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**An Analysis of Public-Private Partnerships in Infrastructure
of Provision of Public Goods through E-Governance in India**

Murali Patibandla

Professor of Strategy Area

Indian Institute of Management Bangalore

Bannerghatta Road, Bangalore – 5600 76

Ph: 080-26993039

muralip@iimb.ac.in

Rupal Sethi

Fellow Programme in Management (FPM) Student

Indian Institute of Management Bangalore

Bannerghatta Road, Bangalore – 5600 76

rupal.sethi14@iimb.ac.in

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Abstract

This article examines the public and private partnerships (PPPs) in investments in infrastructure of provision of public goods in India beset with institutional failures at several fronts. It draws insights from institutional (transaction costs) and information economics. The objective is to examine under what conditions PPPs succeed or fail. This article attempts to introduce (PPP) as a new form of governance structure that is efficient from the other structures in terms of contractual norms, transaction costs of uncertainty and asset specificity and information asymmetry through proper monitoring and incentive mechanism. Furthermore, we bring forth a few technological issues in applying transaction costs and information economics into the PPP model. We analyse the PPP model in the domain of ICT developmental projects carried out by the Indian government as e-governance.

Keywords- Public-Private Partnership, incomplete contracts, monitoring, incentives, information asymmetry and costs, e-governance

1. Introduction

India presents the case of largest number of Public and Private Partnerships (PPPs) both at the central and state government levels in providing infrastructure and public goods. According to the reports of Department of Economic Affairs, the Government of India, the four major sectors where PPP projects are allocated are Energy, Social and Commercial Infrastructure, Transport and Water Sanitation. The sector-wise distribution of number of total PPP projects in India as of 2015 is shown in Figure 1. Majority of the projects (69%) are in the transport sector comprising of airports, inland waterways, railways and roads. Rest of the sectors have nearly equal distribution of total projects.

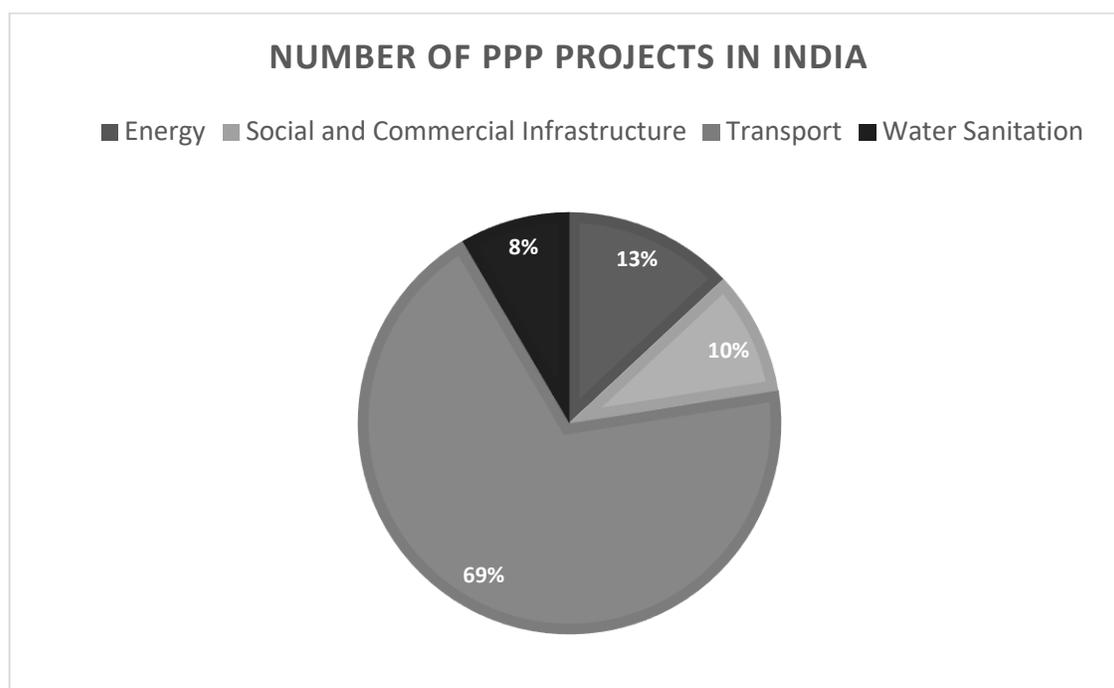


Figure 1: PPP projects distribution in India for FY 2015

The term “public-private partnership” is particularly malleable as a form of privatization. It is defined broadly as an arrangement in which a government and a private entity, for-profit or non-profit, jointly perform or undertake a traditionally public activity. It is defined narrowly as a complex relationship often involving at least one government unit and a consortium of private firms created to build large, capital intensive, long-lived public infrastructure such as highways,

airports, public buildings and water systems to undertake a major civic redevelopment projects. Private capital and management of the design, construction and long-term operation of the infrastructure is characteristic of such projects, along with eventual public ownership (Savas, 2000). The notion of good governance aims to increase accountability, professionalism and reliability in the delivery of public services (Kuriyan and Ray, 2009). As a part of good governance, reforms are being carried out for reengineering and privatization of state bureaucracies, decentralisation of power to citizen levels (Batterbury and Fernando, 2006) and introduction of managerial practices in governance (Clarke and Newman, 2008). One of the viable practices to promote good governance is PPP model that proposes to increase efficiency and responsiveness in delivery of government services (Lewis, 2000).

The PPPs take several organizational forms between the government and private party, such as User-Fee Based Build-Operate-Transfer models, Annuity Based Build-Operate-Transfer models, Performance Based Management/ Maintenance Contracts and Modified Design-Build contracts. The need and objectives for PPPs could be that government desires to tap into private investment, spread the risks over multiple partners in investments of high fixed and sunk cost intensive sectors and tap into organizational and technological efficiency of private sector and to reduce moral hazard behaviour of public agents. Furthermore, in sectors where there are externalities both in static and dynamic nature, government may intervene and get into partnership with private players for undertaking the investment. In some cases, the government provides public goods with tax payers' money: free of costs such as provision of ration cards, primary education, mid-day meals to school children. In some cases, the government subsidizes the prices for the poor. The examples are provision of cooking gas cylinders, electricity and water, etc.

In public sector, the usual trend is to hire multiple agents for fulfilling the tasks. One agent would build the infrastructure while the other agent would deliver the public good or services. This is referred to as the traditional procurement model (Hoppe and Schmitz, 2013). In order to incorporate innovation in the building of the infrastructure process, the cost of the second phase of delivery might shrink as the total cost of the project by the government is fixed. This might lead to poor incentive structure for the agents resulting in bad quality work at both the stages and no scope of innovation of the public good for future. For governments to necessitate the innovation

of technologies in projects, another alternative of delegation of public services by the governments to private agents is introduced in terms of public-private partnerships. In Public-Private Partnerships building and service provision are bundled; that is the government agency contracts with a single party (a consortium) to build the infrastructure and to operate it (Hart, 2003). This setting is beneficial for both the principal as well as the agent in terms of seeking proper incentivisation and innovation in the project catering to the interests of both the parties. The differences between contracting out and partnership contracts is given in Table 1.

S.No.	Contracting Out	Partnership Contracts
1.	Government and private company are in principal-agent relationship	Government and private company are involved in joint decision making and production
2.	Government defines problem, specifies solution and selects company to deliver the service	Both parties develop joint products that contribute to their interests
3.	Contractual transparency includes rules for tenders, bidding, service provision, inspection and monitoring	Relational transparency includes building trust to align interest goals and decrease opportunism

Table 1: Differences between contracting out and partnership contracts

The PPP model also fits in the principal-agent framework (**Jensen and Mekling cite their article**) as illustrated in Figure 2. Here, the owner of the project i.e. the government acts as the principal who supervises and inspects the private sector participant, the agent who is the executor of the project. The quality of the project depends on the degree of effort the agents puts in. This

effort is unobservable by the principal and thus acts as an information advantage to the agent (Wang and Lui, 2015). However, on proper contracting terms for both parties, PPP is least prone to the moral hazard problem as we shall see from our case analysis.

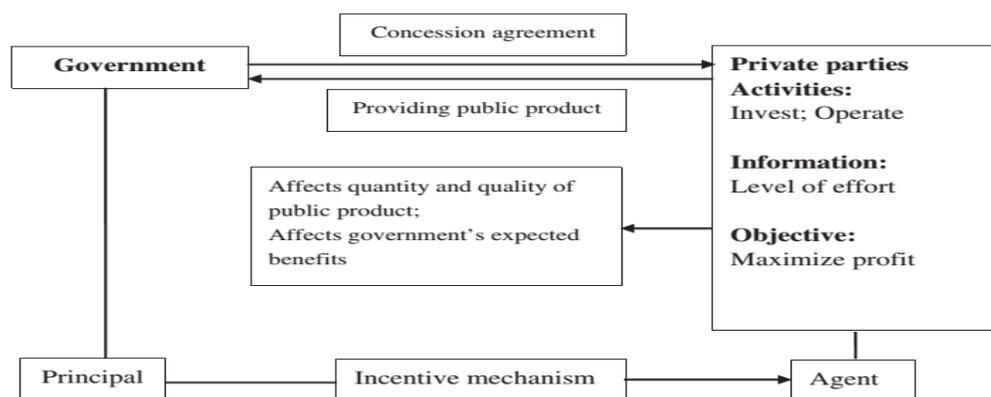


Figure 2: The principal-agent relationship between the government and private parties

According to a World Bank report, India was the largest market for PPP projects in the developing countries of the world. India alone accounted for over half of the total investments in new PPP projects in developing countries in 2011, when it implemented 43 projects which attracted total investment of \$20 billion (Business Standard, 2013). The second phase where the Indian government has started investing is the operations. This includes incorporating the PPP model in ICT for Development issues like e-government projects. This article discusses in detail two successful e-government projects that are based on the PPP model.

According to the year-wise distribution of PPP projects in India as highlighted in Figure 3, there are spikes of increase in the number of projects (and investment) mainly due to institutional changes such as change of government at the centre or state. Although the investment in PPP projects by the Government of India is constantly increasing, we need to know the status-wise distribution of these projects to have a better understanding of the PPP model. Figure 4 shows the distribution of projects which were completed, operational, under construction or terminated (Database of Infrastructure Projects in India). It is surprising to note that none of the projects listed in the database are completed. While 44% of the projects are operational, 38% of them are under construction and 6% were terminated.

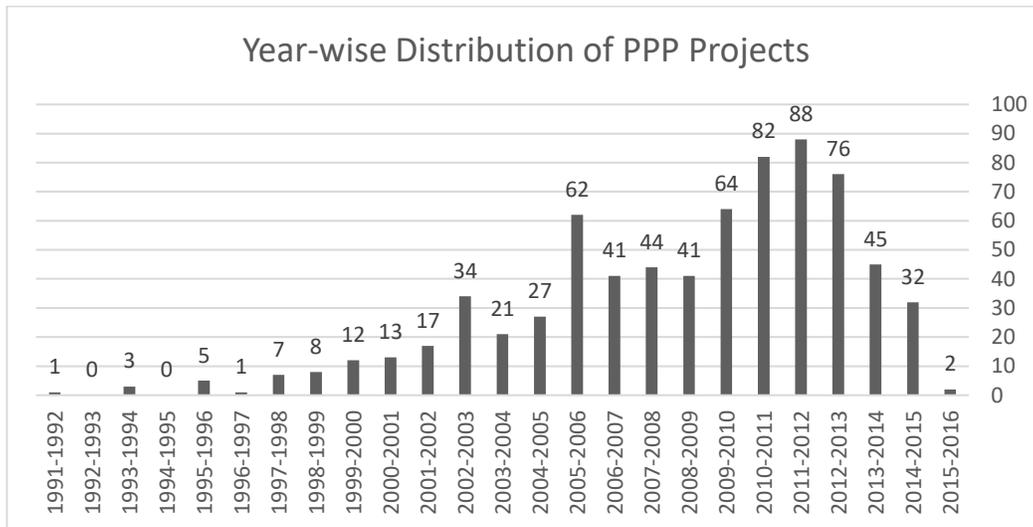


Figure 3: Year-wise distribution of PPP projects in India from 1991-2016

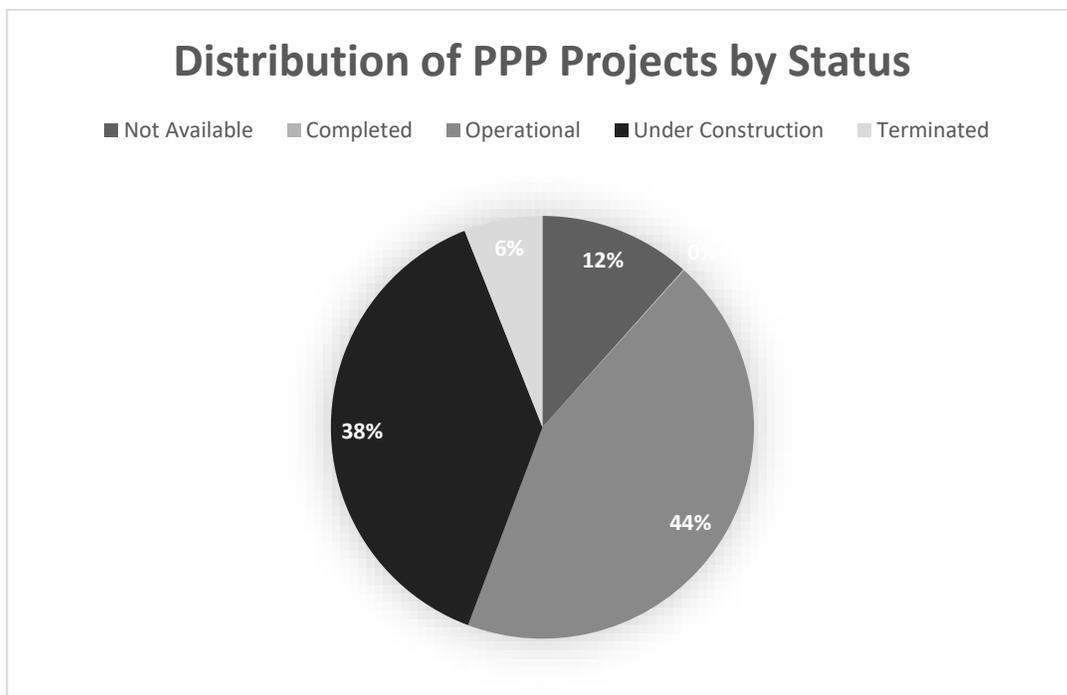


Figure 4: Distribution of PPP projects by Status of Completion in India in 2015

These statistics presented across Figure 1-4 enable us to put forth two major questions regarding the PPP model adoption by the Government of India.

1. Why was there no explicit mention of PPP projects in the service provision of public goods such as Internet and Communication Technology (ICT) driven governance?
2. Since there are so many PPP projects that are under construction since years or terminated in between, what are the factors that lead to failures of PPP model?

Thus, the objective of this research is to understand the conditions required for PPPs to be successful in the sphere of e-governance projects. Several PPP projects adopt ICT (E-governance) models for developmental goals but they are nowhere mentioned in public records of the government. E-governance is expected to improve transparency and reduce corruption in the provisions of the public goods. Since in several cases, PPPs failed in terms of not meeting the targets, no investments after the contracting and charging higher prices than efficient prices from the other party, we need to analyse the reasons for the same in e-governance projects.

We derive our theoretical framework from Transaction Costs Economics (TCE) of New Institutional Economics (Coase, 1937; Williamson, 1975, 1979, 1981, 1991; North, 1990; Hart and Moore, 1990) of the incomplete contract framework and information Economics (Akerlof, 1995; Stiglitz, 1992; Spence, 1976) and principle agency theory (**Jensen and Mekling**). TCE analyses choice of organizational forms private agents adopt in the context of incomplete contracts and possible opportunistic behaviour of agents at the ex post contractual stage. Information economics analyses how imperfect information can result adverse selection of markets degenerating into low quality service providers. Agency theory shows possible in moral hazard outcome and high costs to the public. A simple example is the poor availing ration cards by incurring transactions costs of bribes with poor information about their rights and the government agents inflicting high costs of moral hazard and agency costs. Furthermore, information technology also plays an important role. A good example in the context of India is the Unique Identification Cards in provision of the public goods such as cooking gas and food rations to the poor. The government transfers social security benefits directly into the bank accounts. Our article analyses E-governance PPPs which requires taking into account of technology also in understanding the successful factors.

We analyse two PPP projects based on e-governance model. We evaluate these two projects based on the contracting law between the government and the private party, and consequent provision of public goods. The cases are – *MCA-21* which was the first mission mode project by the Indian government launched initially in Tamil Nadu state and *Akshaya* Project in Kerala state. These projects are chosen as they adopted a different business model of PPP which help us to analyse the characteristics of the contractual norms between both the stakeholder sides. Also both these projects have sustained for more than five years and are widely used for varied applications not restricting to the Government-to-Citizen (G2C) services only and focus on the development of the rural population of India as well. Since several PPP arrangements in India are failures owing to moral hazard outcomes and corruption, it is imperative to analyse successful cases of PPP projects in India and record their nuances. The data collection for the case studies is drawn from secondary sources such as government agencies' reports, newspaper articles, periodicals and other studies by both academia and industry research conducted on these projects.

In section 2, we derive our theoretical framework and in section 3 we discuss our two case studies. In section 4, we provide concluding remarks.

2. Theoretical Framework

The fundamental basis for market exchange between different economic agents is economies of specialisation. However, market exchange involves transaction and information costs of finding right buyers and suppliers, assessing the quality of service providers and formulating and executing contracts. Coase (1937) argued that market mechanism is subject to the friction of transaction costs of search, formulating and executing contracts. Owing to transaction costs, firm as an organization comes into existence to economize on transaction costs of markets. The firm internalizes economic activity until marginal internal bureaucratic costs of hierarchy are equal to the marginal transaction costs of the market (boundaries of the firm). Once the economic activity is internalized, it is hierarchy that governs resource allocation but not strictly price mechanism. Organization and market exchange are basically a trade-off between economies of specialization between economic agents and internalization of economic activity.

Williamson (1985) conceptualizes differential transaction costs through the lens of contracts. In order to focus on transaction costs and their implications on governance choices, Williamson assumes technology as given. Williamson (1991) studied three types of contracting laws pertaining to markets, hierarchies and hybrids: classical contract, neoclassical contract and excuse doctrine, and forbearance. He analysed incomplete contracts. All contracts are incomplete- it is impossible to include all possible contingencies into contracts. The behavioural assumptions are bounded rationality and opportunism. Bounded rationality (Simon, 1957) refers to behaviour intendedly rational but limitedly so owing to informational imperfections and cognitive abilities. Opportunistic behaviour is conceptualized in terms of self-interest with guile. At the *ex ante* stage of a contract, the market is competitive. Once two agents get into a contract, it becomes a bilateral monopoly. Guile implies that when contracts are incomplete, agents renege on their promises when the environment changes or when one realizes that the other party has invested in assets specific to the contract (locked-in). This makes logic of incomplete contracts consistent. Transaction costs differ in three critical dimensions; frequency, uncertainty and asset specificity. Asset specificity has a strong contractual dimension. When agents make asset investments specific to the contract and when environment changes in the favour of one of the agents, s/he could behave opportunistically. According to Williamson's logic when contracts involve high asset-specificity, the preferable governance is hierarchy (vertical integration).

Uncertainty is a critical transaction cost. It takes place both on the demand and supply side. Once two agents get into a contract, demand conditions such as market size (income) and consumer preferences could change. On the supply side, technological change can make investments obsolete. Uncertainty can also arise if government changes policies and regulations. Parties have to incorporate these possibilities in contracts for making contractual safeguards. Higher are the transaction costs higher are the costs of contractual safeguards. Frequency is the costs associated with how frequent the agents in contracts interact based on short term and long duration contracts.

When transaction costs especially asset specificity are high, the preferable governance is integration or internalisation of economic activity. The other important governance choice is hybrid. It is in between integration and market exchange. A firm outsources a part of its economic activity to second party to derive economies of specialization. Williamson (1985) observes that

the viability of the hybrid depends on the efficacy of credible commitments (penalties for premature termination, information-disclosure and verification mechanism and specialized dispute settlements), the costs which vary with the attributes of transactions. In other words, credible commitments of contracts requires incorporating contractual safeguards and how costly these elements depends on the transaction costs- for example high-technology intensive service versus low-technology service. If outsourcing moves to low-end technology services, costs of contractual safeguards decline which make multi-sourcing possible.

Another dimension of multi-sourcing is whether a buyer undertakes multi-sourcing from the same supplier through frequent transactions or different suppliers. Here, repeated interactions and reputation become relevant. Once the initial transaction and information costs of finding the supplier are incurred, the costs of repeat contracts should go down. On the other hand, Nash game theoretic repeated interactions between two parties could result in collusion of the agents which, in turn, results in corruption.

The modern property rights approach of Grossman and Hart (1986) and Hart and Moore (1990) which draws from Williamson's theory of incomplete contracts refers to the organization of collective effort and incentives of economic agents. This approach looks at the firm as a set of property rights and focuses on the role of physical assets in contractual relationship. Two agents, say *A* and *B* with human and physical capital, have the incentive to enter into a contract for joint production if combining their assets results in higher surplus value than each working independently of each other. In other words, the assets in consideration have complementarity properties. As contracts are invariably incomplete, each one has residual rights in using his or her own physical assets arising out of the conditions not specified in the contract. Ownership of physical assets is the source of control rights. The incentive for *A* to buy *B* is to take over the residual rights of *B* when *A* needs *B* to increase investments in the relationship specific assets but *B* has low incentives in undertaking the investment. Merger gives *A* full control over all the physical assets for production. The merging outcome is determined by the incentives of agents before and after the merger in undertaking investments and sharing the surplus value. *A* having full control rights after the merger is the source of higher surplus to *A* which, in turn, reduces the surplus and alters incentives of *B* within the merged firm. Control rights of *A* gives him or her

power in assigning tasks to workers and firing them (denying them the opportunity to work with the physical assets of the firm). Merger takes away control rights of managers of firms which could result the managers leaving the firm. In such cases mergers fail if the firm that takes over the other firm fails to adopt appropriate incentives and management practices. In the present context of PPPs, when the project is handed over to the government agents after completion if the government fail adopt appropriate incentives and managerial practices the PPP can fail.

Information economics show if buyers do not possess information about quality of products in the market it results in adverse selection of market of prices settling down to low levels of adverse selection (Akerloff, 1970). This is widely applicable to whole range of economic activities in an economy. The basic argument is informational imperfections and asymmetries in an economy are pervasive: credit and capital markets, labour markets, product markets, insurance markets, contracts and the government regulation and provision of public goods. Informational asymmetries between economic agents result in one agent reaping rents from agents with no or little information.

One way adverse selection outcomes can be avoided is sellers sending signals of their quality with means such as acquiring skills (higher education) and providing warranties with regard to their service provisions (Spence, 1976). In the present case, the private contractors could invest in sending signals of their quality of their human, physical assets and technology for service provisions and investments in contractual safeguards. For PPPs to be successful, they have to assess quality of the service provider of degree of activity to be outsourced to a private party and formulating contracts with safeguards and enforceability. This is highlighted in our conceptual model given in Figure 5.

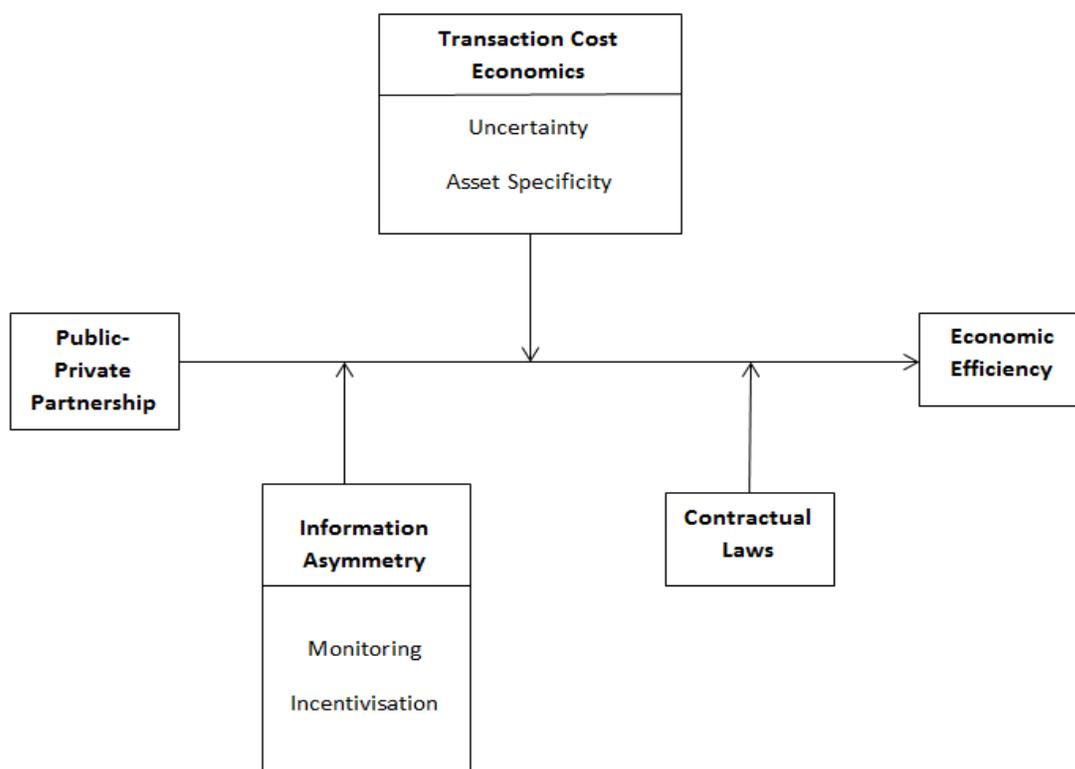


Figure 5: Conceptual Model

2.1 Technology and Transaction and Information Costs

Regarding development projects like e-governance involving ICTs in developing country such as India require a strategic shift from commodity based IT approach to service based approach. Since the government lacks sufficient knowledge in the domain of ICT and innovation, this task of launching high-end advanced projects seemed difficult. The IT needs of the government could have been addressed by an IT partner like a private firm. Thus Public Private Partnership (PPP) model enables government to concentrate on core mission critical value-adding activities while moving the technology-related requirements to IT professionals (IT partner).

In the major part of research in transaction and information economics, technology is assumed to be given in order to develop tractable theory. However, in the recent times, technology especially information technology (IT) is playing an important role in reducing transaction and information costs and asymmetry. Technological change is reducing search and quality assessment costs. For

example, if we take the analogy of adverse selection of quality of used cars of Akerloff, the repair or warranty agents could retain the information about costs, frequency and type of repairs of cars and make it available to potential buyers in the used cars markets, thereby reducing adverse selection outcomes. In present context, the government could access the past behaviour of the private parties in fulfilling the contracts easier through computer records. The quality of service providers can be computerized and the information can be made available to the government agents at multiple levels.

One of the relevant questions in the present context is whether technology can reduce incompleteness of contracts. If information technology increases information about differential quality of private agents, the government can make contracts to those with reputation for abiding by contracts. This reduces incompleteness of contracts but not eliminates it. There will always be uncertainty element in contracts which technology may not solve it fully.

As far as asset specificity of transaction costs in contracts is concerned, it is possible in some industries which are sunk cost intensive, technology might reduce the sunk cost intensity and thereby reduce risk of investment. However, technology cannot fully eliminate asset specificity and possible outcome of opportunistic behaviour. In Williamson's argument firms invest in asset specific investment after getting into a contract. However, it is possible that the parties may possess the required complimentary assets prior to getting into contract. This reduces the possibility of opportunistic behaviour. However, in dynamic terms the parties may have to incur asset specific investments as production increases and technology changes over time.

The IT and IT-enabled services (ITES) like application development, support, enhancement and infrastructure could be delegated to multiple vendors who work collaboratively to deliver services to the clients. Multi sourcing may be one of the strategies of utilizing different relative advantages and capabilities of different agents in the market. We can also see this in terms of de-risking strategies of dependencies and asset specific investments by a few agents and thereby reducing costs of opportunism. Secondly, multi-sourcing could be a strategy to increase competition among the suppliers. On other hand, multi-sourcing could increase transaction costs as it involves contracts between multiple players. Here, the trade-offs the government has to measure are

comparative advantages of tapping into differential capabilities of different agents and costs of multiple contracts.

When contracts are incomplete because of gaps in specification, the possibility of moral hazard arises on either side of the transaction. For example, the holder of the technology may later find a better partner and so deliver less (or inferior) technology to its partner than promised in the original agreement. On the other hand, the recipient firm may use or modify the technology in ways that are not intended in the contract and which are harmful to the transferor (Oxley, 1997). In case of PPP, the technology holder is the private party and the recipient firm is the government.

The amount of monitoring required for private partner firms to have confidence that prescribed activities are indeed being adequately undertaken in a technology transfer partnership will also depend on the scope or complexity of the payoff relevant actions. For example, increases in the number of products or technologies included in a contract, or increases in the geographic scope of the transaction, will inevitably increase the difficulty and cost of monitoring activities (as well as possibly exacerbating specification problems). Similarly, if a contract is used to govern a project involving multiple firms, monitoring costs will increase with the number of partners involved, as assigning accountability for pay-off relevant actions taken by multiple partners under uncertainty is problematic (Alchian and Demsetz, 1972). This suggests that the scope of transactions should be limited unless there are compelling reasons to do otherwise, for example, because of the need to bring together diverse elements in a single project. Where increased scope is necessary, a more hierarchical governance structure is indicated (Oxley, 1997). Since e-governance projects are expanded to large geographical boundaries, again integration of government and private firms is essential to spread the risk in technological changes and increase efficiency of the project.

3. The Analysis of Case Studies

The enforcement of PPP contracts varied based on the relationship between the parties which functioned in the governance structures. For example, the litigation after the failure of a contract in markets is more stringent as compared to hierarchies where the matter is settled internally only. This difference is because the parties involved in a market do not have long term relationship whereas the parties in an organisation (hierarchy) have long-term coordination. On similar lines,

in PPP model the engagement between the government and the private party is based on clear Service Level Agreements (SLAs) which are outcome-driven allowing both the parties to decide, agree and contract on deliverables. This is similar to an outsourcing model where the contractual tenure given to a private firm is long term approximately 8 to 10 years at the end of which either the contract is renewed or the ownership is transferred to the principal. The terms of the SLA requires the IT firm to provide services for which payment is done periodically in fixed amounts. If the agent breaches the contract, the principal can penalise based on agreed norms.

Also, the involvement of the private party in the transaction spreads the risk for the government in the sense that assets are now used collaboratively by both the parties. For example, in the BOT (Build, Operate and Transfer) model of PPP, the private party bears the cost of building and operationalizing the ICT project and transfers it to the government who invests on maintenance and use. Here, the government can ask the private party to set the computer kiosks in various districts of a state in India and operate them using their own agents. As a result, the government is excused from investing in specific assets such as technology hardware and software and human assets such as kiosk operators. Thus, asset specificity decreases.

Uncertainty in PPP model can arise due to contractual specification as well as information asymmetry. If the contract between the government and the private party is not specified properly, there can be situation of ambiguity and residual rights (Grossman, Hart & Moore, 1986). Thus, this situation arising due to asset ownership under incomplete contracts can be minimized using integration. Integration between public bureau and private firm is essential in proper specification of the contract and hence reducing uncertainty between both the parties.

3.1 MCA-21

MCA-21 is India's 1st Mission Mode Project (the highest priority rating assigned by the Indian government) under the National e-Governance Plan (NeGP). The Ministry of Company Affairs (MCA) was responsible for the project which was first launched as a portal on February 18, 2006 in Coimbatore, Tamil Nadu with the aim of providing 21st century services to the citizens (G2C), business groups (G2B) and government (G2G). The MCA-21 project was implemented as part of the MCA's vision: "To be a leader and partner in initiatives for Corporate Reforms, Good

Governance and Enlightened Regulation, with a view to promote and facilitate effective corporate functioning and investor protection". The stakeholders involved in this project are given in Figure 6. The services provided by MCA-21 to various stakeholders were as follows (Administrative Reforms Commission 11th Report):

1. **Business:** to enable registration of a company and file statutory documents quickly and easily
2. **Public:** to get easy access to relevant records and effective grievances redressal
3. **Professionals:** to enable them to offer efficient services to their client companies
4. **Financial Institutions:** to easily find charges for registration and verification
5. **Employees:** to enable them to ensure proactive and effective compliance of relevant laws and corporate governance

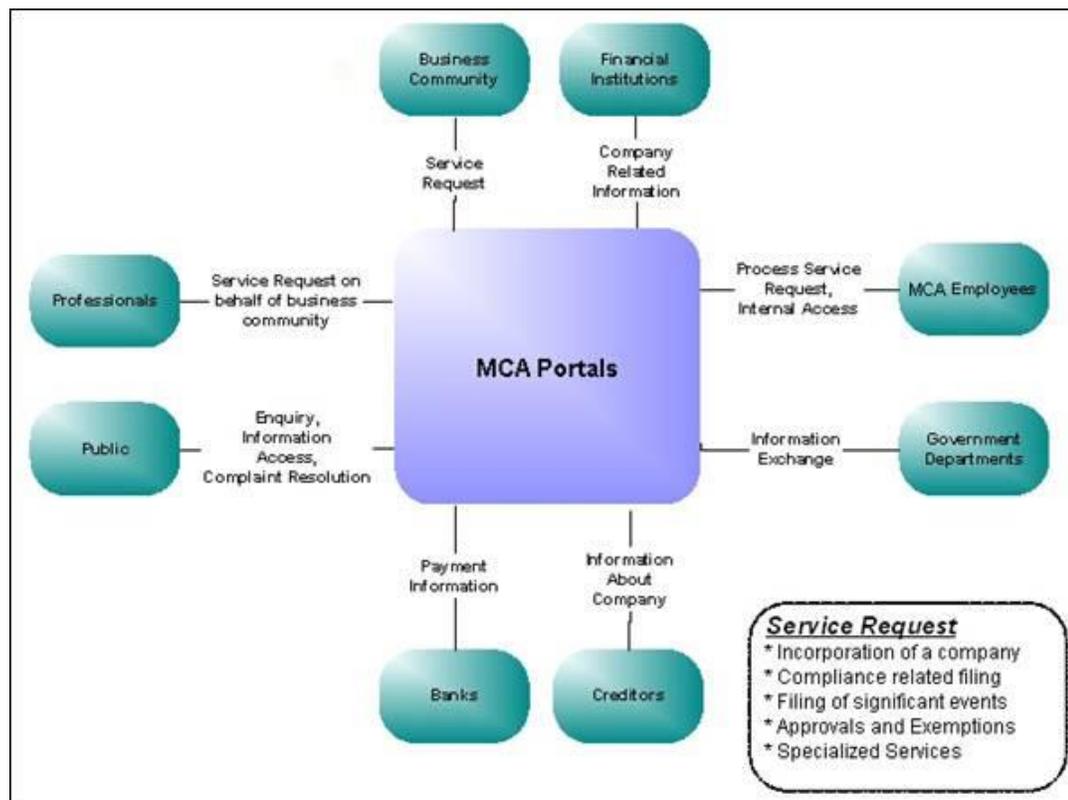


Figure 6: Different stakeholders in MCA-21 (Source: mca.gov.in)

3.1.1 Partnership with TCS

Though administered by the government, this project was executed in PPP mode. Tata Consultancy Services (TCS) who won the bid through competitive bidding (relational transparency) was given a contract to design, develop, implement, manage and maintain the project and transfer it to the government in a BOOT (Build, Open, Operate and Transfer) mode. All the contractual norms were clearly laid and agreed by both the parties. The first phase of the project, signed on March 1, 2005, was completed within a record time of 78 weeks. TCS was expected to run the project for six years till 2012. TCS provided computers, printers, scanners, servers, networks and software. With a main data centre in Delhi and a back-up business continuity server in Chennai, all the 24 offices (four regional directorates and 20 RoC's, registrars of companies) were networked after the first phase.

Applying the principal-agent framework, we infer that the government acts as a principal and the agent is the private stakeholder TCS. The private party (TCS) had an information advantage in terms of technical know-how as compared to the government. However, in the PPP model all the contractual and residual claims were clearly specified eliminating the possibility of moral hazard problem. In addition to the contract, the agent and the principal, during the project implementation phase, both stakeholders of MCA-21 were monitored by external reviewers and auditors. The second phase of the project was implemented by Infosys for the period January 2013 - July 2021 (Economic Times, 2013). The technical aspects of MCA-21 cover the following areas (ARC Report) which were taken care of by the private party:

1. Design and development of application system
2. Setting up of IT infrastructure
3. Setting up the Digital Signature/PKI delivery mechanisms and associated security requirements
4. Setting up of Physical Front Offices (PFOs)
5. Setting up of temporary FOs for the peak periods to meet with the requirements and subsequent shutdown of temporary FOs at the end of such peak periods
6. Migrating legacy data and digitization of paper documents to the new system

7. Providing MCA services to all MCA 21 stakeholders in accordance with the Service Oriented Approach
8. Providing user training at all levels and all offices (Front and Back Offices).

3.1.2 Accomplishments of MCA-21

The implementation of MCA-21 enabled various stakeholders to approach the Government for seeking a complete basket of services in an efficient and transparent manner. The programme was a with more than 90% of e-filing being done by stakeholders (as against the target of 25%), total transparency for service delivery to stakeholders through online reports, more than 40% electronic on-line payments and very high level of stakeholder satisfaction (Chakrabarty, 2008). Further, the user was in a position to track the transaction status at every stage; from making payment to the processing and ultimately the approval status. The time taken in delivery of services had shown remarkable improvement across years. These are highlighted in Table 2. These improvements as of 2014 end (Annual Report 2014-2015; Ministry of Corporate Affairs) were shown in Table 2. Both the private agents of contracts TCS and Infoys have a reputation of high quality delivery of services. This resolved informational imperfections of the PPP. Both the Government and the private agents incorporated contractual safeguards in order to reduce the costs of opportunism at ex post stage. Furthermore, the asset specificity dimension for the private parties was low as the technology assets were already possessed by the parties and the assets could be redeployed.

Type of Service	Prior to MCA21	After MCA21
Name Approval	7 days	1-2 days
Company Incorporation	15 days	1-3 days
Change of Name	15 days	3 days
Charge creation / modification	10-15 days	Instantaneous
Certified Copy	10 days	2 days
Annual Return	60 days	Instantaneous
Balance-sheet	60 days	Instantaneous
Change in Directors	60 days	Instantaneous
Change in Regd. Office Address	60 days	1-3 days
Increase in Authorized Capital	60 days	1-3 days
Inspection of Public Documents	Physical appearance	On-line

Table 2: Service Metrics before and after MCA-21 as of 2014

3.2 Akshaya Project

Akshaya was an e-government project with objective to make at least one person in each of over 65 lakh (6.5 million) families e-literate in the state of Kerala. An IT dissemination project, Akshaya was launched on 18th November, 2002 as a pilot project in Malappuram district of Kerala. It was initiated with a target of opening 5000 networked multi-purpose Community Technology Centre called e-kendras to provide access to relevant information online in their local language to the entire state. Apart from providing e-literacy, Akshaya also was aimed to bridge the digital divide. Akshaya project was expected to set up a network of 6000 information centres in the state, provide employment opportunities to over 50,000 rural populations and generate investment opportunities for young entrepreneurs. The business model for the Akshaya e-centres is illustrated in Figure 7 (Mohan, 2004).

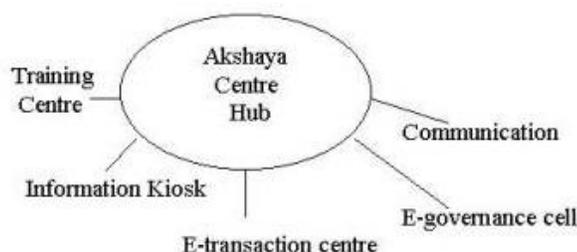


Figure 7: Business Model for Akshaya e-kendra

In the initial phase, Akshaya e-kendra imparted basic training to the user varying from basics and scope of IT to hands-on technical skills in operating a computer and using internet. Various self-development training was also provided to the public in the form of CDs on spoken English, vocational training, personality development, career planning, agriculture, health and law and justice. The project was a PPP with active participation from various stakeholders such as the government, the Panchayati (village) Raj system and the entrepreneurs.

The following are the partners in Akshaya project (Mohanani, 2004):

1. **Kerala State IT Mission:** Kerala State IT Mission is the autonomous nodal IT implementation agency for the Department of IT, Government of Kerala that provides managerial support to the Department's various initiatives.
2. **Science & Technology Entrepreneurship Development Board (STED), Calicut:** It is a project set up by National Science & Technology Entrepreneurship Development Board, Department of Science & Technology, Government of India.
3. **Centre for Development of Imaging Technology (C-DIT):** It is an autonomous centre under Government of Kerala, established in 1988. For the Akshaya project, C-DIT has developed and supplied IT literacy CD with customized software like Chithraavidya, Ganithavidya and Aksharavidya.
4. **Local Self Government:** The entire programme is implemented with the active participation of the existing panchayati (village) raj institutions, NGOs and private sector in the state.

3.2.1 Partnership with the Entrepreneurs

In contrast to the MCA-21 project where the IT partner was a well-established IT firm, TCS and later Infosys, the Akshaya project had young entrepreneurs as private stakeholders. Similar to transparent selection criterion for a private firm in terms of bidding for the project, these entrepreneurs were also interviewed and selected by the district level officials. More than 2000 applications were filed by the potential entrepreneurs. Loans were arranged for the potential entrepreneurs from the local banks (such as Western Union Money Transfer Bank), without the need for collateral at a minimal rate of interest spanning between 12-13 percent. It was mandatory for the entrepreneurs to keep at least three trainers and five computers in these Akshaya Centres (Telecentre Magazine, 2007).

The state works with entrepreneurs to develop their e-center services, provides content and connectivity, and oversees the training of these individuals (Kuriyan and Ray, 2009). On the other hand, the investment for setting up the e-kendra was made by the entrepreneurs (approx. Indian

Rupees 300,000) with 5 to 10 computers, printers, scanners, webcam, other peripherals and necessary software. In return of the investment and services of the entrepreneurs towards the developmental goals of the state, the Kerala government helped them to repay their loans by paying them incentives for each member of the family who came to the e-literacy training. Also the state gave them opportunity to create their own business strategies for the e-kendras.

In this case also, there was apparent information asymmetry; however the problem of moral hazard was mitigated due to the flexibility given to the private partner (entrepreneurs in this case) to carry out their own business side by side along with the training for e-literacy. Also as one of the measures to avoid the moral hazard, proper incentives were given to the agents (entrepreneurs) by the principal (state) based on the observable outcome. Thus, proper specification of the contract is evident.

3.2.2 Accomplishments of Akshaya

After the implementation of Akshaya project, Malappuram was declared the first e-literate district in India where 6 lakh (0.6 million) beneficiaries were trained. Kannur, another district in Kerala followed the e-literate district tag after Malappuram. Many successful outcomes were observed as a result of this project (Telecentre Magazine):

1. Malappuram was the first district where all villages were linked by broadband.
2. Akshaya e-kendras receive telephone, electricity, water and university fees bills resulting in transaction cost of Indian Rupees 291 million across 165 e-Pay Service enabled centres (www.e-kendra.org).
3. Advanced computer training to 6,000 scheduled (backward) caste girls were completed and training programmes for 38,000 Government employees started through Akshaya e-Centres.
4. Akshaya centres are authorised to help the small-scale firms and customers to upload and download the information and advertisements to the web portal created by District Industries Centre, Malappuram. (www.malappuramindustry.com).

5. All the land records in the district were computerised through Akshaya platform. The work entrusted to 60 Akshaya entrepreneurs by 133 village offices in Malappuram District. More than one million records were digitalised and handed over to National Informatics centre
6. The project involved opportunities for women's participation as entrepreneurs, trainees and for various social and cultural events. About 70% of the beneficiaries of Akshaya e-literacy training was women.
7. The penetration of the project in the deprived segments of the society including the scheduled castes, scheduled tribes, poor fishermen and labourers was at a large scale. The distribution of e-kendras in the rural districts of Kerala was much higher than the urban districts as shown in Table 3.

No	Phase	District	Urban	Rural	Total
1	Pilot Project	Malappuram	15	326	341
2	Second phase (Seven districts)	Kasaragod	16	91	107
3		Kannur	38	159	197
4		Kozhikode	22	144	166
5		Thrissur	37	168	205
6		Ernakulam	48	165	213
7		Pathanamthitta	10	94	104
8		Kollam	21	134	155
		Total	192	955	1147
9	Third phase (Six districts)	Wayanad	3	68	71
10		Palakkad	24	231	255
11		Kottayam	18	185	203
12		Idikki	5	120	125
13		Alappuzha	29	193	222
14		Thiruvananthapuram	47	250	297
		Total	126	1047	1173
		Grant Total	333	2328	2661
		% of Rural centres		87.50	

Table 3: District-wise count of e-kendras

4. Conclusion

This article has examined the efficiency of Public-Private Partnership as a form of e-governance in India in terms of Transaction Cost Economics and Information Asymmetry problems. Furthermore, it has brought forth technological issues related to information into the analysis.

There are two levels of agency problems in the public sector, firstly between citizens and elected officials and secondly between the government and private party. We focus on the second type of moral hazard problem and discuss its cause of information asymmetry in detail along with the contracting norms and transaction cost economics. This article is an attempt of adding a fifth and more efficient governance structure to the Williamson's existing framework of markets, hybrids and hierarchies (Williamson, 1991) and public bureaus (Patibandla, 2006). In the public sector, moral hazard occurs owing to the inability of the government (principal) to contract the unobservable effort variables of the agent who has an information advantage. Unbalanced information may also be due to excessive bureaucratic paperwork which hinders monitoring activity. Stiglitz on the contrary, claimed that in the public sector the principal has more information than the agent that it wishes to conceal in the contract (Sappington and Stiglitz, 1987).

Focussing on the Indian government's initiative in providing public goods and services online to its citizens, we infer that yet another successful alternative of minimizing the moral hazard problem is the (PPP). The PPP model comprises of already laid terms and conditions for both the principal (government) and the agent (private firm) in order to avoid deviation from the public interest based on information asymmetry. Out of several successful e-government projects by the Indian government, we analyse the cases of two projects- *MCA-21 and Akshaya*. The first case of MCA-21 illustrates the partnership of the government of India with an established IT firm Tata Consultancy Services (TCS) which is responsible for designing, developing, implementing, managing and maintaining the project. The contract has been clearly specified in this case including the duration and outcome of tasks required on the part of the private party. In this case, the private firm (agent) has an information advantage which is its efficient technological skills whereas the government (principal) lacks such expertise. However, adopting a PPP model and outsourcing desired services, MCA-21 is a success with no apparent moral hazard problems. The second case of Akshaya is a project that was undertaken by the Kerala government (principal) who appointed various young private entrepreneurs (agents) to create and operate the e-kendras for providing e-literacy throughout the state. Here, the government (principal) is more strong and rich in information as compared to the weak-voiced entrepreneurs (agents) who hardly have any say in the project. Nevertheless, the problem of moral hazard was mitigated since the PPP framework

provides sufficient flexibility to the agents to establish their own business side-by-side adhering to the state's interests. The incentive mechanism for the private party was weak but not under-specified; however they also received grants and special services by the government. Thus, PPP model helps to minimize the problem of information asymmetry whether the principal or the agent has information advantage as evident in each of the case studies.

Projects such as MCA-21 and Akshaya offer examples and explain the dynamics of a successful PPP. Thus, the advantages of PPP model as reflected by these two cases include:

- a. Technology risk was borne by the IT partner while government bears the business risk only
- b. Governments were absolved of IT responsibility, ownership, obsolescence and upgrades and can focus fully on its core business
- c. Single platform and synchronised deployment became possible.
- d. Service Level Agreements (SLA) ensure service standards with the government paying only for desired service
- e. Project related risks moved entirely to the partner as the Government payed only for desired/acceptable outcomes
- f. SLAs ensure outcome-based investment in technology leading to observable and verifiable results by the agents

Therefore, we have shown that Public-Private Partnership could be considered as a governance structure that serves to be more efficient than public bureaus in terms of reducing transaction costs and information asymmetry problems.

5. Limitations and Future Scope

This article has studied the viability of Public-Private Partnerships as a governance structure in addition to markets, hybrids and hierarchies and public bureaus. Two cases are analysed based on the PPP model and the sustainability of e-government projects in Indian context. We however, present our findings based only on secondary data. If primary data was also a part of the study, a more detailed explanation could have been given regarding the responsibilities and risks spreading between both principal and agent in the public sector. Also, as specified, there are two levels of

agency problems in the public sector- the first level between the citizens (principal) and the elected officials (agents) and the second level between the government (principal) and the hired party (agent) for the purpose of providing public goods and services. This article only focuses on the second level of moral hazard problem. As a future extension of this topic for other researchers, it is a good idea to look into the information asymmetry and transaction cost economizing between the citizens and the elected officials of the new government with technology as a mediator. For example, with technology, the search costs for the citizens would reduce substantially in order to gain information about the contestants for the elections, thus reducing information asymmetry.

References

1. Akerlof, G. (1995). The market for “lemons”: Quality uncertainty and the market mechanism (pp. 175-188). Macmillan Education UK.
2. Alchian, A. A., & Demsetz, H. (1972). Production, information costs, and economic organization. *The American economic review*, 777-795.
3. Arnott, R., & Stiglitz, J. E. (1991). Moral hazard and nonmarket institutions: Dysfunctional crowding out of peer monitoring?. *The American Economic Review*, 179-190.
4. Arrow, K. J. (1974). *The limits of organization*. WW Norton & Company.
5. Arrow, K. J. (1985). Informational structure of the firm. *The American Economic Review*, 303-307.
6. Athias, L. (2013). Local Public-Services Provision under Public–Private Partnerships: Contractual Design and Contracting Parties Incentives. *Local Government Studies*, 39(3), 312-331.
7. Attila, G. (2012). Agency Problems In Public Sector. *Annals of Faculty of Economics*, 1(1), 708-712.
8. Batterbury, S. P., & Fernando, J. L. (2006). Rescaling governance and the impacts of political and environmental decentralization: an introduction. *World development*, 34(11), 1851-1863.
9. Chakrabarty, T. (2008). Towards an ideal e-Governance scenario in India. Tata Consultancy Services, Trivandrum.
10. Clarke, J., & Newman, J. (2007). What's in a name? New Labour's citizen-consumers and the remaking of public services. *Cultural Studies*, 21(4-5), 738-757.
11. Coase, R. H. (1937). The nature of the firm. *economica*, 4(16), 386-405.
12. Cowen, T., & Parker, D. (1997). *Markets in the firm: a market-process approach to management* (No. 134). Coronet Books Incorporated.
13. Cox, J. C., Isacc, R. M., Cech, P. A., & Conn, D. (1996). Moral hazard and adverse selection in procurement contracting. *Games and Economic Behavior*, 17(2), 147-176.
14. Escobar, A. (1995). *Encountering development: The making and unmaking of the Third World*. Princeton University Press.

15. Freeman, C., & Louçã, F. (2001). *As Time Goes By: From the Industrial Revolutions to the Information Revolution: From the Industrial Revolutions to the Information Revolution*. Oxford University Press.
16. Grossman, S. J., & Hart, O. D. (1986). The costs and benefits of ownership: A theory of vertical and lateral integration. *The Journal of Political Economy*, 691-719.
17. Hart, O. (2003). Incomplete contracts and public ownership: Remarks, and an application to public-private partnerships*. *The Economic Journal*, 113(486), C69-C76.
18. Hart, O., & Moore, J. (1990). Property Rights and the Nature of the Firm. *Journal of political economy*, 98(6), 1119-1158.
19. Heeks, R. (2008). ICT4D 2.0: The next phase of applying ICT for international development. *Computer*, 41(6), 26-33.
20. Hilbert, M. (2012). Toward a Conceptual Framework for ICT for Development: Lessons Learned from the Cube Framework Used in Latin America. *Information Technologies & International Development*, 8(4), pp-243.
21. Hoppe, E. I., & Schmitz, P. W. (2013). Public-private partnerships versus traditional procurement: Innovation incentives and information gathering. *The RAND Journal of Economics*, 44(1), 56-74.
22. Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of financial economics*, 3(4), 305-360.
23. Kuriyan, R., & Ray, I. (2009). Outsourcing the state? Public-private partnerships and information technologies in India. *World Development*, 37(10), 1663-1673.
24. Laffont, J. J., & Martimort, D. (2009). *The theory of incentives: the principal-agent model*. Princeton university press.
25. Lewis, D. (2002). 15 Building 'active' partnerships in aid-recipient countries. *Public-Private Partnerships: Theory and Practice in International Perspective*, 252.
26. Mohanan, P. (2004). Akshaya at a Glance. *Information Technology in Developing Countries*, 14(1).
27. North, D. C. (1990). A transaction cost theory of politics. *Journal of theoretical politics*, 2(4), 355-367.

28. Oxley, J. E. (1997). Appropriability hazards and governance in strategic alliances: A transaction cost approach. *Journal of law, Economics, and Organization*, 13(2), 387-409.
29. Patibandla, M. (2006). *Evolution of Markets and Institutions: A study of an emerging economy*. Routledge.
30. Sappington, D. E., & Stiglitz, J. E. (1987). Privatization, information and incentives. *Journal of policy analysis and management*, 6(4), 567-585.
31. Savas, E. S., & Savas, E. S. (2000). *Privatization and public-private partnerships* (p. 31). New York: Chatham House.
32. Schumpeter, J. A. (1939). *Business Cycles: a theoretical and statistical analysis of the capitalist process*. McGraw-Hill.
33. Schuurman, F. J. (2000). Paradigms lost, paradigms regained? *Development studies in the twenty-first century*. *Third World Quarterly*, 21(1), 7-20.
34. Simon, D. (1997). Development reconsidered; new directions in development thinking. *Geografiska Annaler: Series B, Human Geography*, 79(4), 183-201.
35. Spence, M. (1976). Informational aspects of market structure: An introduction. *The Quarterly Journal of Economics*, 591-597.
36. Sreekumar, T. T. (2008). Decrypting e-governance: Narratives, power play and participation in the Gyandoot intranet. *ICTs and Indian Social Change: Diffusion, Poverty, Governance*, 160-191.
37. Stiglitz, J. E. (1988). *Principal and agent*. John M. Olin Program for the Study of Economic Organization and Public Policy, Department of Economics/Woodrow Wilson School of Public and International Affairs, Princeton University.
38. Stiglitz, J. E. (2002). Information and the Change in the Paradigm in Economics. *American Economic Review*, 460-501.
39. Stiglitz, J. E. (2002). Towards a new paradigm for development: strategies, policies and processes. *Applied Econometrics and International Development*, 2(1), 116-122.
40. Wang, Y., & Liu, J. (2015). Evaluation of the excess revenue sharing ratio in PPP projects using principal-agent models. *International Journal of Project Management*.
41. Williamson, O. E. (1975). *Markets and hierarchies*. New York, 26-30.

42. Williamson, O. E. (1979). Transaction-cost economics: the governance of contractual relations. *Journal of law and economics*, 233-261.
43. Williamson, O. E. (1981). The economics of organization: The transaction cost approach. *American journal of sociology*, 548-577.
44. Williamson, O. E. (1985). *The economic institutions of capitalism*. Simon and Schuster.
45. Williamson, O. E. (1991). Comparative economic organization: The analysis of discrete structural alternatives. *Administrative science quarterly*, 269-296.
46. Williamson, O. E. (1996). *The mechanisms of governance*. Oxford University Press.
47. Williamson, O. E., & Winter, S. G. (1993). *The nature of the firm: origins, evolution, and development*. Oxford University Press.
48. <https://infrastructureindia.gov.in> , [accessed on 1 March 2018](#)
49. <http://www.pppinindia.com/Defining-PPP.php> , [accessed on 1 March 2018](#)