior level ensured close strategic focus. The government rules ensure a high level of control over the procurement of inputs and also physical control over assets.

Table 2 Paired case analysis.

S. No.	Key features	Pair I: Traditional financing		Pair II: PPP based financing	
		Case 1	Case 3	Case 2	Case 4
1	Project leadership at top level	No	Partly	Yes	Yes
2	Technical upgrades for HW and SW	No	No	Yes	Yes
3	Sharing of technical and project risks	No	No	Yes	Yes
4	Technical innovations during project operations period	No	No	Yes	Yes
5	Upfront sunk investment	Yes	Yes	No	No
6	Payments for outputs only	No	No	Yes	Partly
7	Legal commitment for full project period	No	No	Yes	Yes
8	Tariff and revenues to support financial viability of the project (full/partly)	No	No	Yes	Yes
9	Payment for "outputs based" deliverables	No	No	Yes	Yes
10	Financial viability, project revenues, cash flows etc. planned upfront for full project period	No	No	Yes	Yes
11	Option "to buy or not to buy the assets" after project period	No	No	Yes	No
12	Project management by technical experts/professionals	No	Partly	Yes	Yes
13	Independent project governance structure	No	No	Yes	Yes

In both cases, due to lack of project management capacity, project management consultants were hired from the market. This ensured high level of project management in both the projects. However, major problems were encountered in technical procurement in the ID case study as the professional consultants were side-lined by the government staff on procurement issues.

Replication logic

The within-case analysis adopted as part of this study helped us identify the key features of each case individually through a detailed project questionnaire. The paired case analysis in Table 2 helped us identify the resemblance in features between the project cases with the same financing approaches. The key features emerging from the paired case study analysis result from the essential requirements of the concerned financial strategy option adopted. For example, Pair I projects (Figs. 2 and 3) that adopted the traditional financing approach had the following features: upfront sunk investments, ownership of hardware (HW) and software (SW) assets, contract management responsibilities of the implementing agencies, funds availability based on financial approval by budget year, and fiduciary rules based on GFR and procurement rules. It is important to note that under the traditional financing approach, the project managers are governed by a set of policies, rules and procedures under the financing strategy

adopted and therefore have little or limited flexibility to re-structure the project features even if they seek to make changes in the project design.

On the other hand, projects under the PPP based strategic financing approach (Figs. 4 and 5) ensured financial viability for the entire project period, involved contractual arrangements for sharing of technical and project risks, legal commitment for the entire project period, and developed new and independent governance structure as essential requirements of the project development guidelines. This analysis reveals that additional features i.e. technical innovation during the project period and upgrading the HW and SW by the IT vendor on its own decision would not take place in the government adopted traditional financing because the procurement of HW and SW was completed upfront. Similarly, the options to buy or not to buy the HW and SW later at the end of the project period were not possible under the government’s traditional financing option. In the PPP financing option this is possible because the transaction structuring allows flexibility for the IT service provider to own the assets and to be paid for according to SLA based services/outputs, and the innovations as well as upgraded assets to directly benefit the IT vendor/partner. It is important to note that these features are possible in the PPP option, but only in case these unique features are invoked as part of the project structuring at project development stage. For example, the e-Procurement case has incorporated this option in the project design; however, the CSC project has not opted to use this feature in their project.

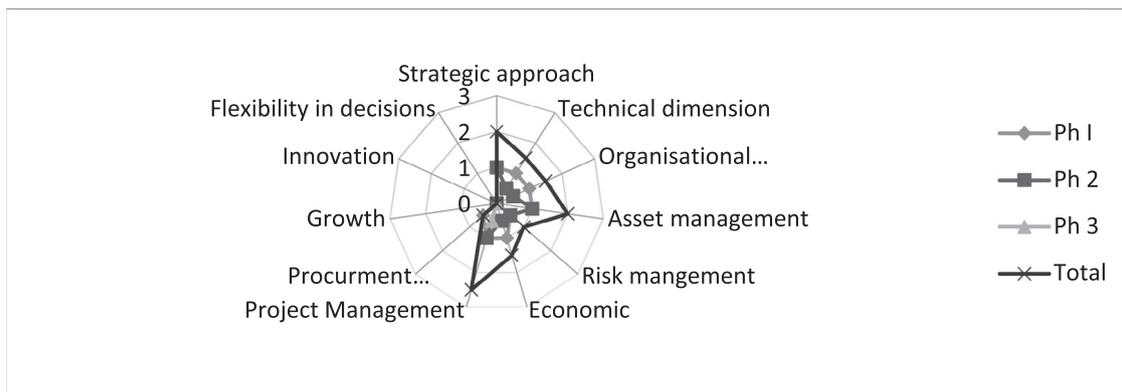


Figure 2 ID case study (Case 1–Government’s traditional financing).

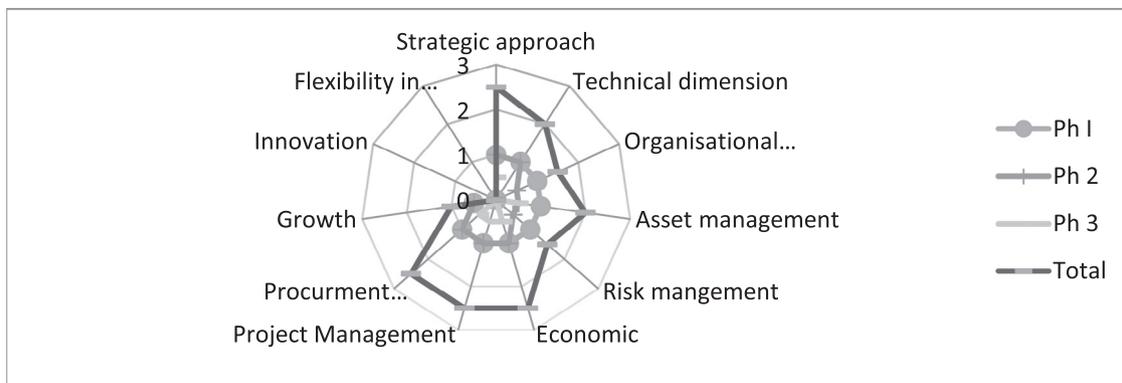


Figure 3 PWD case study (Case 3–Government’s traditional financing).

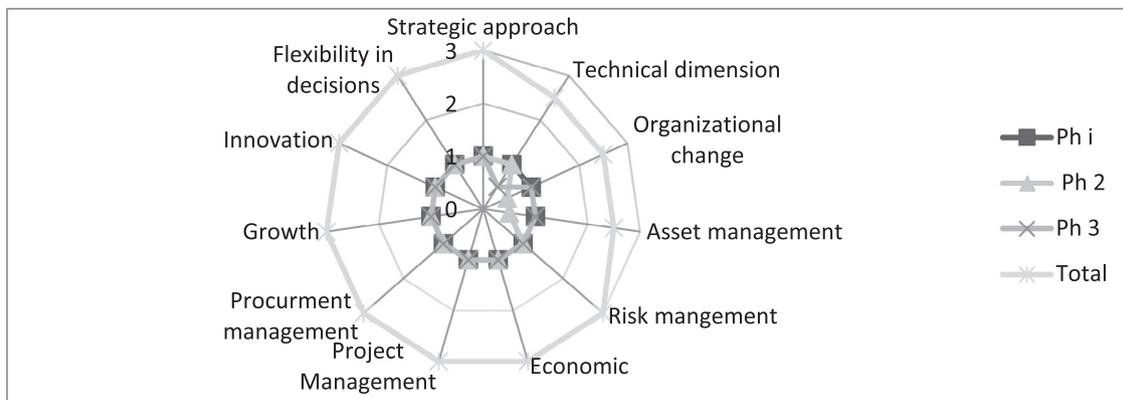


Figure 4 E-Procurement case study (Case 2—PPP innovative financing).

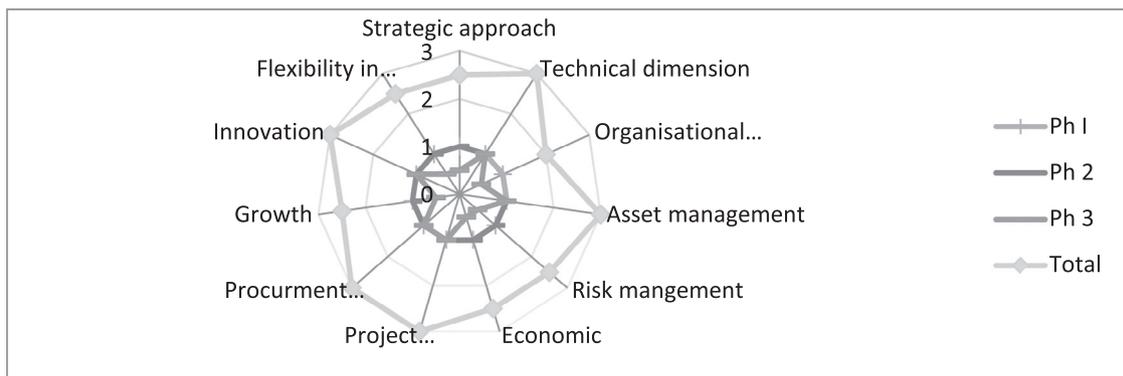


Figure 5 CSC case study (Case 4—PPP innovative financing).

We can, therefore, argue that these rule based features will be replicated in other projects as these have to be complied with, as part of the policy and rules. In addition, the PPP based approach will provide optional flexibility based features for PPP projects and they will also have a higher chance of being replicated because they a) provide additional flexibility for project structuring to meet any special requirements, and b) contribute to underlying business interests of the private partner through growth, cost reduction, improved profitability, and so on.

Both cases however experienced serious challenges in managing the organisational change and risk management issues. The traditional approach focusses on procurement of inputs at the expense of addressing the issues of how the completed assets will be operated successfully without adequate technical skills and capabilities. The technical capabilities required are diverse and different at each stage of the project life cycle i.e. design, construction and operations. This capability and experience cannot be built overnight by any organisation. In both the projects, it was observed that the project teams continued fighting the complex technical procurement and design issues and therefore failed in focusing on issues relating to innovation and growth. Both projects allowed zero flexibility in decision making and were bound by complex contractual and technical problems. In both the projects, the entire risk of the project was borne by the government agency which had little prior experience of managing or operating such projects.

In Pair II, PPP approach based cases (Figs. 4 and 5), the key dimensions for assessment have been addressed more effectively, showing much higher achievement in each of the 11 key dimensions. The assessment of the e-Procurement project case study (Fig. 4) shows that all the 11 dimensions have been addressed fairly well. The technical project management by the private partners enabled the government agency to focus on issues of organisational change, training and capacity building. The focus on payment by deliverables/ outputs provides in-built incentives to growth by departments, by users, and by number of transactions. As the fees per transaction are fixed, the private partner has incentives to bring in innovations to improve efficiency and reduce costs both capital and operational. The joint project management model adopted in PPPs has helped both overall project management and technical project management issues. The risks in both the projects continue to be at high levels but have been managed well through risk-sharing and risk mitigation strategies devised jointly between the two partners. The flexibility in decision-making for the government agency reduced the risk of failed investments in both these projects.

Theoretical perspective and propositions

The analysis of the main findings from the case studies demonstrates that the financing strategy adopted was of critical importance, as it had significant impact on the strategic

management in terms of the success of the projects. The patterns that emerged from these strategies enabled us to draw inferences regarding the conditions for the success of e-Government projects. We derived four propositions from the inferences drawn from the analysis of the four case studies.

Proposition 1

Each e-Government project has unique requirements in terms of governance, risk management, and sharing of resources. A one size fits all approach cannot be successfully adopted in all the projects. Our Proposition 1 is as follows:

The PPP based financing approach, in contrast to the traditional financing approach, facilitates customised project structuring, and includes tailor-made governance model, risk management mechanism, and sharing of resources.

e-Government projects are complex technology adoption projects which require understanding of the technology issues as well as organisational changes. Both the PPP projects (CPP and CSC) created an independent project management structure that was specifically designed to manage the challenges relating to technology, policies, process, and human resource management, and to the governance needs of these projects. In both the cases, full time high-level officials were designated along with the team leader from the private sector IT solution provider, as members of the governance team. Both the parties worked together on basic principles of the partnership arrangement. In contrast to this approach, in the traditional financing cases (ID and PWD) a regular IT project committee was established with members from the implementing department, finance, and other government departments. The private sector IT solution provider reported to the committee and had little say in the decision-making process.

Strong leadership is one critical pattern required in all four cases, according to cross case analysis. In project management research, top management support is considered a critical success factor (Young & Jordan, 2008). However, in government departments, transfer of senior officials every three years creates serious challenges. In our case studies, all the projects had support from the highest levels within the government in the beginning. After some time, both the traditional financing projects (ID and PWD) gradually experienced loss of top-level support. This resulted from the lack of funding allocation in later stages, transfer of original champions of these projects, lack of top management interest after completion of large procurements, and lack of contractual/legal commitment binding the organisation. In contrast, under a PPP arrangement, both partners continued to have top level support mainly due to external investor pressures, funding pressures during the operational phase, sharing of large payments/revenues over operations phase, and continued contractual commitments over the project life.

In the traditional financing approach, both the case studies (ID and PWD) have shown that the risks are neither systematically identified nor managed adequately. However, in PPP based projects (CPP and CSC), risk identification and its management are the most critical aspects for ensuring the project's risk-adjusted returns. In traditional financing cases, we

observe that the project risk is borne entirely by the government agency, the total cost of the IT solution is paid upfront, and the responsibility for operations falls entirely on the implementing agency. All the four case studies confirm the existence of "technical complexity" and that the "risks are real" and that they cannot be eliminated. But they can be identified and managed effectively with the right technical expertise. The PPP based models help the government organisations acquire this technical expertise through partnerships and the risks can be shared with the private partner who has the right expertise and experience. For example, in the CPP project, the main principle was that *the risks should be allocated to the entity that is best suited to manage the same*. The sharing of risks was formally defined in the contract as it requires careful structuring. The case studies underline that the right skills required for these projects cannot be built overnight, they are high cost resources and even when acquired they can be difficult to retain.

The third aspect highlighted by the case studies is that the IT asset is complex, has high specificity, and experiences high level of obsolescence. These characteristics make these projects high-risk implementations. Therefore, excessive focus on procuring and owning these assets is counter-productive. Successful projects have shown that the real value from the e-Government project's assets is derived from their long term and effective use and not from their ownership. Under the CPP project, the systems are owned by the private partner but the e-Procurement software is hosted in the GoK's State Data Centre that is owned and administered by the Government of Karnataka. The PPP models help to structure projects where the government agency can have access to these assets, derive value from the assets, and have the "real option" to acquire them when it is most suitable for the project owners.

Proposition 2

Successful implementation of e-Government requires a transformed organisation which has adequate core capability for overall project management. Our Proposition 2 is as follows:

The PPP based financing approach, as compared to the traditional financing approach, is better suited for managing organisational change, building and enhancing managerial capacities, and technical capabilities.

The case studies have highlighted the most critical factors for success of e-Government projects, i.e., the ability of an organisation to change and to learn new skills. Many of the new skills required do not exist in the government agencies and the failure to build particular capabilities is the biggest problem in implementing the e-Government project. In the ID case, the project was not able to deliver staff training successfully and in the PWD case the training remained limited for the pilot locations only. Although in the e-Procurement case the private partner held multiple training programmes for staff in 65 departments and for 3500 suppliers. Similarly, in the CSC project, training was provided to staff in over 95,000 centres. Benefits from IT enabled systems will result only when the process re-engineering identifies old, redundant, and inefficient processes and designs new IT-enabled processes to improve efficiency, reduce errors, and ensure

faster processing and transfer of information for quicker and more efficient decisions.

The analysis shows that e-Government project management capacities do not exist within the organisation and that the critical capabilities cannot be outsourced fully. The biggest challenge for any government agency is to build these core capacities in-house. All the four case studies have opted for creation of a project management cell staffed through external professionals and experts as well as internal experienced staff. Both technical and management capabilities are required for addressing the internal integration requirements. Any organisation attempting to achieve these capabilities will be presented with serious challenges. Therefore, these projects require project management support throughout the project life cycle.

The case studies have shown that the e-Government projects have multiple procurement packages with highly technical requirements such as hardware, system software, databases, application software, storage, data centre, networking, specialised consultancies, and so on. These are specialised procurements for which the government agency normally does not have any in-house experience or expertise. The ID project experienced serious contractual defaults which demonstrate that the contractual arrangements work well as first line of defence, but they are incomplete to address the dozens of unspecified situations, unforeseen problems, limited asymmetric information and the many enforcement issues. All these challenges leave the government agencies vulnerable to agency conflicts and interpretation of legal documents.

Proposition 3

The successful implementation of e-Government projects requires provisions for incentives for innovation, cost savings and growth. Our Proposition 3 is as follows:

The PPP based financing approach, in comparison to the traditional financing approach, is more amenable to building incentives for innovations, cost effectiveness, and growth.

There is no incentive for the private partner to build innovations in projects under the traditional financing approach. In a PPP approach, the private partner is committed to provide the services agreed upon and the cost savings and additional revenues from the innovations benefit the private partner fully (or are shared). This provides the private partner with strong incentives to control the capital and operational costs and to improve the revenues of the systems through new ideas and innovations. In the CPP project, the private partner used "virtualisation" for added flexibility and scalability (by using 8 servers in place of at least 70 servers), resulting in huge cost savings.

The value from the e-Government projects is derived from "IT asset value" and from "value in use" (Bloch & Hoyos-Gomez, 2009). However, we find that in the projects adopting the government's traditional financing approach, the main focus is on the IT asset value. To make sense economically, the UK government has defined its policy on PPP initiatives and requires that a PPP has to generate a combination of allocative

efficiency and productive efficiency that is superior to traditional public provision. (HM Treasury, 2000). The project therefore must strive to complete successful asset construction and also its effective and efficient use. In PPP model based projects, this is supported through the transaction fee models. For example, as in the CPP project, two types of transaction fees are included: a) fixed fee per bid, and b) percentage of estimated contract value (ECV). Similarly in the CSC project, the payments by government are contingent on the achievement of agreed-upon service levels. The findings show that under a PPP project, the cash-flow pattern undergoes significant changes and most of the payments are made during the operational phase.

In PPPs, the improvement in efficiency is derived from three specific sources, namely: i) *specific ownership structure* of the assets; ii) *bundling* together of the construction and service provision, and iii) *sharing of risks and associated rewards* (Ghobadian et al., 2004). In our findings, both the PPP cases (CPP and CSC) established project specific governance structures, bundled the asset construction and operations responsibilities at least for the first few years, and have formally agreed to sharing arrangement of risks and returns from the project. The traditional financing approach tried to address the first aspect partially, but not the other two.

Another significant pattern in the PPP based approach relates to built-in incentives for growth. In these projects, growth is a primary objective where the private partner has to recover the project costs and his profits from transaction-based fees. In the traditional procurement approach, the capital cost and operational costs are incurred through budget resources, and there is no pressure or incentive for the IT supplier to push for growth. In the CPP project, e-Procurement started initially with only 7 departments, but by the end of year 2010, the system was operational in 63 state departments, the number of users of suppliers increased from an initial 130 to over 4800 in the first three years. Similarly, in the CSC project the centres have grown to 97,159 across the country, and over 46% are open seven days a week and the services being provided are growing steadily. In comparison, the ID systems failed to take off to stable operational stage and the PWD project remained at the pilot stage itself.

Proposition 4

The e-Government projects involve high investment costs and are unique and one project may differ significantly from another. Therefore, it is not possible to develop a standard structured approach for decision making. A flexible decision making structure is needed for the success of the e-Government projects.

The PPP based financing approach, as compared to the traditional financing approach, adds value to a project by creating options for certain investment decisions and risk management.

In the e-Procurement case study, we can see a unique source of value-addition through building "options" for government's decision-making in the PPP contract. Pandey (2009, p. 303) defines real options as "those strategic elements in the investment that help creating flexibility in operations, or

that have the potential of generating profitable opportunities in future". Real options provide discretion to take certain investment decisions, without any obligation, for a given price. Under the e-Procurement project, the government has the right to purchase or not to purchase option of application software and/or of the hardware from the private partner. Risks in a project relate to uncertain outcomes which have a direct effect either on the provision of the services (e.g. because the IT systems are not built on time), or the financial viability of the project (e.g. loss of revenue due to limited demand or increased costs). In either case the result is a loss or cost that has to be borne by someone and one of the main elements of innovative PPP model is to determine where this loss or cost will lie. The PPP arrangement helps shift (or at least share) this loss with the private partner who is better qualified and equipped to take on this risk.

Proposition 5

The PPP based financing transactions are, however, more costly when compared to the traditional financing approach, and the financial structuring requires professionals with expertise and experience in developing the legal and financial structures to augment the financial leverage, while managing the project risks and addressing other specific requirements of the project.

The PPP based financing approach, compared to the traditional financing approach, is more complex, requires a sustainable business model, needs high level experts, and involves significantly high transaction costs. It is therefore suitable for projects that meet these specific requirements.

Similar to the government's traditional financing approach, the PPP based approach may not be suitable under all circumstances. The application of the PPP model may require some basic pre-requisites, for example, existence of a sustainable business model and feasibility of clear segregation of responsibilities between the two partners. In the absence of a fully financially sustainable model, other variants like PFI may be used where the government steps in with funding to support the financial feasibility gap. The main objective therefore is not to apply a one size fits all approach but to carefully select the most suitable approach that is "fit for purpose". Therefore, mainstreaming of PPPs in e-Government projects would require professional expertise and would require a clear set of guidelines and processes that address the complexities in structuring and execution of PPPs, and provide detailed guidance on steps and best practices in implementing PPPs in e-government projects. The guidelines should also address the critical issues and challenges relating to policy and legal frameworks, procurement rules in government, issues in assessment of costs and benefits, specialised expertise, and additional transaction costs in implementing the PPP approach.

Conclusions

Our analysis has helped us answer the questions which we had raised in the beginning. Do the PPP approaches only provide

an alternative source of finance, skills and expertise, or do they actually impact the key factors which define the success (or failure) of e-Government projects? The analysis of the findings confirms that the financing strategy adopted in the project was of critical importance and in addition to the additional source of project funding and technical expertise, the PPP approach had a significant impact on strategic management and the success of the projects. Under Proposition 1, the PPP based approaches have helped develop customised structuring through project specific governance models, strategies for risk identification and risk-sharing. The second proposition emphasises the building of unique partnerships to build core capabilities required to make the organisational change and build capacities to successfully construct and operate these projects. Proposition 3 helps us address the challenges through building innovations for technical solutions, output based financing (using transaction fee based models), and adding additional sources of value from growth. Finally, Proposition 4 helps us to address the question relating to mitigation of strategic errors resulting in loss of investments through building "real options" in a project's decision-making. These options add to flexibility in making key decisions and provide managers the right to decide without taking on any obligation. And finally, the fifth proposition acknowledges that the innovative PPP led approaches are more complex, are based on the existence of a sustainable business model, require high level of expertise, and are more expensive to implement. Therefore these approaches may be suitable where the project meets these specific requirements.

This study underlines the importance of financial structuring to build a PPP model that provides flexibility to address the multiple dimensions and unique requirements of each individual project. The overall perspective setting out the research propositions, the main dimensions for the analysis, key findings and the resulting implications are presented in Fig. 6. The initial 11 dimensions evaluated have been re-grouped in 13 areas under 5 main areas. Asset management has two sub-components—asset ownership and asset's operation and maintenance, and the organisational area also has two important sub-components—core capabilities and change management. With this evaluation of 13 key features, the study brings out some exceptional value-additions which can be provided by the innovative PPP based approaches in successfully implementing e-Government projects. Projects adopting the traditional financing approach will experience higher levels of risks, inflexibilities in procurement and structuring of project, and lack of innovative options, and would therefore require exceptional expertise in project managers who could address all these challenges.

The main argument from this study against the traditional financing approach adopted in e-government projects is that it fails to take into consideration the project risks and revenues and their optimal allocation to support prudent investment decision-making. The traditional financing approach causes excessive risk taking by the government, as the risks are not shared with the technical service provider who is more qualified and experienced to manage the project risks. Even when these risks are identified and evaluated, the traditional financing approach provides little flexibility to build some of these critical components (partnerships, project specific governance models, real options, growth, innovation etc.) as the options to structure the project transaction are limited.

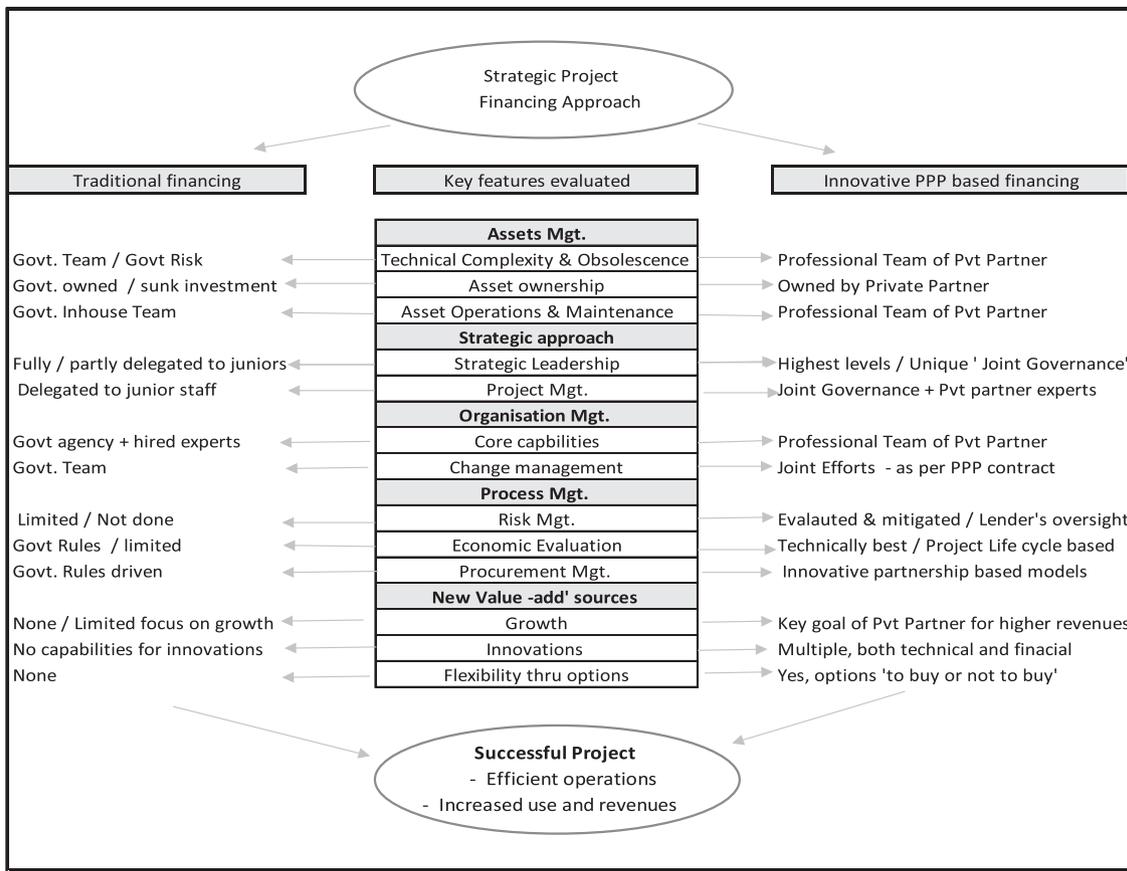


Figure 6 Overall perspective.

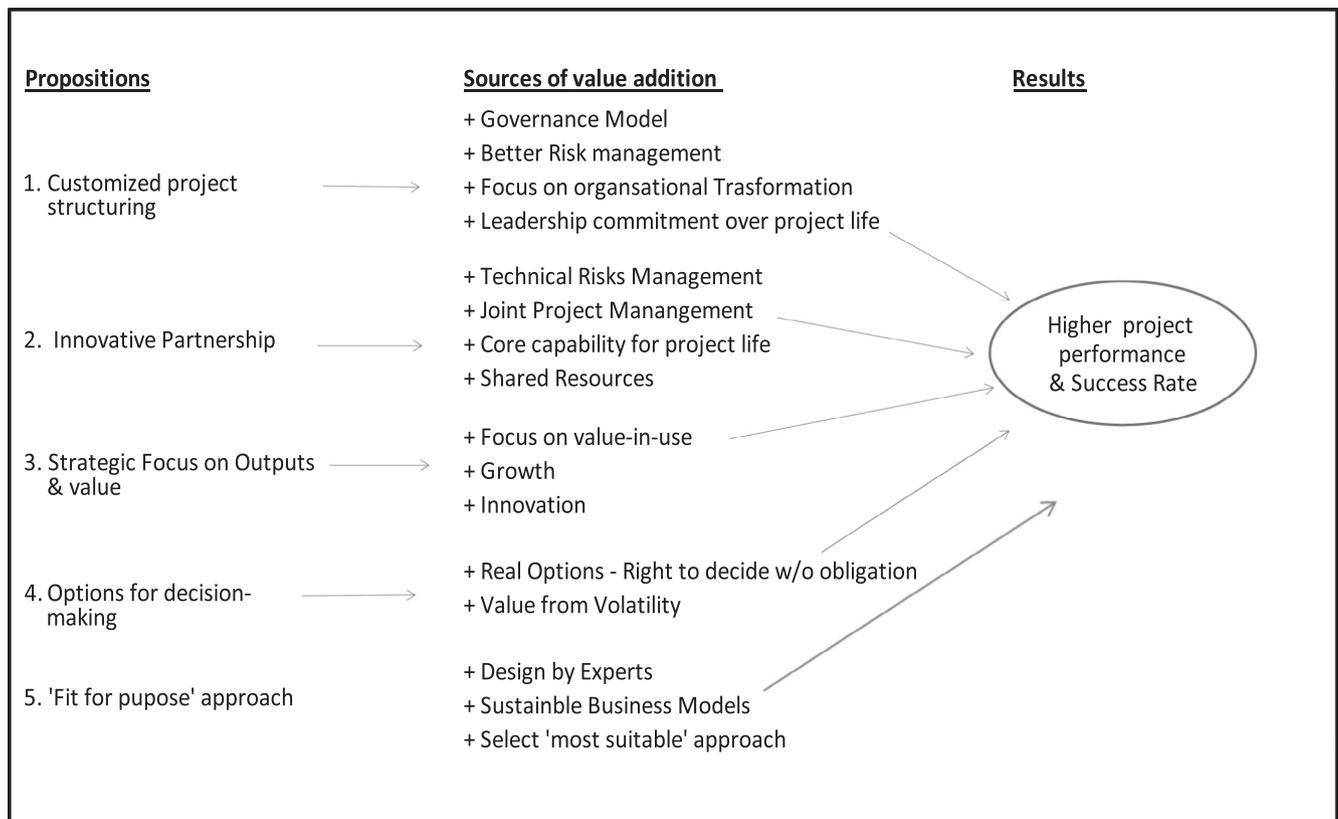


Figure 7 Propositions and sources of value-addition.

In the context of high risk and complex technology adoption projects, the PPP based innovative financing approach is considered more valuable than traditional financing.

Our analysis indicates that the PPP based approach helps build PPP models for e-Government projects and therefore has the potential to deliver significant real benefits from several sources of value addition. The key propositions and how they are supported by sources of value addition are summarised in Fig. 7. This research study has identified important insights on additional sources of value-addition from the PPP based approach from opportunities for growth, innovation, and options in decision-making in complex high-risk environments. However, not all e-Government projects would meet the requirements of using the PPP based approach e.g. business model, higher cost of project preparation, longer time for project preparation, cost and availability of financial structuring experts etc. The case studies also caution that many areas of real value-addition will be realised only where this important tool is handled with care using the right expertise.

It is recommended that the innovative PPP based financing may be considered a valuable approach in development and structuring e-Government projects in future. Based on this limited study, it may be too early to conclude that the PPP based approach is the preferred approach for e-Government projects in all cases. More research is required and both government agencies and private IT solution providers would need to share project data/information to enable further research. However, this study confirms the potential of the PPP based financing approach and its variants in designing financing strategies for e-Government projects.

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