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Special Issue on Public Procurement October, 2022

ARUN JAITLEY
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(An Institution of Ministry of Finance, Government of India)

THEME OF मनुष्यवती भूमिरर्थः

Kautilya's Tantrayukti

अशीतिशततमं प्रकरणम्-तंत्रयुक्तय:

मनुष्याणां वृत्तिरर्थः, मनुष्यवती भूमिरित्यर्थः ।१। तस्या : पृथिव्या लाभपालनोपायः शास्त्रमर्थशास्त्रमिती ।२।

तदद्वात्रिंशद्युक्तिमुक्तम् – अधिकरणम् , विधानम्, योगः , पदार्थः, हेत्वर्थः , उद्देशः, निर्देशः, उपदेशः, अपदेशः, अतिदेशः, प्रदेशः, उपमानम्, अर्थापत्तिः, संशयः, प्रसङ्गः, विपर्ययः, वाक्यशेषः, अनुमतम्, व्याख्यानम्, निर्वचनम्, निदर्शनम्, अपवर्गः, स्वसंज्ञा, पूर्वपक्षः, उत्तरपक्षः एकान्तः, अनागतावेक्षणम्, अतिक्रान्तावेक्षणम्, नियोगः, विकल्पः, समुच्चयः, ऊह्यम् इति ।३।

यमर्थमधिकृत्योच्यते तदधिकरणम् ।४। 'पृथिव्या लामे पालने च यावन्त्यर्थशास्त्राणी पूर्वाचार्ये: प्रस्थापितानी प्रायस्तानि संहृत्यैकमिदमर्थशास्त्रम् कृतम्' (१.१.१) इति ।५।

–कौटिलीयेअर्थशास्त्रे तंत्रयुक्तिः - षड्ग्चादशमधिकरणम्

English Translation

1. The source of the livelihood of men is wealth. In other words, the earth inhabited by men.
2. The science which is the means of the attainment and protection of that earth is the Science of Politics.
3. That contains thirty-two devices of treatment: topic, statement (of contents), employment (of sentences), meaning of words, reason for (establishing) something mentions, explanation, advice, reference, application, Indication, analogy implication, doubt (similar) situation, contrary (corollary), completion of a sentence, agreement. emphasizing, derivation (of a word), Illustration, exception, one's own technical term, the prima facie view, the correct view, Invariable rule, reference to a future statement, reference to a past statement, restriction, option, combination, and what is understood.
4. The object. with respect to which a statement is made, is the topic.
5. For instance: "This single (treatise on the) Science of Politics is composed mostly by bringing together (the teachings of) as many treatises on the Science of Politics as have been composed by the ancient teachers for the acquisition and protection of the earth."

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ABOUT AJNIFM

The Arun Jaitley National Institute of Financial Management (AJ-NIFM) is a Center of Excellence specializing in capacity building of professionals in the fields of Public Policy, Public Finance, Financial Markets, Financial Management, and other related areas for promoting the highest standards of professional competence and practice.

AJ-NIFM was set up in 1993 as a registered society under the Ministry of Finance, Government of India. To begin with, it was mandated to train the officers recruited by the Union Public Service Commission (UPSC) through the Civil Services Examination and allocated to the various services responsible for managing senior and top management positions dealing with accounts and finance in the Government of India. In due course of time, AJ-NIFM has become a premier resource center to meet the training needs of the Central Government for their senior and middle-level officers. AJ-NIFM also caters to the State Government, Defense establishments, Autonomous Bodies, and other Financial Institutions for their capacity building and research requirements.

AJ-NIFM plays a pivotal role in governance and administrative reforms by providing a platform for interaction, exchange of ideas, and experience among officers from various organized services, state governments, and personnel of civil and defense establishments.

Apart from capacity building, AJ-NIFM is also engaged in research studies in the areas of financial markets, accounting, audit, financial management, public procurement, and other issues related to public finance, public policy, and delivery systems. The outcomes of such research studies are published and disseminated through Research Papers, Journals, and Books.

AJNIFM also undertakes various consultancy projects relating to its domain viz., monitoring and evaluation of various government schemes, third party evaluations, writing of policy documents, manuals, etc.

The Union Finance Minister of the Government of India is the President of the AJ-NIFM Society. The Secretary (Expenditure) of, the Government of India is the Chairman of the Board of Governors (BoG). The Director, AJ-NIFM is responsible for the administration and academic programs of the Institute. AJ-NIFM has a distinct advantage of an amalgamation of faculty from academics, industry experts, and Government.

AJNIFM has five functional verticals:

- Capacity Building
- Award of Degrees / Diplomas
- Research & Publications
- Consultancies
- Innovation.

These functions are delivered by three Schools:

1. School of Public Finance (SPF)
2. School of Financial Markets (SFM)
3. School of Management Studies (SMS)

A. TRAINING PROGRAMMES AT AJNIFM

The approach of AJNIFM is to impart multifaceted training in various aspects of financial management, budgeting, accounting, auditing, public procurement, and information technology keeping in view the fast-changing economic, commercial and

technological environment. The focus is on practical applications, including the use of IT.

1. PROFESSIONAL TRAINING COURSE (PTC):

AJNIFM provides professional training to the Officer Trainees of organized Central Finance & Accounts Services which are responsible for the management of Finance, Accounts, Costing, and Audit functions in the Government of India. The duration of the Professional Training Course is 26 weeks, divided into two modules of 13 weeks each with a total of 36 credits.

From the year 2022, this program will be delivered in coordination with the Institute of Government Accounts & Finance (INGAF) and the National Academy of Defence Financial Management (NADFM) leading to the award of Post Graduate Diploma in Public Financial Management from AJ-NIFM.

2. MASTER OF BUSINESS ADMINISTRATION (FINANCE):

MBA (F) is a two-year full-time residential program. The program is recognized by Jawaharlal Nehru University, New Delhi. The program is open to fresh graduates as well as experienced candidates desirous of a career in the financial sector. The MBA (Finance) program has been designed to develop trained professionals in the financial sector capable of occupying positions of responsibility in regulatory bodies, market intermediaries, banks, mutual funds, asset management companies, stock exchanges, commodity exchanges, and similar organizations in private and government sectors. The curriculum also consists of attachments at Mumbai as well as Singapore wherein the participants avail an opportunity to interact with the professionals functioning at the apex level in the financial sectors such as RBI, SEBI, NCDEX, MCX, FIMMDA.

3. MASTER OF BUSINESS ADMINISTRATION (FINANCIAL MANAGEMENT):

MBA (FM) is a two-year full-time program. This program is also recognized by Jawaharlal Nehru University, Delhi. The program is open to the officers at middle and senior levels, working with central and state government including defense services, public sector undertakings, and autonomous organizations/ bodies as well as executives from the private sector. The program is designed to enable the senior officers/ executives of the government and corporate sector to meet contemporary challenges in Financial Management including Public Financial Management.

4. POST GRADUATE PROGRAMME (GOVERNMENT ACCOUNTING & INTERNAL AUDIT):

The Post Graduate Programme in Government Accounting & Internal Audit Programme is a one-year program designed to upgrade the technical skills of officers of the office of Controller General of Accounts and other organized accounting services of the various government departments in the areas of accounting, internal audit, information technology, general management, etc. and improve their soft skills.

5. CAPACITY BUILDING PROGRAMMES / MANAGEMENT DEVELOPMENT PROGRAMMES (MDPS):

AJ-NIFM conducts many capacities building short-duration Management Development Programmes (MDPs) / Executive Development Programmes (EDPs) in

various areas of public finance viz expenditure management, revenue management, debt management, budgeting, public financial administration, financial management, accounting, internal audit, procurement, GST, IT, HR, etc.

The officers of Indian Economic Service (IES), Indian Statistical Service (ISS), Indian Telecom Service (ITS), other central government services, state government services, PSUs, municipal corporations, autonomous institutes, and bodies participate in these MDPs/EDPs.

AJ-NIFM also conducts a few programs under the ITEC initiative of the Ministry of External Affairs with the participation of officials from many developing countries.

Besides, AJ-NIFM also organizes a few mid-career training programs (MCTPs) for officers of participating services with international attachments.

B. General Information

1. Campus

The Institute is located on a plot of land measuring over 40 acres on Pali Road, Faridabad, Haryana. The Institute building is beautifully landscaped, with a unique architectural design. Its sprawling lush green lawns, luxurious green cover around with perennial shrubs, flowers, and trees make the campus an ideal place for serious studies as well as recreation amid nature.

2. Accommodation

The Institute has two hostels namely Ganga and Yamuna, each having 182 & 96 rooms respectively. The officer trainees are accommodated in Yamuna Hostel.

3. AJ-NIFM Library

AJ-NIFM Library is committed to providing the widest possible access to information and this commitment is reflected in the range of services provided by it. Its website https://library.nifm.ac.in/ is linked to various online databases that are available from any device within the institute network. The library works tirelessly to fulfill its mission to address the interests and needs of the institute, students, and participating members by providing and maintaining access to a collection of materials and electronic resources that addresses the interest and needs of the institute/library members.

AJ-NIFM Library is fully automated and has a collection of over 37,500 books on Finance, Management, Economics, Public Policy, Financial Management, Accounting, Computer, Taxation, etc. In addition, the AJ-NIFM library has an invaluable collection of books on literature, fiction, etc., both in English and Hindi.

The library holds a rich collection of electronic resources which include different types of the full-text online database(s) related to Social and Management Science covering more than 5000 Journals/Periodicals and E-books on different subjects. AJ-NIFM library also subscribes to Company and Industrial Database, and Socio-economic database for their users. The library is also providing different types of services viz circulation, reading facilities, mail alert service, reference and information service, database search service, document delivery, interlibrary loan, photocopying, orientation programs, Online Public Access Catalogue (OPAC), Current Awareness Services (CAS), and Research Assistance Service.

AJ-NIFM Library is a member of DELNET (Developing Library Network). It provides access to more than 3.5 crore records comprising books, E-Journals, E-books, etc. to facilitate their users/researchers.

3.1 RESOURCES

3.1.1 PRINT

Print	Resources
Books	37741
Bound volume of periodicals	2747
Current subscribed journals	54
Non-book Materials	3248
Newspapers	23
Magazines	25

3.1.2 E-RESOURCES

E-Books	
McGraw Hill	https://www.expresslibrary.mheducation.com/bookshelf
Kopy Kitab	http://ajnifm.kopykitab.com
Pearson	http://elibrary.in.pearson.com/
Sage Publishing	https://etext.sagepub.in/etext
Full Text Database	
J-Gate Social & Mgt. Sc.	https://jgateplus.com
EBSCO: Business Source Elite	http://search.ebscohost.com
JSTOR	http://www.jstor.org/
EPW	https://www.epw.in/
Sage Journals (17 Journals)	https://journals.sagepub.com/
Statistical Database	
CMIE Prowess IQ (CMIE)	http://prowessiq.cmie.com/
Economic Outlook (CMIE)	https://economicoutlook.cmie.com/
IndiaStat (Single User)	www.indiastat.com
Bibliographical Database	
DELNET	http://164.100.247.26/
ISID Research Reference	http://103.82.220.134/Login
Library Website	
On-line Public Access Catalogue (OPAC)	https://library.nifm.ac.in/

3.1.3 LIBRARY TIMINGS:

Monday to Friday	09:00 am to 07:00 pm
Saturday	10.00 am to 02.00 pm
Sunday and Gazette Holidays	Closed

4. COMPUTER FACILITIES

4.1 IT INFRASTRUCTURE:

- **Computer Labs:** The institute has three *"State of the Art"* Computer Labs. The computer Lab-1 and Lab-2 have a seating capacity of 55 and 62 persons

respectively which are used for conducting online/hands-on classes for Long Term Courses, Management Development Programme, and other short duration programs. The third computer lab is a small computer lab with a seating capacity of 19 being used for research and practice purposes. All the labs have good quality Multimedia projectors for conducting practical classes. There is a heavy-duty network printer installed in each lab.

- **Server Room:** There is a dedicated Server Room wherein all the servers have been installed together on different shelves in a closed server rack and are managed through a KVM switch. To protect the network by filtering traffic and blocking outsiders from gaining unauthorized access to the user data, a Fortigate 300C firewall is mounted in an open rack which is further connected to all the manageable L3 & L2 network switches in the same rack. From these switches, the connectivity has been extended to all the buildings through the fiber cable.

- **Desktops and Printers:** There are a total of 247 personal computers available in the institute, out of which 136 desktops are installed in three computer labs. The newly renovated Computer Lab-1 has the latest Lenovo M910Z All-in-one desktops whereas Lab-2 and Lab-3 have Lenovo M93p desktops. All the faculty and other staff members of the institute are issued desktops for carrying out their office work.

  The institute has 59 laser printers available in IT inventory comprising multi-function (monochrome and color) printers, heavy-duty network, and normal-duty standalone printers. All the faculty members and some dept. have been issued multi-function printers.

- **Internet Connectivity:** We are connected to the National Knowledge Network (NKN), a state-of-the-art multi-gigabit pan-India network, meant for providing a unified high-speed network backbone for all knowledge-related institutions in the country. This has recently been enhanced to a bandwidth of 1Gbps. Additionally, the institute has another internet connectivity of 20 Mbps from M/s BSNL to meet the redundancy in internet services.

  The institute has a robust LAN infrastructure that brings all the buildings (Admin building, Ganga Bhawan Hostel, Yamuna Bhawan Hostel, Executive hostel, and the Residential Quarters) together through manageable switches which are further connected to NKN through the firewall to cater uninterrupted internet connectivity to the users. Internet connectivity has been made available in every room of Ganga and Yamuna Hostels through LAN.

- **Wi-Fi Connectivity:** In addition to the wired net connectivity, a few locations like Lecture Halls for Long Term Programs, Faculty Rooms, Library, and Yamuna Hostel (1st and 2nd Floor) are Wi-Fi enabled.

- **Software:** The institute has advanced statistical and analytical software like SPSS, and IDEA to strengthen its research and consultancy program. In addition to this, a yearly subscription for Cisco WebEx Meeting / Google Class Room Hosts has been procured for all the long-term courses and MDP programs for conducting online classes because of the pandemic outbreak.
  - Anti-Virus (QuickHeal Seqrite EPTS)

- IDEA V11 Audit Software
- Tableau Desktop Professional Software
- SPSS 25.0
- Tally.Net subscription ERP 9.0
- MS Office 2013
- JAWS for Windows talking
- Prowess (Server-based)
- Cisco WebEx hosts all the programs (Long Term and Short Term)

- **Computer Lab-1 (**55 users' capacity)

Lenovo M910Z All-in-one desktop	Intel Core i5-7500, 8GB RAM,3.4 GHz, 1 TB HDD, keyboard, USB Optical Mouse, 8X DVD-RW, Windows 10 prof.
Printer	HP 3015dn

- **Computer Lab-2** (62 users' capacity)

Lenovo M93p Desktop	Intel i5, 3.2 GHz with 6MB Cache, 4GB DDR3 RAM, 500GB HDD, 18.5" TFT Monitor,104 keys keyboard, USB Optical mouse,6 USB ports, audio ports, 8X DVD Drive, Network card, Windows 8 Pro with Media& Documentation
Printer	HP 3015dn

- **Computer Lab-3** (19 users' capacity)

Lenovo M93p Desktop	Intel i5, 3.2 GHz with 6MB Cache, 4GB DDR3 RAM, 500GB HDD, 18.5" TFT Monitor,104 keys keyboard, USB Optical mouse,6 USB ports, audio ports, 8X DVD Drive, Network card, Windows 8 Pro with Media & Documentation
Printer	HP P1606dn

The comprehensive information about the institute can be found on the institute's website at **https://www.nifm.ac.in**.

5. SPORTS FACILITIES

- **Indoor games** - The Institute has a fully functional Indoor Sports Complex which includes Billiards, Table Tennis, Squash, Badminton, and Other Recreational Facilities.

- **Gymnasium facility -** available in the sports complex which includes equipment like Treadmill, Cross Elliptical, Cycle, Twister, Four Station Gym Machine, Weights, Dumble, etc.

- **Outdoor games** - Courts for Tennis, Volley Ball, and Basket Ball Besides Cricket and Football Ground.

ABOUT JOURNAL

The NIFM Journal of Public Financial Management (NJPFM) is the first Bi-annual (January-June & July-December) peer-reviewed research journal published by the Arun Jaitley National Institute of Financial Management (an Institution of Ministry of Finance, Government of India), Faridabad to provide a platform to academicians, researchers, policymakers for their research work in the field of *Public Finance & Public Policy, Economics, Banking, Governance, Public Procurement, Finance, Accounting, and General Management.* NJPFM is expected to enjoy a high readership among a cross-section of the intelligentsia.

NJPFM is expected to enjoy the highest readership. The areas of interest include but are not limited to the topics *cited supra.* From the day of its inception, the followings are the status of publication:

Sl.No.	Volume	Issue No.	Date	Date of Publication
1	I	1	January – June 2009	16 January 2009
2	I	2	July – December 2009	07 July 2009
3	II	1	January – June 2010	07 January 2010
4	II	2	July – December 2010	07 July 2010
5	III	1	January – June 2011	07 January 2011
6	III	2	July – December 2011	07 July 2011
7	IV	1	January – June 2012	07 January 2012
8	IV	2	July – December 2012	07 July 2012
9	V	1	January – June 2013	07 January 2013
10	V	2	July – December 2013	Not Published
11	VI	1	January – June 2014	Not Published
12	VI	2	July – December 2014	Not Published
13	VII	1	January –June 2015	07 August 2015
14	VII	2	July – December 2015	Not Published
15	VIII	1	January – June 2016	Not Published
16	VIII	2	July – December 2016	Not Published
17	IX	1	January – June 2017	Not Published
18	IX	2	July – December 2017	Not Published
19	X	1	January – June 2018	Not Published
20	X	2	July – December 2018	Not Published
21	XI	1	January – June 2019	Not Published
22	XI	2	July – December 2019	Not Published
23	XII	1	January – June 2020	Not Published
24	XII	2	July – December 2020	Not Published
23	XIII	1	January – June 2021	Not Published
24	XIII	2	July – December 2021	Not Published

25	XIV	1	January – June 2022	07 April 2022
26	XIV	2	July – December 2022	Under Process

It is also expected that the *NIFM Journal of Public Financial Management* would be an appropriate platform for the faculty of NIFM to express and share their relationship with the rest of the world and in bargain invite the academic resources to strengthen NIFM's status as a true *Centre of Excellence* in Public Financial Management.

The NJPFM vision is to be reviewed, abstracted and indexed by the Econ Lit, Journal of Economic Literature [JEL] (of American Economic Association), Mathematical Reviews (of MathSciNet), Newjour, JournalSeek, Getcited, EBSCO database, Thomson Gale Database, and Indian Economics Association.

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Editorial

MADHU RANJAN KUMAR*

PROCUREMENT RESEARCH CENTRE has been established by the Ministry of Finance to do research in the field of public procurement and allied areas and to provide policy input to the Ministry of Finance on different domains of procurement. It is only appropriate that this special issue on public procurement is used as a tool to initiate a discussion on different domains of public procurement. For a long, the realm of public procurement in India has been procedural with little knowledge among the practitioners of the theoretical underpinning of contracting per se. This editorial aims to provide a fundamental level of understanding of the theoretical underpinning.

1. Understanding Contract

A simple legal definition of a contract is that it is an agreement between two or more persons to do a certain thing for consideration. The classical theory of economics says that markets are efficient. That is, if a person wants a product or desires some service to be performed, she will pay the market price and get her product or get the desired service performed. However, are all exchanges efficiently possible by the mechanism called market?

Brousseau and Glachant (2002, p.4) bring out that in a decentralized economy, supply need not meet the demand at a posted price. According to them, the classical understanding of the market does not factor in the following:

i. There is a cost of operating the market.
ii. The market assumes collective coordination among all its actors. That is, all the market actors participate in the tâtonnement process of price discovery and the properties of the Goods being traded are fixed in advance and known to all. However, in reality, the market is decentralized.
iii. Goods are exchanged in a bilateral context. That is, the seller and buyer do not have information on all other exchanges taking place for the same merchandise.

How theories of contract aim to understand the exchange of Goods or services in ways different from a market-based exchange of Goods and services can be understood from what Brousseau and Glachant (2002, p.19) say: 'The unit of analysis in contracting theory is not the market but the transaction……. The

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great contribution of contract economics is to underline that price formation at a bilateral level may prevent spontaneous market adjustment. This failure to adjust is not attributable to external constraints (of a regulatory nature), but rather to the decentralization of decisions' (Brousseau & Glachant 2002, p.21). Brousseau and Glachant (2002, p.4) call the classical understanding where supply meets the demand at a posted price as Walrasian market theory (WT). Then they compare three dominant theories of a contract to the market-based WT. These are summarized in the Table below:

Table 1:
Schematic Representation of Different Theories of Contract

Theory	Rationality	Contracting parties' information	External institutions	Principal issue
WT	Savage	Complete and symmetric	Perfect (Including deviations from the announced plan)	Centralized and simultaneous establishment of all
IT	Savage	Complete and symmetric	Perfect (Guaranteeing the performance of commitment)	Disclosure and incentives ensured by payment schemes
ICT	Savage	Complete and symmetric	Imperfect (Unable to verify some variables)	Allocation of decision rights and residual surplus to motivate non-contractible investments
TCT	Simon	Incomplete and asymmetric	Very imperfect (Unable to verify some variables and subject to bounded rationality)	Creation of procedures for decision-making ex-post and of mechanism to render the commitments enforceable

Source: Brousseau & Glachant (2002, p.15)

Brousseau and Glachant (2002, p.8 –p.12) summarise the above positions as follows:

1.1 Incentive theory (IT)

Developed in the 1980s, Incentive theory (IT) very much like the Walrasian economic theory, assumes that 'economic agents are endowed with substantial, or Savage, rationality (Savage 1954), that they possess complete information concerning the structure of the issues they confront along with unlimited computational abilities, and that they have a complete and ordered preference set'. It defers from Walrasian market theory in the sense that it acknowledges that on certain variables (which are important for the successful execution of the contract), one of the parties –the principal – is under-informed. Incentive Theory is therefore a shift towards a more realistic conceptualization of the contracting world as it acknowledges information asymmetry. It is reasonable to argue that the ex-ante, the principal (the under-informed party) will not have access to all the private information about the agent (the informed party). Thus, to make up for his lack of information about certain aspects of the agent's skill set or productivity, the principal designs a menu of contracts and asks the agent to choose from them. Each option in the

menu refers to a set of private information(s) about the agent. Each option is designed to differentially incentivize the behavior of the agent. The agent weighs each option based on her 'private' information about herself and finally would select the one which maximizes her return. Depending on the option which the agent selects, the principal is now able to deduce the private information about the agent (which was hitherto unknown to the principal). Thus, by linking the incentive structure of a contract to its corresponding information set (about the agent), the principal is able to design a more realistic contract with the agent.

In the context of procurement Malin and Matrimort (2002, p.136) explain it as follows:

The optimal output produced by a privately informed seller (the agent) for an uninformed buyer (the principal) can equivalently be implemented by letting the agent report his information to the principal and having the latter choose the particular output target and compensation or by letting the principal offer a non-linear price and letting the agent choose within this menu his most preferred choice. In the first case, the agent has no freedom of action except on his report to the principal who exerts formal and real authority. In the second case, the agent exerts some form of real authority within the constrained set of decisions proposed by the principal.

The above-explained optimal scheme is a pointer to the 'Irrelevancy Theorem' according to which, ownership may have no impact on the optimal allocation of resources in the economy. Thus, the firm's boundary becomes irrelevant in this case. Accordingly, Sappington and Stiglitz (1987) have shown that a 'publicly owned firm and a regulated privately owned firm can both be induced to produce the same socially optimal output at the same incentive cost by a clever design of procedure for auctioning the right to produce to the private sector. In this case, privatization has no impact on how resources are allocated between the public and the private sectors of the economy (Malin & Matrimort 2002, p.137). They have thus argued that 'the problem with incentive theory is that incentive theory has nothing to say about such things as the distribution of authority within an organization, the limits of the firm, the separation between the public and the private spheres of the economy, and, more generally, nothing to say about organizational forms and designs.

Thus, the incentive theory offers little theoretical foundation as the separation between the public and the private spheres of the economy, or organizational forms and designs, are not dealt with here.

Another problem with Incentive Theory is that it assumes a frictionless world – where the principal incurs no cost in transacting its business with its agent and the principal has all the knowledge –he is fully rational (i.e., he possesses Savage rationality) and thus is capable of correctly processing any amount of input information at nil cost. In the real world, these two issues are however faced. That gave rise to the 'transaction cost theory of contract.

1.2 Transaction cost theory (TCT)

Building on Williamson's transaction cost theory (TCT) (1999), Ménard and Saussiér (2002) have brought out that

TCT was initially developed for explaining the trade-off between making or buying. It was progressively extended to take into account intermediate modes of governance ("hybrid arrangements"). The TCT has also been applied to the decision that a government must make between providing a service itself, or outsourcing it through contractual arrangements. If it is assumed that agents are looking for efficient modes of organization, i.e., arrangements that will minimize both their costs of production and their costs of the transaction, under the constraint that represents the risk of opportunistic behavior of their partners.... then the TCT predicts that the trade-off among different possible arrangements and the adequacy of the resulting choice depends on the characteristics of the transaction that the mode of governance has to organize. Efficient modes of governance are those in correspondence with the degree of specificity of the assets required by the transaction and the degree of uncertainty surrounding this transaction.

Ménard and Saussier (2002) have specifically studied the impact of different forms of governance (in-house vs outsourced), in the context of services that have historically been provided by the government. In their study of the provisioning of water service by different municipalities in France, they concluded that (Ménard and Saussier 2002, p.461)

First, the choice of the mode of governance seems to follow an implicit economic logic that conforms to what TCE predicts, notwithstanding the influence of other factors, e.g., politics. Moreover, this choice of a mode of governance does have a direct impact on the performance of the water supply units' (WSU), as measured by the criterion of quality relative to legal standards. There are significant differences in performance at WSU. But these differences do not express the absolute advantage of one mode of governance over the others. Rather, they follow the logic predicted by TCE. Indeed, integrated arrangements ("régies") are used in situations in which problems of raw water quality are the most acute, and in which investments required are significantly greater. To put it the other way around, when the integrated form ("régies") is adopted in such circumstances, its performance is comparable to and sometimes better than the performance of private operators working in similar conditions.

Contracting from the TCT point of view is based on three cornerstones: (i) bounded rationality (ii) future uncertainty (iii) private conflict resolution.

They work like this: Because the parties to the contract and the judge (who are formally given the authority for dispute resolution) have bounded rationality and because it is not possible for ex-ante to visualize all future situations/problems, the contracts are 'strongly' incomplete (Brousseau & Glachant 2002, p.13). As the future remains uncertain, it is necessary to design provisions that ensure the ex-post commitment of the contracting parties to satisfactory performance of the contract and thus prevent them from displaying opportunistic behavior. This is enabled by creating a private order which facilitates private conflict resolution (It has to be private as due to bounded rationality and future uncertainty, any formal judicial conflict resolution will remain ineffective). This is facilitated by having an institutional framework. This is enabled by a professional code of conduct or 'self-regulation' which is complemented by 'informal' analogs like behavioral rules and imposed relational networks such

as social and ethnic groups (Brousseau & Glachant 2002, p.14). However, that a formal or informal code of conduct or regulation can influence the successful execution of a contract has been disputed by another school of contracting theory called 'incomplete contracting'.

1.3 Incomplete contract theory (ICT)

ICT assumes Savage rationality and no asymmetry of information to either of the contracting parties (Brousseau and Glachant 2002, p.10). But it argues that contracting on unverifiable variables is useless (Brousseau and Glachant 2002, p.10). The Foundation of ICT is based on a framework 'wherein actions are assumed to be ex-ante non-describable but ex-post verifiable. The initial conception of incomplete contracts models focuses on how ownership allocation affects ex-ante investments through its impact on the ex-post bargaining between the contracting parties (paraphrased from Aghion & Rey 2002, p.163). ICT, therefore, brings out the futility of trying to impose a contract based on a professional code of conduct or by self-regulation. Hart (2002) has further examined the role of formal contracts on informal contracts. He concludes (2002, p.160 of online version)

It is hard to draw clear-cut conclusions about whether formal contracts will make it easier to sustain self-enforcing contracts (i.e., formal and informal contracts are complements), or more difficult (i.e., formal and informal contracts are substitutes). Which way it goes would seem to depend on the circumstances.

The above discussion on contract theory shifts the level of analysis from industry or market to more sub-microeconomic 'transaction' between the contracting parties (Brousseau & Glachant 2002, p.19). Relationships between firms are no longer market-based. In light of the concepts of bounded rationality and transaction cost, the efficiency of taking recourse to the Court or legislature has been replaced by "private order" and a private conflict resolution mechanism (Brousseau & Glachant 2002, p.20).

The above emphasis on a contract being a sub-microeconomic transaction between the contracting parties and the emphasis on private conflict resolution brings to the fore the importance of ethics in public procurement.

The first paper by Prof. Vivek Suneja deals with this issue. The general public as the principal in public procurement and the procurement professionals as the agent of the principal create a chasm between the supplier/contractor and the principal where a third-party regulator like a court or legislature/auditor can only do a post-hoc analysis of the efficacy of public procurement made. Accordingly, this provides an opening for opportunistic behavior both to the procuring agent as well as the supplier/contractor. Therein lies the importance of ethics in public procurement.

In a more specific but comprehensive study of two major ministries of the Government of India, Dr. Vikas Rohilla brings out the specific issues which need to be addressed in the domain of high-value complex public procurement. There are very few research studies of high-value complex public procurement. This paper fills that important knowledge gap.

Next paper[1] by Dr. B.K. Sahay is a theoretical paper that aims to bring quantitative elements into the domain of public procurement which is historically driven by procedural details. It argues to shift the role of a contractor to that of a partner in a PPP contract and introduce such policy shift in the design of the contract which facilitates a contractor to behave as a long-term partner. The cost-sharing parameter suggested in this paper can be an important incentive to a long-term partner provided the traceability of cost incurred is ensured.

The paper by Sri Sidheshwar Tiwari brings out how public procurement can be used as a tool to induce demand-side innovation in industry and acknowledges the lack of clear guidelines for public procurement of innovative products. Thus he proposes a model eco-system that can be used to drive innovation through public procurement.

Dr. Yugank Goyal touches upon an under-researched area in public procurement – that of public procurement in an emergency. Assessing the central government and some state government's response to Covid 19, his paper brings out how the initial centralization of procurement at the level of central government and later the decentralization of the same brought out the lack of capacity in public procurement functionaries in devising an appropriate public procurement strategy despite there being clear rules for adopting a flexible approach which the public procurement professionals avoided largely due to their risk-averse behavior an issue which Dr. Rohilla paper also highlights.

Sri Sunil Kumar Chaudhary has brought out the importance of sustainable procurement in road construction during the entire cycle ranging from construction planning to maintenance and operation of the road. His paper shows the challenges involved in sustainable procurement in each stage and the importance of stakeholders for any viable implementation of sustainable procurement in road construction.

All the papers except the paper by Dr. Vivek Suneja were submitted to the International Conference on "Use of Data Analytics in Public Procurement and Supply Chain Management" organized online by Aru Jaitely National Institute of Financial Management (AJNIFM) from 10th June 2022 to 11th June 2022.

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The Rationale for Ethics in Public Procurement: A Transaction Cost Perspectives

VIVEK SUNEJA*

ABSTRACT

The aim of this paper is to explore the rationale, role and significance of ethics in public procurement from a transaction cost perspective. We argue that information asymmetry between the seller and buyer of a product (which may be a good or a service) cannot be remedied beyond a point by recourse to market mechanisms or through bureaucratic procedures. Market and bureaucratic failure hence necessitate the need for ethical behaviour on part of both the buyer and the seller in order to ensure that the transaction is efficient and fair. We make a distinction between the categories of search, experience and credence products and argue that since information asymmetry and quality uncertainty is greater in the case of credence and experience categories of goods relative to search goods, the need for ethics in facilitating transactions shall correspondingly vary. We further demonstrate that while our arguments are valid for both public and private procurement, public procurement is often attended by a higher degree of transactional failure on account of principal – agent issues, and hence requires a greater degree of observance of ethical behaviour by the transacting parties.

Keywords: ethics, public procurement, transaction costs, search goods, experience goods, credence goods

JEL Classification: H57, H41, J18

1. Introduction

Public procurement is big business. The European Union spends about 14 percent of GDP on public procurement. The corresponding figure for OECD countries is 12 percent, which is the same percentage that the world as a whole spends on public procurement. For India, public procurement is estimated to be around 20 percent of GDP.

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Public procurement involves the purchase of goods, services and works by governments and its agencies. Governments generally purchase two kinds of goods: public goods and merit goods. Public goods are goods which are non-rivalrous or non-excludable in nature, such as national defense and public infrastructure, which cannot be provided by private markets. Merit goods are goods such as education and healthcare, which governments may choose to provide on fairness grounds or because such goods confer positive externalities on society as a whole (Stiglitz and Rosengard 2015).

In view of the enormous size of public procurement, governments all over the world have been making efforts to make public procurement processes efficient and effective. In this context, two major challenges that confront public authorities globally are to do with quality assurance and corruption.

2. Contribution of Transaction Cost Economics

In this paper, we explore how the discipline of Transaction Cost Economics can help us in comprehending the rationale, role and significance of ethics in relation to public procurement.

Transaction cost economics studies the transaction costs involved in exchanging products (goods or services). While the path-breaking paper was written by Coase (Coase 1937), it was the 'rediscovery' of his work by Williamson (Williamson 1975) and by Buckley and Casson (Peter J Buckley and Casson 1976) that led to the establishment of this hugely significant branch of economics, in both theoretical as well as policy making terms. Both Coase and Williamson were awarded the Noble Prize in Economics for their seminal contributions (in 1991 and 2009 respectively). In recent decades, there has been an enormous amount of research in this discipline (for an overview, see (Langlois 2022; Peter J. Buckley and Casson 2020)). The theoretical insights of transaction cost economics have been applied to a wide range of areas in economics, business and management, yielding valuable policy prescriptions (Cuypers et al. 2021).

Transaction cost economics points out that a number of things need to be taken care of before any economic exchange / transaction can take place. Information pertaining to the product needs to be disseminated between the potential buyers and the potential sellers. Such information may relate to a variety of aspects including product features, availability, price, terms of exchange and quality. Disseminating and obtaining information about these various aspects necessitate deployment of economic resources that give rise to corresponding kinds of transaction costs. In other words, for a market exchange to take place, considerable market - making / marketing activities are required. Markets do not exist on their own. Markets, understood as institutions that facilitate exchange of goods and services, need to be created. 'Marketing 'is hence best regarded as the set of arrangements, practices and activities involved in market making. This implies that for efficient exchanges to take place, mechanisms need to be instituted to try and reduce the attendant market-making / marketing / transaction costs, to the extent possible (Carter, Casson, and Suneja 1998; Suneja 2018).

3. Central Issue of Quality Uncertainty: Search, Experience and Credence Goods

One of the most important issues involved in procurement of goods and services, in both the public and private contexts, is how to assure product quality. The reason why this is such a key issue in procurement is that often an information asymmetry exists between the potential seller and the potential buyer of the product. The seller is often in possession of more accurate information about the quality of the product than the buyer. With respect to the issue of information asymmetry between sellers and buyers concerning the quality of the product, economists make a distinction between three categories of products: Search Goods, Experience Goods and Credence Goods (Nelson 1974; Darby and Karni 1973).

Search goods are defined as products whose quality can be known prior to the purchase of the product. As an example, when buying flowers in physical /offline mode, the freshness or colour of the flowers can reasonably be ascertained by physical inspection of the flowers [(1)]. On the other hand, the quality of a consumer durable such as a washing machine can only be ascertained after having used the washing machine over a period of time. Products (goods or services) whose quality can be gauged only after experiencing them post-purchase over a period of time are defined as Experience Goods (Nelson 1974). Other examples of experience goods include haircuts, restaurants, hotels, clothes and furniture.

There is another category of products (goods/services) where the information asymmetry is so great that it is difficult for the buyer to accurately assess the quality of the product even after experiencing the product: such products are categorized as Credence Goods. Examples of credence goods include health supplements, and to a degree professional advice such as legal, investment or medical advice. The perceived quality assessment of such goods by the buyer (which may be accurate or not) hence partially rests on whether the buyer believes the seller's claims to be credible or not: such goods are hence called credence goods.

The distinction between these three categories of goods is not always clear cut in practice. Hence, rather than saying whether a good is exclusively a search good, an experience good or a credence good, it can be more helpful to assess the degree to which any particular product possesses search, experience or credence properties. For example, an article of apparel such as a shirt may possess some search properties: by visual and tactile inspection, one can to a degree ascertain the quality of the shirt, pre-purchase. However, not all dimensions of the quality of the shirt can be known in this manner: whether the dye colours are steadfast or not, how much the garment may shrink on washing, how easy would it be to iron the garment or how durable the fabric is: all this can be known only after using / experiencing the product over a period of time: these dimensions / properties of product quality represent experience properties. There may also be aspects of product quality that may not be known even after experiencing the product. For example, how durable the shirt is relative to shirts of other brands, can be known only if shirts of the various brands were to be purchased and then experienced over a period of time under identical or similar conditions. Hence, assessing product quality in relative terms (making inter-brand comparisons) may sometimes be very difficult or impossible: this represents the presence of credence properties.

From our foregoing analysis, it is evident that different products may possess search attributes, experience attributes and credence attributes in different proportions. Hence some goods may be pre-dominantly search goods, some goods may be pre-dominantly experience goods while others may be pre-dominantly credence goods.

4. Goods versus Services

With respect to quality uncertainty, it can be useful to consider the distinction between goods and services. Unlike goods, services are intangible in nature. Moreover, in the case of many services, the act of production cannot be separated from the act of consumption. For example, the act of getting a haircut is characterised by simultaneity in production and consumption: production and consumption cannot be separated from each other in spatial or temporal terms. Such simultaneity in production and consumption implies that such a product cannot be a search product whose quality can be assessed by inspection of the product pre-purchase. Only after one has made the purchase / consumed the product (e.g., when the hair-cut is complete), one may be in a position to assess the quality of the service rendered: such services hence necessarily fall in the categories of experience or credence products. Similar examples abound: only after one has availed the services of a surgeon, can one possibly assess the quality of the surgery service rendered. Our analysis implies that transactions involving services may be associated with a greater degree of quality uncertainty relative to transactions involving goods.

5. Coping with Quality Uncertainty: Quality Assurance Mechanisms

The difficulty in assessing product quality poses a serious challenge to the ability of markets to efficiently facilitate economic transactions. The information asymmetry involved in transacting experience and credence products also poses potentially serious distributional consequences: one party may cheat the other and hence gain at the expense of the other. If the risk of getting cheated is particularly grave, the potential buyer may altogether refrain from transacting: this represents an example of complete market failure(Akerlof 1978). In less severe cases of market failure, the transactions may still occur but be accompanied by varying degrees of cheating behaviour, with adverse consequences for both transactional efficiency and distribution.

In the private sphere, branding has evolved as an important quality assurance mechanism. Brands generally serve three functions: functional, quality assurance and symbolic. In their identification of the provider of the product, brands play a functional role. Brands may also signify symbolic value: consumers of brands may derive a sense of status or self-esteem from consumption of products of particular brands. In this paper, we are chiefly concerned with the quality assurance role that brands can possibly play. Brands can embody a reputation for quality. Having invested in establishing a reputation for quality, if a brand were to supply a shoddy product to its customers, the brand could lose the reputation that it has painstakingly built for quality. As an example, if a particular McDonald's outlet were to supply inferior quality product to some consumers, the entire McDonald's chain may suffer reputation damage and diminution in brand value, as the affected consumers may spread the information about the sub-quality

product to other consumers, through social media, word-of-mouth or through other channels. Having invested in creating a reputation and image in the minds of consumers regarding product quality, brands have an economic incentive to not cheat on product quality. In other words, it is in the enlightened long-term self-interest of brands that have invested in establishing a reputation for quality to maintain the reputation for high standards in product quality. As the proverb goes, reputation arrives on a tortoise but departs on a horse-back.

Branding as a quality assurance mechanism is most effective in the case of experience goods (Nelson 1974). Since a consumer cannot assess the quality of an experience good (such as a washing machine or a submarine) pre-purchase, but only after experiencing the good over a period of time, a consumer may rely on the brand reputation with respect to quality, when deciding which product to purchase. In the case of search goods (such as buying flowers in physical mode), since product quality can be ascertained by the consumer pre-purchase by merely inspecting the products, there is no need to invest in brand building. Things are more complicated in the case of credence goods (such as health supplements, many kinds of consulting services), where consumers cannot accurately assess product quality even after consuming the product. In this case, a brand's reputation for quality may rely more on consumer perception rather than on any strict correlation with actual product quality.

The difficulty of using brands as a quality assurance mechanism in the case of credence products, as pointed out above, should alert us to the fact that the quality assurance role played by branding is far from perfect. In addition, it is certainly not costless. Billions are spent every year by brands to create their brand images. These billions add to the cost of the products, and these costs are ultimately borne by consumers. So, while the brand reputation mechanism may serve as a quality assurance mechanism and hence enable markets to function, this entails significant expenditure of economic resources. When information asymmetry between buyers and sellers creates quality uncertainty, markets cannot function in a costless, efficient manner. Moreover, many consumers may be emotionally and irrationally swayed in their purchase decisions by the symbolic aspect of the brand image, rather than basing their purchase decision on the quality aspect of the brand reputation.

6. Public Procurement: Principal - Agent Problems

The various issues considered so far relate both to public and private buying and selling. Information asymmetry and quality uncertainty exist in both contexts, with adverse consequences for both transactional efficiency and distribution. There are however additional issues to consider in the case of public procurement. In the case of private procurement, it is in the self-interest of the buyer to assess product quality of the various available offerings in an honest fashion. While quality uncertainty may constrain his ability to make the optimum choice, he has no incentive to make an intentionally wrong decision [(2)]. This may no longer be true in the case of public procurement. In the case of public procurement, the purchase is done by the government or its agencies, and funded partially or entirely through taxation or public borrowing. While the principal is the public at large, the agent is an individual (or a group of individuals) who is supposed to represent the best interests of the public, when making the procurement decision.

This creates a possible wedge between the self-interest of the procurement agent and the best interest of the public [3]. The agent may be tempted to accept favours or outright bribes, thus imposing losses on the public. Moreover, the product with the highest quality may not be procured: this may seriously impact efficiency and equity in public procurement.

To deal with this principal-agent problem, public procurement agencies often adopt detailed purchase rules and procedures to try and avoid fraudulent behaviour. The system of a two-stage bidding process, the transparency afforded by e-tendering portals etc. are all aimed to reduce and eliminate cheating behaviour by the sellers and the buyers [4]. However, given the formidable information asymmetry and quality uncertainty that is associated with experience and credence goods, it is almost impossible to design and implement a perfect public procurement system that relies solely on bureaucratic procedures.

7. Transaction Costs Rationale for Ethics in Public Procurement

Our foregoing discussion points to the need for ethics in procurement, especially in public procurement. Market mechanisms that have evolved to assure quality such as branding, are neither perfect nor costless. In the public sector, there is the additional problem that the agents may sacrifice the interests of the public for their self-interest.

The implication of our analysis is inescapable: without ethical behaviour on the part of both buyers and sellers, procurement can neither be efficient nor equitable. Our analysis also suggests that the need for ethical behaviour shall vary depending upon the category of goods. There is a greater need for the transactors to be ethical when the transaction involves experience goods relative to when search goods are involved, since the information asymmetry and quality uncertainty is higher in the case of experience goods. For the same reason, the need for ethical behaviour is the greatest in the case of credence goods. It should then come as no surprise that physicians in ancient Greece were required to take the Hippocratic Oath before they were permitted to start practising medicine. Medical services are a classic case of credence products: so great is the information asymmetry between the patient and the doctor, that unless the physician is ethical, the advice or treatment by the doctor cannot be relied upon.

Ever since the dawn of history, societies and civilisations have recognised the critical need for ethics in both the private and public spheres [5]. The values, norms and practices that embody ethical behaviour have been debated and discussed in both the ancient European tradition (Beresford 2020) as well as in the ancient Indian philosophical and religious texts (Radhakrishnan 1914). It is hence natural to expect that ethical behaviour is imperative for efficient and fair functioning of markets, in both private and public sectors[6]. Economics, after all, is a social science, and economies are embedded in societies[7].

NOTES

(1) This no longer holds when buying flowers online. The buying of flowers in online mode represents the purchase of an experience good, since it is not possible to ascertain the quality of the flowers pre-purchase.

(2) Principal – Agent problems can also afflict procurement in the private sector when the buying agent is not the owner of the enterprise. In such cases, the agent's interests may not coincide with the agents of the principal. The principal would then need to monitor the

buying behaviour of the agent or provide incentives (rewards and punishments) to align the interests of the agents with the interests of the principal. In practice, such monitoring or incentives are often imperfect in terms of what they can achieve

(3) Jenson and Meckling (Jensen and Meckling 1976) were amongst the first to address the agency problem when a principal requires an agent to perform some tasks on his behalf. Unless the self-interest of the agent is aligned with the interest of the principal, the agent lacks the incentive to comply with the directive of the principal in fulsome fashion. For an overview of the literature on the agency problem, see Eisenhardt (Eisenhardt 1989).

(4) The two-stage tender bidding process typically involves the technical bid at the first stage and the financial bid at the second stage. Only those bidders that pass the technical requirements are considered at the financial stage, and the bidder with the lowest bid (L1) is awarded the contract. The problem often lies in laying down the technical specifications in a precise or satisfactory fashion with respect to product quality. While it may be possible to specify minimum levels of expected quality in technical terms, it can be notoriously difficult to specify desired levels of product quality. Furthermore, a two-stage bidding process may not permit justification of acceptable price differentials on the basis of perceived quality differentials of the various bids, given the difficulty of credibly demonstrating and putting monetary value to the differences in product quality of the alternative bids.

(5) The irreplaceable role of ethics in underpinning civilisation was described by Gandhi in 'Hind Swaraj'(Gandhi 1921): unless individuals can govern themselves through self-restraint, no civilisation can flourish in a sustainable fashion.

(6) This paper has not gone into the question of how ethical cultures can be instituted and nurtured. For a conceptual discussion of this issue at the level of the organisation, see Ouchi (Ouchi 1980).

(7) For an excellent exposition of this argument, see Schumacher (Schumacher 2011).

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High Value of Public Procurement: A Case Study of India

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ABSTRACT

Through a review of high value public procurement in the Ministry of Defence and the Ministry of Railways, this research identifies the following issues which affect public procurement in these two ministries: lack of system / process approach, impact of macro environment, political influence, impact of special market dynamics, lack of responsibility and accountability mechanisms, lack of convergence in conflicting stakeholders interest, technology denial due to collusion, continued inefficiencies despite regulations, inadequate research and development and absence of technology leadership, technology denial and rent seeking behaviour by developed countries, handling procurement as intra organisation transactions, agent problem, role of public sector enterprises involved in public procurement, contract management inefficiencies, lack of inter and intra organisational coordination, communication issues, lack of effective evaluation of public procurement effectiveness and media as the new stakeholders in public procurement.

Keywords: Defence, Railways, technology denial, conflicting stakeholder interest

JEL Classification: H57, H41, J18, D74

1. Introduction

THIS RESEARCH SEEKS to examine the strategic (system) issues concerning efficiency in high value public procurement with special reference to defense and railway purchases in India. The scope of the study is limited to:

i. High value public procurement in the two large government organisations of Ministry of Defence and Ministry of Railways under Government of India.

ii. The study only proposes to study high value public procurement

* Indian Army [Necessary consent of the Ministry of Defence was taken for public dissemination of above research as a part of the Ph.D. thesis of the author.]

above Rs 5 Crore.

iii. The study makes no distinction between public procurement from indigenous or foreign sources.

In simple contracts fixed price contracts provide best incentive for price reduction by the seller. Studies have however shown that in complex projects, fixed price mechanism is inefficient (Bajari, McMillan, and Tadelis 2009) and effective monitoring and flexible contracts may offer a better solution. Kelman has been quoted in Cameron and Mar (2000) that buyers with a rigid evaluation system on contract performance and price (judging the seller on an objective criteria) results in vendor delivering lesser performance for the buyer. In a paper that discuses transaction costs against incentives (Bajari and Tadelis 2001) it has been stated that cost plus contracts are actually preferable to fixed price contracts in complex contracts beset with uncertainties when there is greater adaption / changes required in the later stages of the contractual agreements. In complex contracting the costs of renegotiation/contract amendments might be higher and hence cost-plus contracts would incentivize the supplier better. Cost plus contracting thus emerges as a viable alternative in developmental project-based procurement in research and development organisations like the Defence Research Design Organisation (DRDO) in India. Learning from Private Sector study, Telgen, Harland and Knight (2012) have pointed out that public procurement still lags behind private procurement in scientific analysis and accumulated knowledge. Although the differences may only be about 20%, but these demands are in respect of external issues like transparency, integrity, accountability and exemplary behavior, and internal issues like managing multiple goals, political interference and stakeholder's incongruence. A study (Buelens and Van den Broeck 2007) of 3314 Private Sector and 409 Public Sector employees on understanding of differences of work motivation confirmed that public sector employees are less extrinsically motivated implying thereby that civil servants are less motivated by salary. Work life balance is important to them. The differences in public and private procurement (Kelman 2005) are the differences in external environment, the difference in meaning of profit, and inability to use money as a motivator in public procurement. Also, there is often a need for the public procurement organisations to work together in special circumstances of location and situation. Further, within defence procurement, use of contracting with market is in a *niche* function like weapon making. This entails greater importance to ethics and amicable management of mutual issues to avoid public scrutiny. In private sector the supply chain practices find greater usage (Korosec 2003) because of greater discretion and control over the budgeting process. From the point of view of incentive theory, Tullock (1965) states that incentive to assure efficiency within the public bureaucracy tend to be smaller than within similarly sized private firms. Incentives can be used (Lewis and Bajari 2011) to increase satisfaction (welfare) and lower procurement costs for the public procurement. It has been claimed that implicit incentives (Dixit 2002) are likely to be more important in the public sector. The study suggests that policy design must address the complexity of multiplicity of tasks and principals that affect public sector efficiency.

2. Research Method

The literature review brought out that there were no pre-existing studies that

would have suggested a research methodology to study the complex real-life phenomena of public procurement in defence and railway sector in India. Thus, qualitative studies were undertaken by way of interviews and case studies to explore and identify the context and constructs used for the study. The literature review on High Value Public Procurement in India confirmed that there has been no major comprehensive study (apart from the World Bank sponsored India - Country Procurement Assessment Report of 2003) to identify its various defining characteristics. Before undertaking any study, it is important to investigate both the context of research and identify the constructs and understand the co-dependent nature (Knight and Cross 2012) of the relationship between the two. It was therefore essential to delve deeper into the real-world context of public procurement by use of case studies to develop the constructs. A case study (Yin 2011) is defined as an empirical enquiry about a contemporary phenomenon set within its real world context especially when the boundary between the phenomena and the context is not clearly evident. The Comptroller and Auditor General (CAG)'s office also uses case study methodology to audit major public procurement undertaken by government ministries and departments. Thus, the methodology of multiple case study was used to establish the contextual constructs of Indian public procurement scenario. This required identification and evaluation of the following: -

i. An objective assessment of the comparison from a perceptional viewpoint (of how certain actions were taken) without which the real truth could not be expected to emerge.

ii. The process of public procurement involves certain actions by human actors that cannot be objectively gauged without understanding the circumstances under which such actions were taken by these actors. This is only possible in a case study. The case study method (Yin 2011) allows investigators to retain and evaluate the holistic and meaningful characteristics of real-life events.

Case studies were accordingly chosen from various units within Ministry of Defense and Ministry of Railways that were reflective of the various contextual aspects of public procurement in Indian setting. The focus was on identifying the context, characteristics, inefficiencies/gaps (including the reasons for these) and ascertaining the inter organisation similarities/ differences and the strategies that could be applied to obviate these inefficiencies.

2.1 Conduct of case study

Individual interviews were conducted, with various public and private procurement functionaries (who dealt with Ministries of Defence and Ministries of Railways) across hierarchical layers. In these semi structured interviews, free views of the participants were obtained on the likely solutions to the ills (if any) plaguing the procurement. Interviews were also conducted to fill the gaps in the case studies that were conducted as part of the exploratory study. In that sense the interviews guided the process of research by filling the gaps in information throughout the process of research. Case studies helped establish clear linkages between organizational structures, resources, the human elements and the procedures.

Interviews as part of triangulation: Also, interviews were conducted to cross verify

the variables of study as propounded by the public procurement practitioners. The case study information collected could not have been said to be complete in all aspects despite access to the historical records. For, often the files did not reveal the true intent of why certain decisions were taken and why certain facts were not ever mentioned on files. In such cases the views of the stakeholders were obtained to fill the critical information gaps. The aim of the interviews thus was to elicit fresh insights into the subject of procurement from the eyes of experienced practitioners as also validate the findings of the case studies. Suggestions on solution to the inefficiencies were also sought from those interviewed. The interviews were semi structured and a broad protocol was worked out in advance of the interviews. 28 interviews with senior functionaries in the Ministry of Defence, Ministry of Railways, other public and private sector undertakings were undertaken.

Case study design: Since multiple organisation-based case studies were undertaken, an embedded multiple case study design was chosen. The other reason for choosing multiple case study design was to improve the credibility (Yin 2011) of the results. Questions raised during the case studies were also recorded for further consideration by researcher. Literal replication was used to emphasize the presence of similar inefficiencies across cases.

Preparation of the case framework: A case framework was prepared prior to data collection. This was done with a view to identify the commonalities and maintaining chain of evidence. The database facilitated count of the various issues that impacted procurement. It also enhanced reliability. The sources were appropriately cited to maintain a chain of evidence so that the evidence collected could be tracked backwards by even a new observer/researcher. This database was prepared to identify key constructs along the following lines:

i. Macro Environment
ii. Strategic Impact
iii. HR Stakeholder Involvement Issues
iv. Accountability Framework
v. Technology
vi. Regulation and Policy Framework Issues
vii. Performance measurement Capacity
viii. Institutional Memory/ Knowledge Management
ix. Organizational Issues

2.2 Evaluation of Cases

The case study evaluation was done on the basis of common points of comparison. Yin (2011) has stated that there is no algorithm to assess and analyze narrative data. One has to use her own logic to analyze case study data. The analysis of the cases in the given framework was also tempered by the researcher's own experience as a practitioner. It has also been stated (Yin 2011) that analysis can systematically begin by organizing the data into arrays (Huberman and Miles 1994) with each sub unit of comparison organized into various cells (shells) of the table. The same system was followed into the case study for comparison. These sub units of analysis were put in a shell matrix for comparison. Yin further suggests that the techniques for analysis must address the research questions first. Replication logic was used to arrive at common phenomena occurrence after examining the rival explanations. Cross case analysis was used to determine the frequency of occurrence of a particular inefficiency

along with the likely causes/gaps. Associated solution strategies were then inferred from this matrix.

3. Discussion of the results

Given the sensitive nature of the cases (which all belonged to Government of India), their name and other details have been withheld. However, academic learning gleaned from the case studies and interview with senior functionaries are summarized below.

The sections below identify the strategic issues that impact high value public procurement in Ministry of Defence and Ministry of Railways. The results of inferences from the case study and interview phases of the research are now discussed.

Broadly the following contextual issues were identified: -

i. *System / process issues*: A systems view was missing in the process. The connotation of the missing systems view is that the various subparts of the high value public procurement systems were operating in disregard of the other sub system perspective. There was a tendency to persist with status quo as any change will upset the immediate status quo. The higher hierarchy was change averse because of the huge impact any changes would have had. E procurement implementation was one such area in which there was resistance to change as it might introduce new players / vendors and increase accountability of the stakeholders. Communication tracking could then have become easier too. Thus, since apparently e Procurement would lead to greater transparency and accountability; there was resistance to changing over to e procurement despite clear government orders on the subject.

ii. *The Impact of macro environment* - The extraneous factors that affected public procurement efficiency were collusion amongst partners, inefficient internal and external transactions and asymmetry of information. The pace of technology change and high obsolescence often made the high value public procurement decision makers to try to derive the best value from the money spent. However, this was often contested by the user, who had little regard for the money spent. There was a tendency to buy the latest and the most sophisticated technology. Such macro (economic, technological and legal) environment influences always had an influence on high value public procurement.

iii. *Political impact* - High value public procurements require large finances. Thus, the decision making was vested in the political authority. Since such high value public procurement were subject to political clearances and technology transfer restrictions at the highest level, they could not be delinked from political influence.

iv. *Special market dynamics* - High value procurements were technology intensive. Such high technology markets were thus either a monopsony or a duopolistic market where the core technology rested with one or two sellers.

Technology denial regimes are a major way in which these seller countries bring to bear this technology leadership power on the buyers. In such markets the market forces tend to ensure that the allocative efficiency is almost entirely subverted. Such usurping inefficiencies occur because of transaction costs, asymmetry of information, adverse selection, or individuals placing their own interest over public interest. Hence competition was limited and collusive behaviour with the sellers took e advantage of the denial regimes. In a monopsony case of high value public procurement, where there is a single buyer for of the item sold, the buyer's ability to negotiate goes up. Such a buyer would be enticed by a large number of sellers. However, should the buyer buy an additional good of the same type; the seller would try to raise price of the good. Thus, in a single seller confronted with a single buyer situation, both parties try to bargain as hard as possible. Duopsony was uncommon either. The impact of the duopsony was distinctly visible in the procurement of the medium multirole combat aircraft by India. With not many buyers in the market it was observed that the countries in fray, exerted highest levels of push to sell their aircrafts to India. Interestingly as India was about to finalize the choice of this aircraft when the Presidents of USA (06 Nov 2010), Russia (21 Dec 2010) and France (04 Dec 2010) visited India in span of six weeks. A similar conundrum faced the South Koreans in 2001 when they floated bids for the (then $4 Bn) FX Jet Fighter and there was pressure from the USA, Russia, the European Consortium and France. Such conditions are not uncommon in a high value public procurement. Economics of scope may therefore become more relevant in high value public procurement where the procurement goods are niche items integrating multiple high-end technologies from various countries. Buyer country can only achieve the economies of scope when they master at least a few of the core technologies and can integrate monopsony is a market in which there is only one buyer of the item sold. Monopsonist's buying potential has a direct bearing on the market. In a "duopoly" there are two sellers of a good or service in the market. It is a specific variation of oligopolistic market in which only two producers of a type of product have dominant control. Duopsony is a buying side counter to duopoly where there are only two large buyers. Thus, apart from a sound technological base, the requirement of achieving economies of scope lies in the competence to integrate such multiple technologies. Often because of such special market conditions, the seller concealed more information than it should. The seller even signed agreements that the price to him for a particular buy should not be disclosed. He behaved in this manner because of the asymmetry of information wherein the ministry in India often did not know about the actual price the other buyers of the same good might have paid.

v. *Lack of responsibility and accountability mechanisms*- In public procurement, though the ownership

often rests with the government; legislative and bureaucratic controls only worked to enhance process complexity and add to inefficiencies. This was apparently due to the feeling in which nobody seemed to own the public goods or the public procurement process. The higher bureaucracy (hierarchy) wielded enormous influence over the process, but the collegiate system of decision-making diffused responsibility. Such diffusion allowed the decision-making hierarchy to be risk averse. On the other hand, because accountability was important to the government, the government at times spent more money to prevent corruption than the one lost due to corruption. There is a conundrum here, the higher bureaucracy did not assume responsibility and the government spent money to create accountability.

vi. *Lack of convergence in conflicting stakeholders' interest* - There was clear incongruence in the interests of the various stakeholders. Whereas the political hierarchy was concerned about the political ramifications of procurement, the bureaucrat's interests lay in ensuring that the process was followed correctly. The user was at the other end of the continuum. He often wanted the latest technology at the earliest; something that required huge asset specific business investment. Thus, the user's behaviour too bordered on not being very rational.

vii. *Technology denial due to collusion* - Collusive behaviour is often difficult in market where high value public procurement business is conducted as each selling contender wishes to outdo the other. However collusive behavior became evident when the developed nations wished to restrict transfer of technology to India.

viii. *Inefficiencies persisted despite regulations* - Regulations are often designed to assign responsibility and accountability in a procurement system. Public procurement systems are beset with the tendency of the bureaucracy to follow regulations (the process) irrespective of the outcome. However, multiplicity of regulations in public procurement often acted in a manner to counter efficiency leading to fraud and corruption. Thus, the actual impact of regulations was contrary to expectations. Regulations did not offer the flexibility required in a dynamic high value public procurement scenario. Huge investment is required in either procuring the latest technology immediately or in setting up production lines by importing specialist machines. Here the top procurement management's view was more financial prudence centric which demanded either gradual development of the technology or negotiating with the user to accept a comparative lower end technology that met the minimum user needs. Collusive behaviour was seen among sellers to sell a high value public procurement product to the India as they did in the MMRCA aircraft procurement. In this procurement the USA, Russia and the EU competed fiercely to sell their aircrafts to India, but the same countries as part of the

'Wassenaar Agreement' collaborated to prevent transfer of higher end technology to India. Wassenaar Arrangement (named after a town in Netherlands and formed in 1996) consists of 41 participating states that controls transfer of specific technology and items to destinations outside the arrangement. It also controls export of conventional weapons and dual use technologies to non-members. It is a successor to the Coordinating Committee for Multilateral Exports Control (COCOM) which was the first such body. COCOM was formed right after the World War II. Lack of procurement power led to acceptance of restrictive clauses in high technology defence procurements from the USA which comes via the Foreign Military Sales Programme.

ix. This brings out that high value public procurement being dynamic in nature, it is impacted by multifarious factors and does not lend itself to control by regulations. Therefore, despite the labyrinthine regulations, inefficiencies persisted.

x. *Research and development and technology leadership* - Issues of research and development are important because of their application in the high value public procurement goods especially in defence and high technology space activity. Usually, such research should be carried out by government or government sponsored research and development labs and academic institutions. However, lack of research culture, meagre financial resources and lack of technology infrastructure in the country were responsible for the poor research and manufacturing activity in India. As a result, most high technology public procurement (which is also high value) came via the import route. There was lack of not only manufacturing but also quality assurance capability to test high technology products in the country. The countries that have the money to invest in research and development try to retain technology leadership and sell only the matured technology. Such products (which are in the mature phase of the life cycle technology) are sold to the less developed countries when a superior technology has been developed by the sellers. Some of these products may at times be replicated (by reverse engineering) by the less developed countries. However, this technology replication by the buyer is not desired or encouraged by the selling countries. Technology replication is also only possible when the buying country has a sound reverse engineering infrastructure. Technology propagation is thus a by-product of the product life cycle, however even as this happens, the original developers of that technology maintain their technology leadership by learning from experience and further developing new products thus starting a new cycle. Hence it was noted that the dominant strategy of developed countries in high value public procurement transactions was transfer of second grade technology to the buyers. Agreements like the Wassenaar facilitated this. The delay in procurement and development of the

cryogenics engine in India was direct fallout of use of such a dominant strategy by the developed countries.

xi. *Technology denial and rent seeking behaviour by developed countries* - Barriers to entry have a large bearing on high value public procurement as most advanced countries (part of the Wassenaar agreement) control transfer of technology to less developed countries who may want to develop cheaper alternatives to the existing systems. Such arrangements have preserved the asymmetry of technology pervading the high value public procurement market. Repeated attempts to obtain technology for its manufacturing infrastructure with foreign technological assistance / collaborative strategic arrangements have not succeeded. Poor indigenous technology capacity in India has led to the sellers exploiting the weak technology status of the buyer (that is India). This has a direct bearing on procurement efficiency. A rent seeking tendency was also observed with some high technology selling countries wherein these countries (as sellers of high value public procurement goods) controlled the supply and cost of spares.

xii. *Procurement as transactions (intra organisation transactions) and agent problems* – It was noted that the action of incentives in high value public procurement organisation (which are by themselves extremely complex) could not be explained by simple principal agent models. Transaction costs within an organisation or between separate organisations comprise the costs related to identifying the correct source of an economic exchange (here procurement), negotiating the best price (value for procurement) and ensuring efficient process execution leading to an effective outcome from such economic exchange (procurement). Large internal transaction costs were seen to be the norm in high value public procurement in India. Layered systems lead to increased intra government agency costs that had a direct bearing on efficiency. There were clear signs of risk aversion on part of the senior bureaucracy implying undue emphasis on process rather than the effectiveness or outcome of procurement. Such pre contract risk aversion had a major impact on procurement effectiveness. There were clear evidences of delayed decision making by the various stakeholders involved leading to unnecessary delays. In a large number of interviews, buyers expressed their helplessness in contracting unique spares at reasonable prices because the supplier/sellers were taking advantage of the situation. The situation was aggravated by the fact that a large amount of equipment had been procured from a specific country and this seller country was now indulging in rent seeking tactics. In high value public procurement although the government (as principal) has ownership, the controls rest with the agents (bureaucracy). The actions of the procurement bureaucracy were opaque and difficult to monitor. Thus the real life principal agent problem was characterized by information asymmetry. There

was no incentive for the bureaucracy (the agents here) to ensure that the outcome of procurement was effective. Instead, their foremost obsession was process correctness. Thus, information asymmetry and goal incongruence (Miller 1992) were rationalized as a root problem in government procurement. The problem was further compounded by lack of responsibility and accountability that could only be mitigated if detailed tasking of the agent could be drawn up. In a high value public procurement however, it would be virtually impossible to draw up a detailed responsibility assignment chart.

xiii. *Role of public sector enterprises involved in public procurement*: A distinct culture of dependency was noticed because government continues to bear their losses/inefficiencies due to extraneous political and social considerations that facilitated maintenance of status quo in public sector enterprises. A cost benefit analysis comparing the life cycle investment required to manufacture a good/ equipment in a public sector enterprise vis-à-vis its direct procurement would often reveal the inefficiency of investing in public sector enterprises. Usually, the public sector enterprises were awarded cost plus contracts. Such contracts were a norm between the research and development organisations and public sector enterprises for developmental projects (like the Defence Research and Development Organisation sponsored development of weapons). This was because for developmental projects, it is not possible to estimate the costs of the system (goods) in advance. Though at times such contracts were necessity, but these gave no incentive to the contractor to perform. Rather the public sector enterprises often misused such privileges to their advantage. Interestingly, the functioning of such public sector enterprises making high value public procurement goods/ equipment was also impacted by conflicting interests. Despite the large assets held by the public sector enterprises, they were not used as a private enterprise would have used them. Also, in certain areas the bureaucratic approvals required to upgrade facilities to compete with their private sector counterparts often did not come in time.

xiv. *Contract management inefficiencies*: Any procurement system consists of the buyer and the seller in a transaction arrangement. In a high value public procurement arrangement this interaction is laden with a large number of uncertainties and inefficiencies. In most high value public procurement cases distinctly poor contract management culture was observed. Inadequate appreciation and contractual safeguards often led to inefficiency in procurement. Each contract yielded a completely new angle of inefficiency. Some of these are enumerated below:

a) The defined qualitative requirements were noted to be flawed. Unrealistic qualitative requirements were often presented by the buyers (reflecting lack of technological knowhow

of own requirements by the buyers).

b) Despite spending large sums of money on major equipment, important sustenance (technology acquisition arrangements, spare and support equipment) requirements were often not taken care of.

c) In high value public procurement, a large number of foreign contracts were signed. Exchange rate variation had a perceptible bearing on its efficiency. In quite a few cases inability to appreciate currency movement led to inefficiencies. Usually a high value public procurement, a contract is a detailed and formal written documents list the various terms of transaction and contractual responsibilities of both the parties. Yet, despite detailed deliberations in these contracts, often unforeseen conditions would emerge. For countries exporting goods, a lower exchange value may offer greater opportunity for sale. This has a reverse impact on the buyer in case his currency value falls. This may not be formally written but may have been implicit or assumed. This often led to conflict. This implied that some risk prevention and mitigation strategies should be built in the contracts. Though some of these were incorporated as written clauses like risk and expense, there was a need to find innovative solutions to the possible risks that might unexpectedly emerge during contract execution.

xv. *Inter and intra organisational coordination*: Conflicting actions of the stakeholders were clearly evident. Inter and intra agency coordination was found to be lacking. The absence of an IT coordinated inventory management system was felt. This led to the public procurement organisations not knowing about information in the other organisation affecting inter institutional harmony and overall efficiency. Intra organizational trust issues were also detected. The three stakeholders ranging from the decision makers in bureaucracy, the line bureaucracy and the user all had differing opinions and a perceptible conflict of interest. There was lack of standardized procedures and information sharing arrangements (related to price and vendor performance) amongst the various buyer departments. There were no systems for storing organizational memory either.

xvi. *Communication issues*: There was a distinct lack of communication between the buyer and the seller. Though arbitration was the preferred mode of deciding disputes in procurement, it was not seen to be successful. In case of impasse, the sellers at times used their

country's official diplomatic channels to communicate with the buyer. Even amongst various wings of the same department/ministry, there was serious lack of communication that was easily avoidable.

xvii. *Evaluating public procurement effectiveness*: Buyers showed a distinct lack of capacity in their ability to measure or assure the quality or the performance/ effectiveness of the equipment procured. This had a major bearing on pre receipt inspections of the goods procured. It also hindered effective evaluation of procurement. A large number of infirmities were observed in the human resources carrying out high value public procurement. These varied from deficiency of knowledge to lack of ethics. Lack of technical and professional competence in the human resources (including within the senior procurement hierarchy) was observed repeatedly. There was distinct lack of congruence in the interests of the various stakeholders. This issue was also highlighted in a report in the media, wherein the distrust between a ministry and the lower departmental layer was coming in way of procurement. It was claimed by the ministry officials that that the demands of the department were unrealistic. Most of the senior hierarchy handling high value public procurement (other than railways) was posted on short term tenures which affected procurement effectiveness.

xviii. *Media the new stakeholders in public procurement*: There was lack of objective media reporting on issues relating to inefficiencies of high value public procurement. Media's capacity to influence high value public procurement decisions has also increased manifold in recent times. The role of media therefore cannot be negated.

4. Proposed strategy

Threat of entry, power of suppliers, power of buyers, threat of substitutes and rivalry amongst existing competitors are the main competitive (Porter 2008) forces that shape strategy. High value public procurement strategy in India is similarly affected by factors that are no different. The case studies and the interviews revealed similar strategy perspectives which are outlined below:

i. A dynamic macro environment will require an equally dynamic decision-making system.

ii. There has to be greater process streamlining in our high value public procurement systems (Knight et al. 2012).

iii. Strategic collaboration with technologically advanced countries to produce marketable products with multiple variants like the Brahmos is in part an answer to the high value public procurement inefficiencies.

iv. Procurement officials need to be incentivized better so that they do not fall prey to easy enticements.

v. The procurement process (rather than meeting the satisfaction of the user with the equipment procured) has become an end in itself; the arbitration and dispute resolution mechanism are not trusted by the vendors. Thus,

there is a case for a supra body to give neutral decisions. This body could consist of eminent industrialist and public servants with professional and administrative experience.

5. Scope for further research

The above analysis also leads us to the following questions which require further research: -

i. To what degree can high value public procurement be insulated from the dynamics of the macro environmental factors?

ii. High value public procurement has unique bilateral oligopoly market characteristics? How can the challenges of such markets be addressed?

iii. How does India leverage its buying power to negotiate high value public procurements to its advantage?

iv. How can greater congruence be ensured amongst the various stakeholders in a high value public procurement?

v. When assessing a high value public procurement, should priority considerations be accorded to technology or price, or both? What considerations should influence our qualitative requirements? How can the price of procurement be assessed better in a high value public procurement?

vi. Do we have a long-term national vision and associated performance objectives enunciated appropriately? Has India identified core dual use technologies duly prioritized; that it needs to develop keeping its long-term strategic vision? Has such a vision been enunciated formally to various departments and organizations responsible for executing such vision?

vii. What can we do as a nation to build capacity in our manufacturing technology infrastructure in the country, especially in view of the technology denial regimes that are effective today? Are we investing enough in research and development in our country?

viii. Why do vendors repose faith in extraneous centers of influence to communicate and influence the process in a high value public procurement? How can lack of trust be bridged between the buyers and the sellers in a high value public procurement?

ix. How can risk aversion be reduced in our senior high value public procurement hierarchy? Do layers improve or bring down efficiency in procurement? Can we reduce the number of layers in our high value public procurements? What is the impact of the system of investigation and disposal of complaints of unethical high value public procurement on system efficiency?

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Payment Innovation for Successful Public Private Partnership (PPP)

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ABSTRACT

This paper brings out a school of thought within contracting literature that there are prima facie no financial reasons to prefer PPP over public provision of the same asset or service. Whether a PPP makes sense depends largely on the economic characteristics of the infrastructure, not on the way it is funded or financed. Thereafter it develops a payment incentive system which should aid in successful execution of PPP contracts. It concludes that in a bundled contract, the security deposit during maintenance phase should be equal to the projected profit of the construction phase, the projected profit should be a function of contracted cost and the contractor should be fully compensated for his actual construction and maintenance costs during the respective phases. However, for the purpose of final billing, the paper proposes cost sharing parameters (β and β_M). That is, the fraction of variation in actual cost vis-à-vis contracted cost (β) and the fraction of variation in actual maintenance cost vis-à-vis contracted maintenance cost (β_M) should be factored in at the time settling the final bill during construction and maintenance phases respectively.

Keywords: PPP, cost sharing parameter, payment incentive, SPV structure

JEL Classification: H57, H41, J18, H42, H44

1. Introduction

Historically speaking, the first formal understanding of PPP by government of India came in 2006 when Ministry of Finance brought out its guidelines for financing under viability gap funding. It defines Public Private Partnership (PPP) Project as 'a project based on a contract or concession agreement, between a government or statutory entity on the one side and a private sector company on the other side, for delivering an infrastructure service on payment of user charges' (Ministry of Finance 2006). Thereafter, in

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2007-08 budget speech, Finance Minister of India announced setting up of India Infrastructure Project Development Fund (IIPDF). In the guidelines of IIPDF, government defined PPP as a 'partnership between a public sector entity (sponsoring authority) and a private sector entity (a legal entity in which 51% or more of equity is with the private partner/s) for the creation and/or management of infrastructure for public purpose for a specified period of time (concession period) on commercial terms and in which the private partner has been procured through a transparent and open procurement system'. Literature has brought out (Ménard C. and Saussier S. 2002; David and Stiglitz 1987) that that both the public and regulated private sector can be induced to produce the same socially optimal output at the same incentive cost. This therefore points to the irrelevancy of ownership. On the other hand, owner-manager collaboration (i.e., principal agent relationship) and organisational structure of SPV influence contract *execution.* It has been concluded that 'the economic literature on PPPs has often overlooked contractual incompleteness and agency problems within the private consortium (or Special Purpose Vehicle, SPV) joining the PPP. Taking into consideration the imperfections in bundling different tasks, Greco (Greco 2015) has said that 'SPV ownership structure becomes the main instrument to trade off the power of incentives of different private partners. Under imperfect bundling, the scope for welfare-improving PPP reduces, i.e., a stronger positive externality between investment and operation is required. Also, privately negotiated SPV ownership structures always involves less-than-socially-optimal shares to builders. Once additional social benefit of quality (or social costs of X-efficiency) enters the picture, we found that the socially optimal ownership structure should involve stronger incentives (i.e., ownership share) for the builder'. Thus, it has been have argued (Müller and Turner 2005) that attempts to minimize transaction costs through fixed-price or cost-plus contracts can potentially increase overall administrative costs of the project because of their negative impact on owner–manager collaboration at the post contract stage. Williamson's transaction cost theory predicts that 'efficient modes of governance are those in correspondence with the degree of specificity of the assets required by the transaction and the degree of uncertainty surrounding this transaction' (Ménard C. and Saussier S. 2002). Engel *et al* (Engel, Fischer, and Galetovic 2014) argued that 'there is prima facie no financial reasons to prefer PPP over public provision of the same asset or service.…Whether a PPP makes sense depends largely on the economic characteristics of the infrastructure, not on the way it is funded or financed…… From a macroeconomic perspective, social value is created when real capital is deployed and used efficiently – the real side of the balance sheet – not when the financial composition of liabilities changes'.

In India, in terms of implementation, according to a report by the Ministry of Statistic and Programme Implementation (MOSPI), 40% of all central government infrastructure projects are behind schedule or have overshot their original cost estimate. The basic reason for the large number of stalled PPP projects in India is aggressive bidding by the contractor and the lax monitoring of PPP projects thereafter by the banks who funded these contractors (Jha 2015). Thus, infrastructure investment of about Rs 12 lakh crore were stuck at different stages at December 2014 due to reasons such as land acquisition, lack of clearances, unfavourable market conditions and costly finances. The detailed break up is shown in Table – 1.

Table – 1:
Reasons why infrastructure projects were stalled

Reason	Number of projects
Other	160
Not available	130
Unfavourable market	98
Lack of promoter interest	96
Lack of clearance	94
Lack of fund	83
Land acquisition issues	65
Supply problem	36
Lack of environmental clearance	33
Natural calamity	8
Total	804

Source: Ministry of Finance, Government of India

With a view to kick start the stalled PPP projects, GOI set up Kelkar committee (2015). Kelkar committee (Kelkar et al. 2015) conclusions on risk distribution in Indian PPP is in line with the research in this area (Zou, Wang, and Fang 2008). It has been concluded elsewhere (Zou, Wang, and Fang 2008) that '…..unless the risks in terms of financial, technical, managerial, environmental and social, are properly analysed, allocated and managed, the goals of a true value for money and a win-win PPP is hardly attainable'.

Kelkar committee pointed out that 'over more than 50% of PPP projects require some kind of re-negotiation across their lifespan. …..Thus there is a need to establish a credible permanent re-negotiation commission to reset the contracts without any charge of crony capitalism'. However, another school of thought does not consider renegotiation a natural stage in PPP contract (Marques and Cruz 2012). They have concluded that 'in a PPP, renegotiation is a major contract failure that may jeopardize its value for money. Renegotiation happens when the initial conditions of contract are changed and the two parties must enter into a bilateral agreement. This is carried out in an asymmetric information environment where the private partner outweighs the public sector and therefore it is able to extract rents from the contract……. As the probability of renegotiation and alteration of the initial regulatory premise are substantial, the criteria should include an analysis of how such situations are to be mitigated and when disputes occur, how the public interest is to be defended……. The existence of rules for restoring the financial equilibrium is not enough, if the rules are not fair'. On the other hand, Kelkar committee acknowledged the loss of bargaining power of PPP contractor after the contract is signed and thus underscored the importance of re-negotiation in PPP. On re-negotiation, the committee recommended the following:

i. If the distress in project is not caused by the private party and is likely to adversely affect the government or users, then the PPP should be re-negotiated.

ii. If the project distress is due to material reasons and may result in default under the existing concession agreement, then the pact itself can be re-negotiated.

iii. If the distress is due to reasons that were foreseeable at the time of signing the agreement, then no re-negotiation will take place.

iv. If the assumptions made or risks taken by the bidder with respect to the viability of the project at the time of signing of contract has now deteriorated, that will not constitute a ground for negotiation.

This brings the researcher to the conclusion that instead of debating on whether a given project should be handled departmentally or via PPP, the more important aspect is how a contract is designed. Within contract design, this paper will now focus on payment system. If we presume that all PPPs are complex projects, it shows that cost plus contract and negotiation are viable options in PPP contracts. But, almost all PPPs in India are on fixed price basis (barring inflation adjustment) and negotiation with anyone except the lowest bidder is not allowed in India. However, the following section shows that it is possible to use a hybrid contract method in which as an incentive, the contractor is allowed cost compensation partly. The same is discussed now.

2. Designing Incentive in Contract

Canonical equation for contract payment has been discussed researchers (Nachbar J.H. 1994). In ideal case, the government should pay the firm partly as progress payment as the project progresses and partly final payment after project completion. It is explained below:

(i) Progress payment = reimbursement made shortly after the time costs are incurred. So, for the time period 't', if actual cost C^t is incurred, then management pays immediately αC^t. where, α = proportion to be paid of the actual cost C^t (incurred during the time period 't')

Thus, by the end of the contract, $\sum \alpha C^t = \alpha \sum C^t = \alpha C$ is paid via progress payment

where C = total actual cost incurred by the contractor during the project execution and P_{pc} = progress payment made during the construction phase.

i.e. **$P_{pc} = \alpha C$ ..... Eq 1.**

so $(1-\alpha)C$ is the portion of the cost not yet paid at time of project completion.

(ii) Final payment after project completion,

$P^t = (1-\alpha)C + a^* - \beta(C-C^e)$ ..... Eq 2.

Where,

C^e =contracted cost i.e., the cost which for which the contract is signed.

α = progress payment rate,

a^* = contract profit,

P^t = payment made and the end of time 't'

β = cost sharing parameter i.e., the fraction of variation in actual cost vis-à-vis contracted cost $(C-C^e)$ which is born by the supplier.

(iii) Total actual payment made for the entire project say $P = \alpha C + (1-\alpha)C + a^* - \beta(C-C^e)$

Or $P = C + a^* - \beta(C-C^e)$ .....Eq 3.

Thus, the actual payment made consists of the actual cost plus profit and a factor $\beta(C-C^e)$ which can be both positive and negative.

$\beta(C-C^e)$ can be considered as the tax which the contractor pays to purchaser for the cost overrun. So higher β, higher the tax. But if there is cost underrun, i.e., if the supplier is able to affect some saving, β acts as the subsidy i.e., incentive as the supplier is paid more (w.r.t. its actual cost) by that fraction. (β=1 in fixed price contract, β=0 in variable price contract).

The same is explained by a hypothetical example below:

Say contracted price (C^e) = Rs 1000, duration = 2 years, contract says purchaser will pay 95% of the *actual* cost incurred every quarter (i.e., α = .95). And, contract says contractor will bear 90% of cost overrun (β = .9),

Say every quarter, *actual* cost is 130, so .95x130 is paid every qtr.

At the end of 2 years, .95x130x8 = 988 (total stage payment made). Total *actual* cost incurred by contractor = 130x8 =1040. i.e., cost overrun = 1040-1000=40.

Payment made at the end of project = .05x1040 - .9x (1040-1000) + a^* = 52 – 36 + a^* . i.e., 90% of cost overrun (40) i.e..9x40 = 36 is deducted from final bill of contractor. Thus, contractor bears 90% of cost over run and govt bears 10% (Rs 4). Total payment = 988+52-36+ a^* = 1040-36+ a^* = 1004 + a^*.

However, if the contractor is able to save on the cost and total actual cost = 960, the total payment to contractor = 960 -.9(960 - 1000) + a^* = 960 +36 + a^* = 996+ a^*. Thus, here the contractor is paid 90% of its (.9x40=36) saving as subsidy for effecting a saving.

The researcher argues that in order that the maintenance norms are regularly followed, it is necessary that the required periodic investment is made by the contractor in contract throughout the project life cycle. One way to do it is to pay the contractor during the maintenance period, an amount equal to the periodic investment it is required to make, but the contractual profit component of the maintenance period should be paid at the end of the contract period of maintenance and not during the contract. Then this acts as a low powered incentive for the contractor. Here, the government pays the contractor for maintaining the road (i.e., keeping the service available), but unlike a normal PPP contract, the contractor is not paid by the road user. Further, if during the maintenance period, the contractor is paid his working capital requirement (say C_m), then he will look forward to being rewarded for honouring the contractual condition of maintaining the road in good shape. A simple way to do this is to keep the security deposit equal to the projected profit and return the security deposit only at the end of maintenance period (and not at the end of construction period) – a practice which is almost absent in India. After all, the formal justification of a security deposit is that it ensures that the contractor executes the contract diligently and the contract here involves maintenance as well.

To clarify the above further, equation 2 and equation 3 discussed above are reproduced here for further discussion.

$P^t = (1-\alpha)C + a^* - \beta(C-C^e)$……Eq 2.

$P = C + a^* - \beta(C-C^e)$ ……Eq 3.

The contractual profit a^* was a parameter that was paid at the end of the project. However, there was no mention of how much the profit should be. This research has now argued that a^* should be equal to the security deposit. This research now proposes how the contracted profit can be used to incentivise contractor in a PPP contract:

Say the total cost likely to be incurred in maintaining the road during the entire maintenance period of t_M is C_M. The contractor also looks for making a profit for his investment and effort during the maintenance period. Say this profit is a_M. Say the maintenance period is divided into 'n' time periods

i.e., $t_1+t_2+\ldots t_n = t_M$.

(i) Then for each such period, the maintenance progress payment = reimbursement made shortly after the time maintenance costs are incurred. So, for the time period 'g^{th}', if actual cost C_{Mg} is incurred, then management pays immediately $\alpha_M C_{Mg}$,

Where, α_M = proportion to be paid of the actual cost of maintenance C_{Mg} (incurred during the time period 'g')

Thus, by the end of the maintenance period, amount paid as progress payment during maintenance period $P_{pm} = \sum \alpha_M C_{Mg}$

$= \alpha_M \sum C_{Mg} = \alpha_M C_M$ ……Eq 4.

where C_M = total actual maintenance cost incurred by the contractor during the maintenance period.

So, $(1- \alpha_M)C_M$ is the portion of the maintenance cost not yet paid at time of project completion.

(ii) Final payment after completion of maintenance period,

$P_M^t = (1-\alpha_M)C_M + a_M - \beta_M(C_M - C_M^e)$.....Eq 5.

Where,

C_M^e =contracted maintenance cost

α_M = progress payment rate,

a_M = contractual profit during the maintenance period,

$P_M{}^tM$ = payment made at the end of time 't_M'

β_M = cost sharing parameter during maintenance period i.e., the fraction of variation in actual maintenance cost vis-à-vis contracted maintenance cost $(C_M - C_M^e)$ which is born by the supplier.

(iii) Total actual payment made for the entire maintenance period is say $P_M = \alpha_M C_M + (1-\alpha_M)C_M + a_M - \beta_M(C_M - C_M^e)$

Or $P_M = C_M + a_M - \beta_M(C_M - C_M^e)$ .....Eq 6.

Thus, the actual payment made during the maintenance period consists of the actual maintenance cost plus profit from the maintenance period and a factor $\beta_M(C_M - C_M^e)$ which can be both positive and negative.

$\beta_M(C_M - C_M^e)$ can be considered as the tax which the contractor pays to purchaser for the cost overrun during the maintenance period. So higher β_M, higher the tax. But if there is cost underrun, i.e., if the contractor is able to effect some saving, β_M acts as the subsidy i.e. incentive as the contractor is paid more (w.r.t. its actual cost) by that fraction. (β=1 in fixed price contract, β=0 in variable price contract).

Hence combining the construction and maintenance phase (i.e., equation 2 and equation 5), the total payment made to the contractor for the entire project

$P_{total} = C + a^* - \beta(C - C^e) + C_M + a_M - \beta_M(C_M - C_M^e)$

or $P_{total} = (C+C_M) - \{\beta(C-C^e) + \beta_M(C_M - C_M^e)\} + (a^* + a_M)$.....Eq 7.

Out of P_{total}, a portion of the operational cost during the construction and maintenance phase (αC and $\alpha_M C_M$ respectively) should be paid to the contractor during the construction and maintenance period so as minimize the operational risk to the contractor. Thus, at the end of construction period, the contractor is paid based on equation 2 and at the end of the maintenance period, the contractor is paid based on equation 5. Equation 7 shows that while the contractor is paid the actual cost incurred during the construction phase and during the maintenance phase, in case the actual cost incurred during the construction and maintenance phase exceeds the contracted cost, to the extent of β during the construction phase and to the extent of β_M during the maintenance phase, deductions will be made from the final payment. This therefore acts as an incentive to the contractor to keep the operational cost low during each phase. Further, equation 5 shows that the contractor is paid the contractual profit for the maintenance period at the end of maintenance period.

An issue which is thus to be decided is what should be amount of contractual profit for both during the construction phase and during the maintenance phase. Equation 2 and equation 5 bring out that the contractual profit for each phase is to be paid at the end of each phase. It is pertinent to mention here that in government contract (including PPP and EPC), security deposit from the contractor is asked and is kept by the procuring entity in its custody till satisfactory execution of the contract. Thus, it makes sense that the contractual profit is made equal to the security deposit so that after a contract is over, if the con-

tract is satisfactorily executed, the contractor who has already been paid his actual operational cost based on equation 1 and equation 4, is now rewarded with the profit of the contract in the form of refund of his security deposit. This means, the projected profit should be kept in the form of security deposit by the procuring entity.

In addition, conventionally, the security deposit for the construction phase is fully returned after the construction period and the security deposit for the maintenance period is fully returned after the maintenance period. That is, they are treated as two independent deposits. However, in a bundled contract, the maintenance part is critically dependent on the construction part as good quality of construction will mean superior maintenance service. Thus, it is desirable that the security deposit of the maintenance period is not kept at the normal level of 5% to 10% of contracted cost (C_M^e) of the maintenance phase. This is because, in a bundled contract, to reduce his maintenance cost, the contractor will use superior quality during construction and thus his maintenance cost will be lower than what the normal maintenance cost is. Accordingly, the value of his security deposit (which is normally 5% to 10% of the value of a contract) will also be low. However, in a scenario when he is being fully compensated for his operational cost during maintenance, he will have little incentive to continue with the maintenance if there arise problems from sources external to the contract and he may be tempted to leave the maintenance contract in the face of such problem and forgo his security deposit. Thus, to ensure that the contractor is committed to provide good maintenance support, the security deposit for the maintenance period should actually be based on the projected profit of the construction cost (and not of the maintenance cost). Since the security deposit is to be equal to the contractual profit, if a major portion of the contractual profit for the construction phase is kept as security deposit during the maintenance phase, the contractor will have sufficient incentive to persist to provide maintenance support. This also takes care of displaced agency problem as the lead contractor who is normally the one who does the construction will continue to remain associated with the contract till the end of maintenance period because a major portion of the profit of the construction phase will remain blocked in the form of security deposit of the maintenance phase.

This concept is however generally not followed in the EPC/PPP contract. The fact that this payment method has not been followed in Indian EPC/PPP contract shows that among the procuring entities in India there is a lack of understanding of the equations discussed earlier.

Another insight which can be derived from equations discussed earlier is that the contractual profit a^* and a_M should be a function of C^e and C_M^e respectively and not of C and C_M. This will insulate the profit element from actual cost incurred (C and C_M) and peg it as a function of the 'contracted cost', otherwise, the cost plus reimbursement will degenerate into a 'cost plus' profit accrual system to the contractor.

3. Conclusion

This conceptual paper has brought out that

(i) In a bundled contract, the security deposit during maintenance phase should be equal to the projected profit of the construction phase.

(ii) The projected profit should be a function of contracted cost.

(iii) The contractor should be fully compensated for his actual construction and maintenance costs during the respective phases, subject to the respective cost sharing parameters β and β_M.

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Potential of Public Procurement in India to Induce Innovation

SIDHESWAR TIWARI*

ABSTRACT

The significance and potential of public procurement in inducing innovation has been discussed from long time. Public procurement as a demand side innovation policy remained shrouded for many years considering its effectiveness as largely anecdotal. The global economic crisis has made OECD/EU countries to re-visit Public Procurement as an innovation policy, subsequently resulting in its inclusion in their innovation policies. The growth of an economy is directly proportion to the commercial usage of innovations. Recognition of demand is a more frequent factor in innovation than recognition of technical potential. Public Procurement by virtue of its financial magnitude has potential to drive demands. India has conducive market and growing economy. India has responsibility to satisfy the human needs and solving the societal problems. The performance of India in last few years for promoting innovation has been remarkable. India while embarking on its innovation journey, in its vision document 'Strategy for New India @75' has acknowledged that public procurement in India has the potential to drive innovation and has formulated certain policies. Despite this, the public sector has restrictively behaved as customer to induce innovation.

This paper discusses the recent advances made in Public Procurement in India and how conducive are these advances along with other policies in inducing innovation. The significance and justifications of re-defining public procurement policies to induce innovation is discussed, followed by a consideration of the challenges, appropriate strategies and model for developing an innovation eco-system in public procurement and objectives that should be addressed.

Keywords: Public procurement; Demand, Innovation; Public sector, India, economy, Public Procurement policies

JEL Classification: H57, H41, J18, D73, H83

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1. Introduction

1.1 Public Procurement for Innovation promotion

The significance and potential of public procurement in inducing innovation has been discussed under many different definitions such as "innovation-oriented public procurement"(Rothwell and Zegveld 1981), "public procurement for innovation"(Edquist and Zabala-Iturriagagoitia 2012), "innovative public procurement"(Edler and Georghiou 2007), "public technology procurement"(Edquist and Hommen 2000). All these various definitions—although with somewhat different conceptual nuances and logics—refer to government purchasing activities that foster innovation. One can identify two main approaches how the public procurement is associated with innovation. First, it is understood as a tool for stimulating the development of new products (goods, services, systems); second, it can refer to public procurement that attempts to open up innovation possibilities without necessarily targeting new products (Elvira Uyarra and Flanagan 2010).

Public procurement as an innovation policy has been neglected or downplayed for many years. In the 1970s, a number of empirical studies explored the meaning of procurement for innovation (Mowery and Rosenberg 1979; Rothwell and Zegveld 1981) going forward also compared R&D subsidies and state procurement contracts without direct R&D procurement. They concluded that, over longer periods, state procurement triggered greater innovation impulses in more areas than did R&D subsidies. (Geroski 1990) also analysed the quantitative and qualitative meaning of state demand for innovation and concluded that procurement policy "is a far more efficient instrument to use in stimulating innovation than any of a wide range of frequently used R&D subsidies".

Using public procurement for innovation and development is, however, not a new phenomenon. Case of USA is especially notable, where public procurement programs played a crucial role in creating technologies such as the Internet, global positioning systems, and the semiconductor industry—all of which have had major economic impacts (Ruttan 2005). Japan in 1960's used to employ public purchasing as a direct developmental policy tool (Rothwell and Zegveld 1981). In Sweden, a "developmental pair" approach evolved between the state and technology companies based on technology-intensive public-procurement programs (Edquist and Hommen 1999).

1.2 Public Procurement and Innovation in India

In India, public procurement is an activity "not merely for meeting day to day functional requirement, but also for underpinning various services that are expected from the government, e.g., infrastructure, national defense and security, utilities, eco-nomic development, employment generation, social services and so on" (Government of India 2011).

Public procurement as a percentage of GDP in the country is estimated between 20% to 22%. For a size of Indian economy at USD 2.7 trillion, this amounts to public procurement to the tune of USD 500 billion annually.

A major transformation has taken place in the last few years in the way Public Procurement in India by setting up Government e-Marketplace (GeM) and the Central Public Procurement Portal. This allowed procurement to take place in a completely paperless, cashless and system-driven e-market with minimal human interface. These platforms helped in not only making public procurement efficient and accountable but also enhances resource efficiency. Post removal of legacy hindrances of human interferences, unaccountability, and corruption in the structure, the other a major transformation happened in the policies by inclusion of quality parameters in the procurement process. Policies promoting and enforcing 'Make in India' up to a threshold, combined with other policies like timely payment monitoring, preferences to small and medium scale (MSE) have elevated the standards of Public Procurement in India.

India's innovation strategies guided by the National Innovation System comprises of policymakers, financing banks, public R&D labs, and industrial policy resolutions/statements. India has significantly improved its Global innovation Ranking from 66 in 2016 to 46 in 2021 (Global Innovation Ranking). A culture of innovation has been manifested in India by private sector (Pharma, Automobile, IT etc.) as well as public sector (Space, Defense, Agriculture, etc.). India has all the ingredients needed to become a global driver of innovation: It has a strong market potential, an excellent talent pool, and an underlying culture of frugal innovation (WIPO 2016).

The public procurement system is highly biased in favor of experienced and established products and technologies. This strongly discourages new and innovative technologies offered by startups, who do not get much needed support from government procurement (NITI Aayog 2018).

1.3 Research question

This working paper belongs to the general area of policy research - perceived as a pragmatic, and 'action' and 'application' oriented discipline (Hill and Head 1997; E. Uyarra 2003). In particular, for science, technology and innovation (STI) policy research, Morlacchi and Martin (Morlacchi and Martin 2009) considered that

> *'…rather than being theory-driven or paradigm-driven, it is primarily a problem- oriented field that focuses on practical issues to do with specific policies for science, technology and innovation…'*

The problems that this study aims to deal with are expressed in the following perceived gaps. An immediate gap is observed in the Public Procurement system of India for absence of policies, guidelines, models for the acquisition of goods and services that constitute innovations, which did not exist at the time the procurement cell was launched.

Taking into account these specificities, this study aims to analyze (1) the Potential of public procurement in India to induce innovation and if possible, (2) challenges and (3) strategies to include in innovation policy, and (4) can there be a conclusive model or (5) objectives of the model.

2. Public Procurement, Innovation, Public Procurement as Demand Side Innovation Policy

2.1 Public Procurement – Element, Processes and Functions

Modern public procurement was established as a government activity with the objectives of controlling public budgeting, achieving value for money, and improving accountability (Thomas 1919). The procurement process is shaped by both internal and external factors. Major internal factors include procurement planning (e.g., the designing procedures), stakeholder interactions (e.g., dialogues between buyers and suppliers), and concrete methods and techniques (e.g., evaluation criteria). Major external factors include Legal framework (e.g., international trade regulations), governance and administration (e.g., policy implementation structures), and more broadly, the overall context where the procurement system situates, including cultural, social, legal, economic and political circumstances. In particular, market conditions have direct impacts on procurement processes in the sense that favorable market conditions can enhance competition, transparency and equality, which can further stimulate the delivery of value-for-money and, in some cases, innovative solutions (Fiorentino 2006) (Fiorentino, 2006).

2.2 Innovation

Here, we attempt to understand the context of innovation and policy studies by reviewing relevant conceptual origins and issues. This study adopts the definition by the Oslo Manual that innovation is

> *'…the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations… the minimum requirement for an innovation is that the product, process, marketing method or organizational method must be new (or significantly improved) to the firm'* .

2.2.1 Theoretical and policy perspectives on innovation

Innovation policies can be classified as supply-side oriented or systemic-side or demand side oriented. Similarly, theories of the innovation process can be classified as being linear or systems-oriented. There are important parallels and logical connections to be drawn between these two classifications. On the one hand, linear views of the innovation process support a supply-side orientation in innovation policies. On the other hand, systems perspectives on innovation yield a much more fruitful perspective on the demand side, in terms of both theoretical and policy relevance (Edquist and Hommen 1999).

2.2.1.1. Linear System

A linear view of the innovation process means, "Science leads to technology and technology satisfies market needs" (Limoges et al. 1994). It conceives of commercial research and development as applied science and envisions a smooth, unidirectional flow from basic scientific research to commercial applications. In this model, there is no feedback from the several later stages of the innovation process (i.e., product development, production, and marketing) to the initial stage of research, nor is there feedback between any of the other stages. Problems with the linear model of innovation, is the complete absence of feedback paths that has already been noted (Landau and Rosenberg 1986).

2.2.1.2 Systems Side or Demand side

The recognition of the role of demand is implicit in the old proverb, "necessity is the mother of invention," and there have been numerous examples of inventions and innovations that were initiated and driven largely in response to pressing social demands.

Numerous case studies of innovation (Freeman 2013) brought out the importance of flows of information and knowledge between firms as well as within firms. Moreover, the results of the empirical research pointed to the importance both of flows to and from source scientific and technical knowledge and of flows to and from users of products and processes.

2.2.2 The influence of demand on innovation

Demand, commonly described in economics as the desire and willingness to pay a price for a specific good or service, was explicitly emphasized as a significant force to 'pull' innovation (Schmookler 2013). Non-linear innovation perspectives (Edquist and Hommen 1999) such as 'user-producer interactive learning' (B.-A. Lundvall, Dosi, and Freeman 1988) and 'distributed innovation process' (Hippel 2007) explicitly highlighted the crucial role played by users. Integrating their perspectives with that from (Malerba et al. 2007; Elvira Uyarra and Flanagan 2010; Di Stefano, Gambardella, and Verona 2012), the major impacts of demand upon innovation include:

- Selection: demand as 'selecting mechanisms' in evolutionary processes;
- Feedback: users/markets providing feedback to improve innovation;
- Stimulation: expected markets stimulating the creation and diffusion of in-novation;
- Innovation/co-innovation: users as innovators/co-innovators.

Certain arrangements of significantly sized demand can favour innovation processes. In particular, the notion of 'lead users' has been raised by von Hippel (1988) to characterize a crucial demand arrangement for innovation, which is defined as 'users whose present strong needs will become general in a marketplace months or years in the future' (Hippel 2007). Lead users can potentially address all of the four types of impacts identified above. Similarly, the concept of 'lead markets' was brought about to characterize the demand mechanism where certain markets' present preferences for specific technologies which later on become adopted in other markets as well (Beise 2004). Lead markets can then realize both the size and the structure required for innovation. Moving from lead users to lead markets, as argued by (Georghiou and Secretariat 2006), requires early adoption of innovation by multiple users or else through 'a single user with sufficient purchasing power to constitute a market on its own'

The government through public procurement can fulfil this role of 'single user'.

2.2 Demand Side Innovation Policies

(B.-Å. Lundvall and Borrás 2005) consider that innovation policies should cover all the issues related to innovation and target at 'overall innovative performance of the economy'. If

properly arranged, demand can trigger the creation and/or accelerate the diffusion of innovations. Nevertheless, in reality the demand side does not always function well without public interventions; there is a range of system and market failures that are particularly demand-related. (Edler 2010) generalized those failures into two broad categories, i.e., insufficiency of demand which prevents users from voluntarily adopting innovations with a high potential benefit, and insufficiency of demand articulation which prevents suppliers from adequately satisfying users' needs (as elaborated in (Mowery and Rosenberg 1979)). Within the former category are failures such as high entry costs due to the very early stage of the product cycle, high transaction costs for users to learn about and adopt innovations, lack of awareness among potential users of the benefits and characteristics of innovations, and path dependencies and technological lock-ins (Edler 2010, 2013). Within the latter category are failures such as inadequate user-supplier interactions, lack of understanding among suppliers of user's unmet needs, and lack of abilities among users to clearly specify their preferences.

Those failures point to gaps to be addressed by demand-side innovation policies (DSIPs), which are defined as:

> *'…all public measures to induce innovations and/or speed up diffusion of innovations through increasing the demand for innovations, defining new functional requirement for products and services or better articulating demand'* (Edler and Georghiou 2007).

Four major types of Demand Side Innovation Policies have been recognized, i.e., Innovation in Public Procurement policies, private demand policies, regulations, and 'systemic approaches' (Edler 2013). Although some systemic approaches such as supply chain measures and pre-commercial procurement (PCP) stand in the mid - way of supply and demand sides, (Edler and Georghiou 2007) argued that they are treated as DSIP because of their 'critical role in bringing users and suppliers together'. DSIP and supply-side policies are complementary with rather than alternative to each other; coordination and integration of these instruments are crucial in addressing system failures (Borrás and Edquist 2013).

Support of private demand can lower transaction costs and trigger the creation and diffusion of innovations (Edler 2013); established private markets can serve as selecting mechanisms. Awareness-building measures can contribute to mitigating market failures and soft institutional failures. Regulations and standards can specify demand, shape the structure of markets, and stimulate and select innovative solutions through mandates or industrial competition (Blind 2009). Adjusting regulations and standards with an innovation focus can contribute to remedying hard institutional failures. Systemic approaches can address market, interaction and capability failures by enhancing interactive learning between stakeholders.

Innovation in Public Procurement policy has the potential to fulfil all the tasks above since it can serve as '*a cornerstone of a coordinated and technology or sector specific mix of policies*' (Edler and Georghiou 2007).

2.3 Public procurement as demand side policy within innovation policy

With regards to innovation, public procurement can be divided into two types: the purchase of standard products like paper or paperclips, i.e., involving no innovation, and public technology procurement, i.e., the purchase of new technologies and innovative products and services. The latter category is referred to if a government announces its intention to foster public procurement as an innovation policy instrument.

Then, public procurement might be a suitable tool for stimulating the generation and diffusion of technological innovation (Geroski 1990). The two principal reasons for the use of this policy tool are to satisfy and improve the supply of public services and to meet certain political goals by stimulating demand, e.g., in areas of sustainability or energy efficiency (Dalpé 1994). After the government has placed a tender for a specific need and firms have applied, the decision is made by the government. Only one firm or a consortium of firms gets the order to generate and deliver the product or service. Thus, it is a competitive and selective system. A major advantage of public procurement in innovation policy is that government specifies a desired output and leaves it to the creativity of private businesses to achieve this result with the most effective and efficient technologies. Since the purchase of the new product by the government is contracted, the market risk for the developing and delivering firm is reduced, because a certain amount of sales is guaranteed. Often, the government is a large-scale and major user of innovation and technologies. Thus, it can act as an early-state or lead user which bears the costs of learning and refining novel products. Besides, the public sector's significant scale enables innovative firms to generate experience/scale cost reductions quickly. This should lead to reduced prices and therefore newly created or extended markets for private demand as well (Hippel 2007). Through the use of a particular innovation, the government can also send positive signals to the private market and increase awareness so that public procurement might also spill over to the private market and propel the diffusion of innovations (Edler and Georghiou 2007).

2.3.1 Various Models for Public procurement as demand side policy

Researchers have developed various typologies in order to understand the functioning mechanisms of Public Procurement as demand side for Innovation Policy from different angles of views. A classification of major perspectives is presented in below Table – 1, adopted from various research papers on Demand side of Innovation (2011).

3. Public Procurement, Innovation Status and Policies In India

3.1 Public Procurement in India

In India, public procurement is an activity "not merely for meeting day to day functional requirements, but also for underpinning various services that are expected from the government, e.g., infrastructure, national defence and security, utilities, economic development, employment generation, social services and so on." (vide Report of the Committee on Public Procurement, 2011 or 'Dhall Committee Report') (Government of India 2011).

Public procurement in India is both a complex and an important subject. It is a system-wide activity across the Central and state governments and their autonomous and statutory bodies and public sector enterprises, with a wide variety of sec-tor/institution specific requirements. Local governments, at the Municipal and Panchayat levels also follow their individual procurement practices. "Diversity in procurement practices is an integral feature of the vast governmental system in the country" (Administrative Staff College of India Journal of Management 2011).

Table – 1:
Various typologies in Public Procurement as demand side Innovation Policy

Developed by	Typology according to	Typological Categories
Rothweld and Zegveld (1981)	Market Structure	• Monopsony • Polypsony • Oligopsony
Edquist and Hommen (2000)	Type of innovation (technology life cycle, TLC)	• Developmental • Adaptive
	End Users	• Procurers as end-users • Procurers as catalyst
	Market Structure	• Monopsony • Polypsony • Oligopsony
Edler and Georghiou (2007)	End Users	• State in connection with private users
	Strategic nature	• General • Strategic
	Commercialization stage	• Commercial • Pre-Commercial
Uyarra and Flanagan (2010)	Nature of Procured Items	• Adapted procurement • Technological procurement • Experimental procurement • Efficient procurement
Rolfstam (2012b)	End Users	• Direct • Cooperative • Catalytic • Distributed
	Market development process	• Initiation (Development) • Escalation (adaption) • Consolidation (standardization)

The subject is further made complex, as India does not have a single public procurement policy or public procurement law. There is no specific legislation that governs public procurement contracts in India. The legislative framework on public procurement (which mostly takes place through a tender process for large procurements) is presently based on guidelines contained in rules, procedures and manuals formulated by the Government, which apply to government departments and public sector undertakings (PSUs). These are, namely:

- General Financial Rules, 2017 (GFR) and
- Delegation of Financial Power Rules, 1978 (DFPR)
- The general rules regarding public procurement are provided under the GFR, which are applicable to all ministries and departments of the Government. GFR are supplemented by the DFPR, which are based on the principles of the GFR and empower the Central Government to sanction expenditure for public procurement contracts.
- In line with the GFR, a few state governments like Tamil Nadu, Karnataka, Rajasthan, Andhra Pradesh, Assam and certain PSUs have developed their own financial rules which govern public procurement. Additionally, certain states such as Tamil Nadu and Karnataka have enacted specific rules and regulations governing public procurement called the Tamil Nadu Transparency in Tenders Act, 1988 and the Karnataka Transparency in Public Procurement Act, 1999, respectively.
- Manual for Procurement of Goods, 2017 (MPG);
- Manual for Procurement of Works, 2019 (MPW); and
- Manual for Procurement of Consultancy and Other Services, 2017 (MPCS)

3.1.1. Public Procurement Bill 2012

The Ministry of Finance, Government of India, introduced a Public Procurement Bill in the Lok Sabha in May 2012. The jurisdiction of the Bill covered any Ministry or Department of the Union Government of India, any Union Government's Public Sector Undertaking, or any company in which the government has a stake of more than 50 percent. Since the Bill was only introduced in the Lok Sabha, it lapsed with the fifteenth Lok Sabha.

Consistent with the priorities of the present government, the Ministry of Finance is seeking suggestions for refinements to the 2012 Bill from concerned stakeholders. This signals the current government's intention to table and then to secure its passage in both houses of Parliament in coming years.

3.2 Performance of Indian Public Procurement system:

Currently, significant Government expenditure is incurred towards the procurement of goods, works and services. In high-impact projects and state-of-the-art equipment—involving a high-level of customization, specialization and cutting-edge technology—where innovation, quality, experience, and competence of the bidder are important, the method of selection of the lowest bidder often results in suboptimal delivery, non-performances, higher life cycle cost, delays, and arbitrations. After reviewing the efficacy of the existing methodology of bidder selection through the Least Cost Selection (or L1) method, The Ministry of Finance, Government of India has brought into effect certain policies for including quality parameters.

Based on detailed deliberations with various stakeholders, NITI Aayog came up with several alternative procurement strategies for inclusion in the General Financial Rules (GFR) 2017, to enable public procurement

authorities and agencies to transparently select the appropriate method depending on project-specific requirements. Basis these recommendations, the Procurement Policy Division of the Ministry of Finance issued general instructions on 'Procurement and Project Management' on 29 October 2021. The instructions have introduced the Fixed Budget-Based Selection (FBS) method for engaging consultancy service and allowed Quality- and Cost-Based Selection (QCBS) in the procurement of works and non-consultancy services. The newly defined concept of Quality-Oriented Procurement (QOP) is a step towards bringing Value for Money into the procurement process rather than merely focusing on the lowest cost (L1). This shall empower procurement authorities with more options and enable them to make effective decisions in the public interest (NITI Aayog 2022).

3.2.1 Policies supporting Entrepreneurship in India - 'Make in India'

'Make in India' is an initiative by Govt. Of India to transform India into a production house by leveraging its human capital and SME's. Polices promoting it are included in tender specs.

3.2.2 Policies supporting 'Small and Medium Scale Industries'

The Micro, Small and Medium Enterprises (MSME) sector contributes significantly to manufacturing output, employment and exports of India. Polices promoting it are included in tender specs. The share of MSE procurement rose from 30.18% in 2020 (Rs 39,665 Crores) to 33.91% in 2022 (Rs 43,709 Crores).

3.3 Innovation System in India

India is well known for its close relationship with innovation, from developing low-cost vaccines to space programs, and safeguarding millions of lives through the development of effective warning systems for cyclones. Under the pandemic's challenge, India combated the impact of the pandemic through policy advocacy, production and dissemination of appropriate technology, creation and augmentation of medical infrastructure, and numerous other interventions. The various programs launched by Govt. to promote Innovation is commendable. Starting with the Indian Innovation Index, wherein the progress of Innovation in states will be monitored to collaboration with IITs, Private R&Ds – Adobe, Dassault, Dell, IBM, IEA, Lego, Monsha'at, INQ, Atal Innovation Mission, Collaborating with I Denmark, Saudi Arabia, USA, etc. (NITI Aayog 2022).

3.3.1 Innovation facilitating mechanism in India.

Below are the innovation-facilitating mechanisms and driving factors. (Refer: Table – 2). These range from government finance systems, handholding systems that work with the innovators at every stage until they mature, and intellectual property rights (IPR) facilitation to design-related support in India.

Table – 2:
Innovation-facilitating mechanisms and driving factors in India

Drivers	Facilitators	Intermediate Outcomes	Final Outcomes
1. Policy 2. Procedures for implementation 3. Knowledge inputs/access 4. Finance	1. Government funding bodies Examples: DST, SIDBI, DBT and NABARD. Ministries have some upgraded funds. 2. Technology R&D centres: CSIR, ICAR, DAE, DRDO, ISRO, CPRI, CMTI, and so on. Industrial R&D centres including in-house R&D units, foreign R&D units, elite institutions, such as IITs, IISc, NITs, and central universities 3. Certification/standard approval Eg: BIS, IPO (for patent, design, and other IP components)	▪ Publications ▪ Patents ▪ New designs ▪ Performance improvement in existing products/service ▪ Start-ups, ▪ Skill upgrades ▪ Joint R&D projects ▪ Prototypes ▪ Demonstration services. ▪ Technology-intensive products and services	Production of solutions (products and services) that are affordable and accessible to: ▪ People with very low incomes. ▪ People in the middle class. ▪ People in aspiring upward mobile classes. Products and services distributed to global markets

3.3.2 India's Performance in Global Innovation Index.

India has significantly improved on the Global Innovation Index, 66th in 2016 to 46th in 2021. It takes 2nd place in the lower middle-income group. India held the 3rd position in its income group in 2019 and 2020 having entered the top three in 2019. India has also been portrayed as successful in developing sophisticated services that are technologically dynamic and can be traded internationally. It continues to lead the world in the ICT services exports indicator (1st) and holds top ranks in other indicators, such as Domestic industry diversification (12th) and Graduates in science and engineering (12th) (WIPO 2021).

Table – 3:
Ranking of India in various parameters in Global Innovation Index (Global Innovation Index 2021, WIPO.net)

Strength Indicator	Rank	Weakness Indicator	Rank
Graduates in science and engineering, %	12	School life expectancy, years	95
Global corp. R&D investors, top 3, mnUS$	15	Pupil-teacher ratio, secondary	99
QS university ranking, top 3	23	Tertiary inbound mobility, %	108
Trade, diversification, and market scale	7	ICT access	111
Domestic industry diversification	12	ICT use	101
Domestic market scale, bn PPP$	3	Environmental performance	125
Citable documents H-index	21	Females employed w/adv. deg, %	103
Labor productivity growth, %	17	New businesses	115
Knowledge diffusion	13	Printing and oth., % mnf.	83
ICT services exports, % total trade	1		

3.4 Policies adopted for inducing innovation through public procurement

Table – 4:
Gap in Innovation Policy in Public Procurement Vs Remedy envisaged

Observation	Policy Adopted
"The public procurement system is heavily biased in favour of experienced and established products and technologies. This strongly discourages new and innovative technologies offered by start-ups, who do not get much needed support from government procurement"	1. In all government procurements, international competitive bidding for both products and services should be resorted to only when Indian manufacturers are unable to supply products/services of comparable international quality. This will promote the Make in India initiative. 2. Quarterly workshops may be organized for creating awareness among procurement managers of various ministries/ departments/state governments/CPSUs, about the DIPP's Public Procurement Order 2017 (which aims to promote Make in India products/services). 3. To adopt innovative technologies, experts/scientific practitioners should be mandatorily included on board/committees related to government procurement. All RFP/RFQ documents should include a suitable clause in this regard. 4. In order to promote procurement of goods/ services developed by Indian start-ups, preference in the technical evaluation could be provided to them.

4. Conclusion

With the new Intellectual Property Policy 2016 of India that aims to push IPRs as a marketable financial asset, promote innovation and entrepreneurship, while protecting public interest, and National Innovation Act, India is in a revamping state of its policies. On public procurement front, the Govt. of India has indicated intention for procuring new and innovative products by mentioning vision (ref. Table 4) in 'Strategy for New India @75' – Report of (NITI Aayog). Policies promoting 'Make in India', 'Locsal Content', etc. fall short to deal with complexity that exist in innovation procurement. The conclusion put forward here is that the rationales and instruments of public procurement as demand-side innovation policy need to be further developed and deployed broadly to support and increase the generation and diffusion of innovation for the benefit of local and global needs.

Challenges in the existing procurement eco-system:

i. Need and purpose of procurement of Innovative solutions by public authorities is not articulated, neither there are clear guidelines
ii. Even if R&D and Innovating firms are developing something, the public procuring group is not aligned with their objectives and that of users.
iii. Procuring personnel lack the knowledge and capabilities about technologies, market developments, innovations, neither there are platform for their involvements
iv. The demand of public procurement is scattered, un-uniform with unknown time-lines.
v. The eligibility criterion for Start-ups/ MSEs makes it difficult for getting involved in public procurement.

At a macro level, to start with Public Procurement to induce innovation, following strategies can be adopted to develop a Innovative Eco-system under Public Procurement:

- Platform to mention the requirements in terms of functionality so that vendors can develop their own design to address the requirement/need.
- This can be integral with CPPP with a section wherein all PSUs/Govt. Dept. can post their challenges and products they seek to procure in future or looking for improved alternatives.
- Tenders should permit variants, for opening up bids to alternative ideas.
- Rigid specifications are restrictive, but variants acceptance will require upgradation of procuring authorities skills to evaluate and accept the changes.
- Terms to facilitate generation of intellectual property in collaboration with vendors and after a tenure term for transferring, thereby allowing them to exploit their innovations in wider markets.
    - a collaborative approach with IPR organizations can be made to reduce the hustle of filing IPR, evaluations and its commercialization.
- Pre-commercial deliberations with multiple stakeholders for technical and competitive dialogues between purchaser and supplier, to understand problem and solution.
    - This is the most important stage, wherein public

R&Ds to be involved to develop innovative products as sought by public procurers wherever required.

- Post adoption of above mentioned strategies, an Innovation eco-system can be invented. This eco-system needs to be highly dynamic and interactive.

A proposed Innovation Eco-system model is as follows:

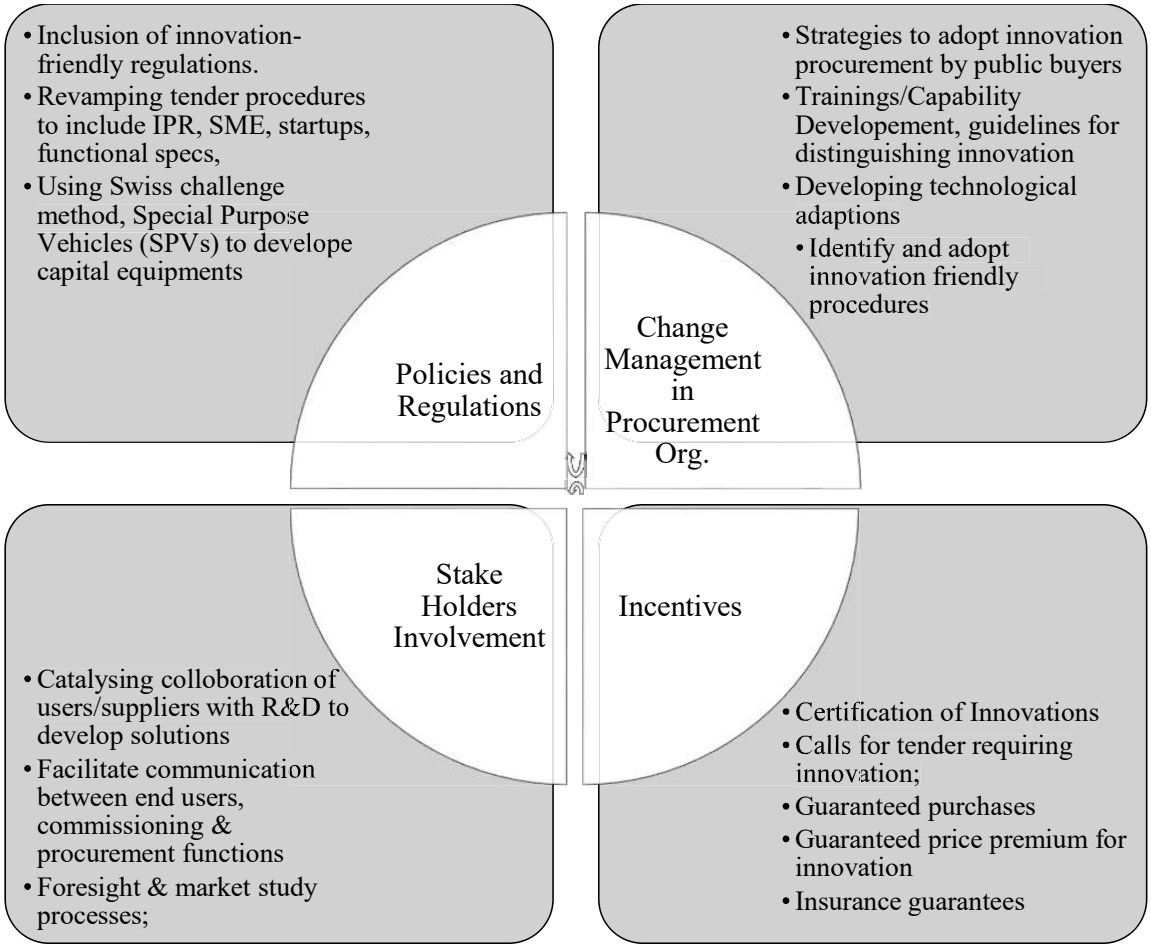

Figure – 1: Innovation Eco-system model
Source: Developed for this research

Once the eco-system is established, strategies specific to below mentioned objectives can be developed by further research:

1. Objective – To meet the societal need
   As India embarks on its innovation journey, Indian corporations and the government should first focus on the significant internal market needs in the energy, water, transport, healthcare, food security, and digital products and services sectors to deliver tangible human and environmental benefits. These sectors are a basic challenge to India Public System. They appear like great market

seeking solutions not in a traditional technology or R&D driven method, but in a market pull method.

2. Objective – To elevate India's Global Innovation Index
   As per Table 3, India did well in some sector, but some sectors are dragging the innovation potential, like Education, ICT access, ICT uses, and Environmental performance. India highly lags in these sectors, and innovative solution are required to boost the ranks.

3. Objective – To develop new products
   India has heterogeneity in geography as well as in economy. Being a mixed economy, the public sectors have strategic importance. Nuclear, Space, Oil & Gas, Defense are highly dependent on imported technology and goods. Sector Objective can be solutions for Infrastructural projects, developing capital equipment for heavy industries – Space, Oil and Gas, Nuclear, etc. Development of new products for substituting imported capital goods will require a collaborative approach with Indian industries, R&D and further commercialization.

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Chief Editor

Public Procurement in India During the Pandemic

YUGANK GOYAL*

ABSTRACT

The paper makes an attempt to understand how public procurement laws responded to the Covid-19 pandemic in India. India relies significantly on public procurement for securing public service delivery, which heightened during the pandemic. Public procurement in emergencies however requires creative interpretation and implementation, since it has potential to arrest the impact at many levels of such a crisis. We collect and examine the information on the governments' decisions and the implementation of those policies geared through public procurement during the pandemic. In addition to allowing policy learnings to follow in India, the paper contributes to the literature on the role of public procurement during emergencies.

Keywords: Public procurement, Covid-19, India, disaster procurement

JEL Classification: H57, H41, J18

1. Introduction

Public procurement presents a *Janus* face to its scholars. Viewed from one side, it is a potent tool for policy intervention by the government (Rolfstam 2009; Kattel and Lember 2010; Grandia and Meehan 2017). Recently, various country studies have illuminated how public procurement has been (or can be) effectively used to impact innovation (Uyarra et al. 2020; Miller and Lehoux 2020), environment (Cheng et al. 2018; Lundberg et al. 2015), small scale industrial performance (Loader 2018; Goyal 2019; Flynn and Davis 2014), industrial development (Snider and Rendon 2008) for instance. As the volume of public procurement literature has increased, the 'strategic' view of public procurement has also magnified, and perhaps for good reasons (Guarnieri and Gomes 2019; Glas, Schaupp, and Essig 2017). Given the enormous size of public procurement, and its distributional consequences particularly in developing countries, the scholarly temptation to recommend its creative use as policy lever is high.

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On the other side, public procurement policies are often institutionally inert and inefficient (Hunja 2003; Schapper, Malta, and Gilbert 2006). They tend to fulfil powerful interest groups and are seen to remain entrenched in the rent seeking political systems of the countries (Bosio et al. 2022; Goyal 2019). Part of the reason is government's heavy bureaucracy that resists change, high transaction costs (Globerman and Vining 1996), or, the 'bureaucratic overhead' (Gholz and Sapolsky 1999). In fact, this 'slowness' creates an organizational osmosis, which influence even the suppliers who become rigid, statist and less agile (Beuve, Moszoro, and Spiller 2021). Together therefore, the *Janus* face presents an important narrative of public procurement, often fueling in the several dilemmas that public procurement face (McCue, Prier, and Swanson 2015). By scope, public procurement is an important policy button; but by structure it is very difficult to press it.

Disasters and emergencies however, reconcile this contradiction. Under extreme socio-economic or political pressures accumulating as a result of a disaster, changes in public procurement policies becomes (or should become) possible (Atkinson and Sapat 2012; Racca 2013). In situations of dire emergencies when crucial supplies may be hit, governments often need to interpret creatively and even issue executive orders, that are in larger interest of the people, even at the cost of procedures that are otherwise required in routine cases of public procurement. These routine procedures require adequate time for deciding the supplier to ensure reduced prices (and even quality sometimes) to the government. This may not be the desired strategy during an emergency when timely delivery is a matter of lives and deaths of large number of people. Public procurement processes can often be very inefficient and slow and may not respond to the crises effectively, but during an emergency, these policy bottlenecks become not just visible, but painful. These are moments of extreme institutional stress, and the prevailing inefficiencies of public procurement processes have a chance of buckling in under these pressures of disasters.

And yet, despite being such a potent weapon in this policy discourse, public procurement in emergencies is hardly studied. The COVID-19 pandemic – which continues to unfold and wreak havoc – offers a scholarly opening. It offers a unique window to study the manner in which public procurement processes responded (and still responding) to the crisis. The pandemic struck on the vulnerable healthcare systems of countries around the world exposing their weaknesses, and caught the governments which were generally unprepared to deal with the calamity of this magnitude. In the wake of the pandemic's severe stress on supplies of healthcare goods and services, along with other essential goods in lockdowns, public procurement policies are being recalibrated across the world, as tools to fight the pandemic. Since the situation continues to evolve everywhere, these policies are also expected to develop agility and responsiveness to changing nature of demand and supply of healthcare related items. In fact, research in the area has begun emerging already, with some scholars suggesting ways in which certain public procurement systems are responding to the ongoing pandemic (Turudić 2020; Atkinson et al. 2020; McEvoy and Ferri 2020; Sadiq and Kessa 2020; Vecchi, Cusumano, and Boyer 2020; Nemec et al. 2020; Livingston, Desai, and Berkwits 2020).

Important lessons in the field of public procurement are to be learnt by close observation of how countries' public procurement policies are getting refashioned and redesigned to effectively respond to the COVID-19 crisis. Regardless of the outcome of the policies, it is important to systematically study the experiences of different countries in facilitating the management of pandemic through their public procurement tools. Not only will this push the frontiers of knowledge on using public procurement for policy outcomes, thus furthering reforms in the field, but also evolve a better understanding of managing emergencies like the ongoing pandemic through public procurement. We study the experience of India for this purpose.

2. Literature Review

To distil the literature on the subject matter, will 'unfortunately' not be a tall order because the interaction between public procurement for and during the emergency is rather limited. Despite a voluminous and growing literature on public procurement on one side, and disaster management on the other, research on the role of procurement policies and practices for disaster preparedness and mitigation has been indeed malnourished (Friar 2006; Atkinson and Sapat 2012). Early scholarly nudges in this direction came from Drabkin and Thai (2007) when the '9-11' disaster in the USA encouraged scholars to consider a serious inquiry of emergency procurement methods. Later, Zhuo (2010) made an admirable attempt to examine the issues related to public procurement in the 2004 Indian Ocean Tsunami, earthquakes and floods in China and New Zealand's floods. Earthquakes in New Zealand were also studied by Le Masurier et al. (2006). Yet, despite the importance of the subject, literature remains woefully inadequate. Barring occasional mention in disaster-related scholarship, the area has been lying for want of greater attention. Atkinson and Sapat's (2012) analysis of public procurement affected due to hurricane Katrina is a useful attempt, in which interestingly, the authors also show that emergencies open up a unique lens to view not just public procurement, but also the larger goals of the government.

Indeed, it is not very difficult to see the importance of the dynamics of public procurement and emergencies. Governments during disasters scramble for necessary materials, create short-run supply chains, and attempt to arrest possibilities of market runs. Demand and critical infrastructure often get disrupted in crises (Haavisto and Kovács 2015), and there is a pressing need during these times for public procurement to assume a more strategic role (Storsjö and Kachali 2017). Government's decisions on procurement can mean the difference between life and death for significant part of the population, particularly the vulnerable one. Given the nature of an emergency, often single source purchase may become a necessity, along with a range of other knee-jerk mechanisms that would come in place, including ad hoc committees and different types of delay tactics (Buor 2019). If designed or used ineffectively, these can exacerbate the impact of the disaster. Supply networks may not possess the necessary resilience, communication may break down, and delayed decision making may lead to exposing people to the crisis' worst impacts, thus requiring complex supply chains to be set up rather than executing marginal changes (Day 2014).

Further, since a range of disaster planning can be done ex ante, and required institutional clauses can be incorporated in the relevant statutes, it can be very useful to develop larger research agenda on emergencies and public procurement. Public sector resources often fall within competing priorities and interests. A framework of public procurement institutions for its contingent allocation can prevent avoidable damage when disaster strikes. A collective and community resilience to emergencies is often considered to be an effective non-linear and dynamic response to it (Cheng et al. 2018), as against the deterministic and reductionist strategies(Day 2014). But if there is something that the ongoing pandemic has taught – and as we excavate in this paper – it is that most optimal strategies are institutional alloys of both types of response. Since procurement systems responses to dangerous events like pandemics can have long term impact on recovery of the affected areas (Atkinson and Sapat 2012). Since pandemics have become rather unusually frequent in the modern, de-territorialized world, this becomes an important area of research.

Public procurement is as a mechanism within government systems, is characterized by high risk aversion on part of bureaucrats and rigid mechanisms which can be hugely procedural (Vyas, Hayllar, and Wu 2018; Bozeman and Kingsley 1998). In fact, often times in this arrangement, procurement designs and decisions are not assessed as much with value-for-money principles as much with the way in which bureaucratic principles are contracted out (Moore 1995). Since these priorities and designs often need to get buckled under the weight of emergencies, understanding public procurement in times of socio-economic stress gives an alternative view of how could public procurement reforms look like, if at all. In emergencies, considerations of fairness, accountability and even redistribution may need to be bypassed for addressing pressing priorities of quick turnarounds, like shrinking vendor pools. There will also be a lack of enforcement on quality controls and diluted monitoring during such scenarios, thus inflating opportunities for corruption and wasteful use of public money (Atkinson and Sapat 2012; Nikolova and Marinov 2017). But then, it is such extreme disaster situation that allows for foregoing economic gains in procurement or value for money. Despite the rationality in discounting for economic considerations in favor of swiftness, the contexts in which the public procurement is set in a society, often dominates how disaster will impact public procurement – something that unpack in this article as well.

While public procurement post disasters can be an effective tool to restore social and economic stability, perhaps the need to understand its role while an emergency is going on has larger utility for designing relevant institutional features as well as help identify government's priorities. Government's response tells us '*a great deal about the accountability and transparency of the government institution, and whether the institution itself constrains or encourages official behavior in a way that is favorable or hostile to community interests.*' (Atkinson and Sapat 2012). Therefore, dwelling on the intersection of disaster and public procurement can illuminate not just the designs in which procurement practices can be used to mitigate disaster's impact, but also understand carefully, the prevalent government institutions and capacity. This requires however, a stronger theoretical grounding for research in public procurement

field, and carving out models and frameworks through which the phenomenon of governance be understood using the lens of procurement.

Public procurement however, remains a relatively new and practitioner-oriented field (Flynn and Davis 2014; Matthews 2005). Thematic analysis of literature in the field during 2001-2013 reveals merely 18% papers reflect a management-discipline influence on the field – others being economics (56%), and sociology (18%) and psychology (8%) – let alone disaster management (Flynn and Davis 2014). In fact, the study also revealed that merely 29% papers carrying a theoretical contribution, and just about 10% papers conceptual in nature (Flynn and Davis 2014). This indicates that the field of public procurement is also in need a more conceptual and theoretical grounding to enrich the case studies or surveys lying within. Our paper is an effort in that direction as well. After developing a journey across Indian and Chinese experience of employing public procurement tools to arrest the ongoing pandemic's impact, we recast those experiences in a framework that may aid to a more general understanding of the issues.

Interestingly, some work on public procurement and Covid-19 pandemic has begun emerging. The pandemic has potential to offer huge lessons in public procurement issues indeed (Folliot Lalliot and Yukins 2020; Livingston, Desai, and Berkwits 2020; Cocciolo, Di Maro, and Samaddar 2020). While some knowledge on the subject matter has come from the perspective of impact of Covid-19 in procurement through international trade (Hoekman et al. 2022; Fiorini, Hoekman, and Yildirim 2020), a greater volume of knowledge is found across in journalistic accounts in popular media, most of such scattered information being in need of a systematic understanding of what is going on. There are some insights that have already begun to emerge in country specific studies, particularly on USA (Atkinson et al. 2020; Sadiq and Kessa 2020; Vecchi, Cusumano, and Boyer 2020), China (He, Huang, and Yuan 2016; Cheng et al. 2018) Europe (McEvoy and Ferri 2020; Nemec et al. 2020; Preda 2020; Turudić 2020), and South Africa (Mathiba 2020). Some of these studies have focused on experience of stakeholders, others have excavated institutional and administrative procedures, both in terms of practice as well as on statutory directions and government orders that came out as a response to the pandemic. We marry the two approaches, and offer a comparative understanding of country-level approach through a framework we develop.

3. Indian Experience

In terms of size of public procurement as a share of GDP, India's figures are some of the highest in the world. Estimates indicate that India's procurement value is almost 25% of its GDP (Prasad 2018). This may be reflective of a heavy public service bureaucracy, entrenched patronage and large size of the state itself at central and state level. It also helps the state in controlling its vast resources, playing patronage politics and entrenching rent seeking (Goyal 2019). In other words, India has relied on public/government procurement heavily for its growth. In the context of Covid-19 India's response could not achieve the desired results (Ganguly 2020; Chetterje 2020; Laxminarayan, Jameel, and Sarkar 2020), and despite the glimmer of hope with declining cases since September 2020 (PTI 2021b), the second wave (continuing even as the article is being

written in April 2021), is spreading mayhem across the country (Biswas 2021; Beaumont 2021). We discuss various policy measures and the designs of public procurement in India during the pandemic.

3.1. Governing laws and rules

Public procurement in India is characterized by corruption, unreasonableness, delays and high levels if inefficiency (Hazarika and Jena 2017; Lewis-Faupel et al. 2016; Goyal 2019). India is one of the very few countries in the world which does not have a legislation on public procurement (a Bill has been pending in the Parliament since 2012). The governing rules come from the General Financial Rules, published most recently in 2017 and Manual for Procurement of Goods 2017, along with the Delegation of Financial Power Rules, 1978. In addition, however, various laws, government orders, statutes, bye-laws and policy documents on contracts, corruption, sale of goods, and arbitration are invoked for procurement at several levels. Further, few states (provinces) have enacted state-specific legislation, that adds to complexities. Often, rules of procurement differ across departments too, like railways, defense, electronics, telecommunication, renewable energy, and micro, small, and medium-scale enterprises. All of this lends huge uncertainty in interpreting and executing procurement contracts. That is why, big firms use their past knowledge, networks, connections, influence with the government, and surplus resources to engage with the bureaucracy and to play in this zone of uncertainty, whereas small firms as well as innovative firms who cannot make lobbying investments easily, routinely shy away (Goyal 2019).

The contracts are too heavily biased against suppliers. For instance, they have to stipulate budgetary allocation far too much in advance with little scope for future renegotiation or even an interim price-escalation, state governments allot financially unsustainable projects, particularly in the election year, government departments frequently revise and make budgetary cuts due to urgent political priorities, payments are routinely delayed and unlike in many other countries, government does not pay interest on delays, bureaucratically minded officers often block or avoid certification of completion of work to avoid payment pressures or avoid taking responsibility about work's quality (Verma 2020a). The bid documents often impose unreasonably high eligibility criteria on the bidders, thus knocking out small companies or innovative boutique firms in the race (Goyal 2019). The government at present does not have any formal system to recognize sub-contractors nor does it have a reliable database to monitor projects; it routinely announces one-sided damages and blocks funds on petty issues causing huge liquidity losses to contractors compelling them to add these risk premium in the bid, making projects needlessly expensive (Verma 2020a). The pandemic could have been utilized to usher significant reforms in the field. Our research indicates, very little happened on this front.

The existing legal framework allows the government to use certain emergency measures as regards the public procurement strategy. There are four important statutory allowances:

i. The colonial law, Epidemic Disease Act 1897, is especially curated for empowering the government to take drastic measures. But it has limited impact over public procurement businesses, given its archaic design.
ii. Section 8.2 of the Manual for Procurement of Goods 2017

talks about handling procurement in urgencies/emergencies and disaster management. It allows for direct procurement without quotation, direct procurement by Purchase Committee, and Single Tender Enquiry, with reduced time for submission of bids. In fact, the provisions also allow for drawing advance cash for procurement, and postponing accounts and vouchers to be submitted after the purchase.

iii. In General, Financial Rules 2017, Rule 166 provides for Single Tender Enquiry (with consent from a Competent Authority) and under Rule 194, government can select the goods/services by directly nominating or negotiating during emergency or situations arising after natural disasters.

iv. Finally, the National Disaster Management Plan 2019 empowers the National Disaster Management Authority (NDMA) to authorize for emergency procurement of materials for rescue and relief in threatening disaster. (Indian government had declared the pandemic, a disaster)

In addition, there are various state-level statutes on procurement, which have emergency procurement clauses embedded. For instance, in Chapter IV of Rajasthan Transparency in Public Procurement Act, 2013, single source procurement (with some ceiling) is allowed for in the emergent situation. Similarly, Kerala's Stores Purchase Manual 2013 states that in an emergency, Single Tender Procurement may be adopted.

Unfortunately, a range of existing framework could not be utilized. The government had set up a National Medical Devices Promotion Council in 2018 to catalyze domestic manufacturing in the sector (Sharma 2020). It is doubtful the Council had any meaningful presence in the entire pandemic duration, except having one meeting in January 2020. A number of suggestions were offered earlier in the pandemic period about using it to alter the foundational design of India's public procurement system but little has happened in many of those aspects. Four ideas merit special mention (Sharan 2020). Firstly, India could have adopted a public procurement and evolved a comprehensive, independent statute on this issue, relieving itself from the meandering clauses of various rules as well as other statutes on corruption and vigilance that needlessly influence processes of public procurement with huge uncertainty. In fact, instances of corruption in public procurement during the pandemic continued (Babu 2020). Secondly, India could have adopted a price-quality ratio to assess the bids would allow for quality considerations to justifiably take centerstage in a public health emergency situation, since the public procurement processes are otherwise focused only on cost considerations. Thirdly, India could have employed innovation-enhancing procurement rules to replace old, archaic emphasis on traditional technology, during the pandemic. The state could invite unsolicited proposals from innovators, and upon being convinced of the utility, attract other bidders to compete even as the original bidder retains right of first refusal. And finally, the government could have used existing manufacturing capacity of even the private sector – often underutilized during the pandemic – to revitalize into producing goods needed to address the public health emergencies. The oxygen shortage being witnessed in India's second wave is indeed a result of ignoring the last point here. In fact, the Industrial (Development and Regulation)

Act, 1951 allows for taking over parts of industrial production and using procurement methods to ensure agglomeration of goods necessary in emergency. The government was unable to use several devices creatively.

3.2. India's Covid-19 trajectory

The spread of COVID-19 in India followed two cycles, first moderate wave between March and December 2020 with a peak in September, and the second, far more devastating wave, starting in April 2021 with no peak in sight at the time of writing this article. The first cycle was characterized by an aggressive and fierce imposition of a nationwide lockdown leading to significant economic costs (Lancet 2020; Lee et al. 2020), and the consequent mass migrations of workers from cities to villages hundred – even thousands – of miles away on foot in a display of extreme depravation and misery (Mukhra, Krishan, and Kanchan 2020; Pandey 2020; Srivastava 2020). The second cycle is exhibiting an unprecedented horror even with partial state-wide lockdowns. There is an intense pressure on an already incapacitated healthcare system resulting in thousands of daily deaths happening due to lack of oxygen, or some essential medicines, largely being explained by the oversight and callous unpreparedness of the government (Bhowmick 2021; Chughtai 2021).

When the pandemic struck, there was an urgent need for the government to procure vast amount of medical supplies for its public healthcare system. The capacity is woefully inadequate (Taneja 2020). For a population of around 1.4 billion, it has 1.9 million beds and only 95,000 ICU beds, and even these resources are largely held by the private sector, often outside the reach of poor Indians. Private healthcare provision, which accounts for around 60% hospitals, 20% beds and more than 80% doctors. In the case of pandemic, the government not only had to augment its own capacity but also take critical decision regarding temporary taking over of the enormous private sector in healthcare in India.

3.3. Central purchasing agency

Whether public procurement is centralized or decentralized has significant impact on its performance (Besley and Coate 2003; Dimitri, Dini, and Piga 2006; Vagstad 2000). In India, centralization was the dominant method (Suryawanshi 2020). In order to arrest suppliers' tendency to manipulate prices by pushing requirement of one agency against another one's need, the Ministry of Textiles, on 18 March 2020, announced the nomination of a central purchasing agency, the HLL Lifecare Limited (a public sector firm located in Kerala), to be the sole procurer in all central and state government hospitals (Folliot Lalliot and Yukins 2020; Verma 2020b). This centralization aimed to agglomerate quantities kept efficiency and timeliness as the central goal in the pandemic (Verma 2020a).

Diplomatically, India imposed export sanctions (caps and restrictions) on masks, ventilators and textile raw materials, even as it allowed for export of essential items needed by other countries more, conditional on reciprocal arrangements of supplies of other items raising new challenges of global public procurement (Verma 2020a). This however, led to another problem, namely manufacturers of many premium quality (and therefore expensive) products were now not only prohibited to sell their goods outside India, but also could not even be successful in government bids, focused

on procuring only the lowest cost good (Datta 2020).

3.4. Encouraging online bidding: Government e-Marketplace

Government launched the Covid-19 Platform on the Government e-Marketplace, which is an online portal for tenders of goods that many government departments use (www.gem.gov.in). The government advertised extensively and invited sellers of Covid-19 related items and goods to the platform (Dubey 2022). This platform had listed almost 10,000 suppliers and their products that were relevant to mitigate the outbreak. The registration process of these suppliers as well as their listing requirements on the portal was eased and fast-tracked. For instance, the bidding time was reduced from a usual frame of 2 weeks to 3 days, just as the delivery period for essential commodities was reduced to 2 days. Buyers were allowed to filter sellers based on their lead time inputs. However, all these changes were made for low-value orders, which may have dampened the impact of the interventions. Hospitals and government departments were encouraged to use the Platform for ensuring regular supplies. In some sense, presence of the portal came as a blessing.

The GeM COVID-19 status report dashboard (https://gem.gov.in/covid19-reports) illustrates the state of public procurement of medical supplies during the pandemic year (March 2020-April 2021). It generated addition of almost 15 thousand unique sellers with 25 thousand unique products on the portal, leading to an upward of a quarter million unique orders in both medical (top five by value being antigen test kits, ambulances, PCR test kits, sanitizers and masks) and auxiliary (top five by value being desktop computers, waste bins, printers, sanitary napkins and plastic chairs) categories each, indicating a very high volume of procurement through the portal. Intriguingly, there is a wide disparity amongst states for the procurement values on the portal, indicating low take-up of revised and more flexible norms across the country.

Some flexibilities were allowed. On the e-Marketplace, for orders less than INR 50,000, buyers can do a 'direct purchase' the product without going through the bidding if they want. Another process is that of finding L1 (lowest bid in a comparison), and finally, the reverse auction in which sellers call compete for the order, out-lowering each other's bid. During the pandemic period, the status report suggests that under medical categories, the order value under direct purchase and L1 process remained the same in each quarter (around INR 2-2.8 billion) but the bidding and reverse auction, which started with INR 1.4 billion in March-May 2020, spiked to INR 12.8 billion during Sept-Nov 2020, and fell back to similar values it began with at the time of writing the article. The direct purchase and L1 method was used for around 20-25 times that of bidding and reverse auction.

What do we infer from this? Firstly, that creating a COVID-19 portal was a good decision, given the large volume of unique orders reflected on the portal. But secondly, we also learn that the government did not make any special provision in its categorical and process-based rules (Rule 149 of GeM) during the pandemic, except reducing bidding time. Note that the high usage of direct purchase option may also be due to the fact that buyers will keep ordering same

items repeatedly by capping each order below the stipulated limit of INR 50,000. Bidding and reverse auction had a sudden spike in Sept-Nov 2020 period (period of pandemic's temporary decline in India), which is 2-3 times the earlier or later order methods. In other words, people may have been benefited by relaxing norms under direct purchase and L1 method, but that quite did not happen.

3.5. Arresting price increase by crackdown

When pandemic struck India with some force, an early impact was price gouging and black marketing of items such as masks and hand sanitizers. The bureaucratic knee-jerk response was a strong crackdown against the druggists who were selling these products at higher prices. From an economic perspective, this policy was misguided – price increase was not just a result of high demand but also because of an inelastic supply. The raw materials had become more expensive too, leading to increase in retail price. But fearing the bureaucracy and police, many druggists stopped selling these products in the first place. This was worsened after the amendment in the Essential Commodities Act 1955. In March 2020, government enlisted masks, melt-blown nonwoven fabric used as raw material for masks, and hand sanitizers under the Essential Commodities Act 1955, capping their prices. The legislation imposes heavy penalties against violators. Most druggists don't understand these legislative pieces, and for fear of being impounded, they stopped selling these products, leading to a further shortage. This was short-lived as the supply resumed, but for some time in the beginning, instead of fast tracking or subsidizing procurement, government's disastrous response was to curtail demand.

3.6. Procurement's policy push for 'Make in India'

The pandemic resulted in an aggressive policy push towards procuring of goods made in India. The government announced and mandated that medical supplies by public health institutions procure their needs by implementing the Public Procurement (Preference to Make in India) Order 2017 for medical supplies. In November 2020, these guidelines were further circulated across all major medical institutions of India by defining local content requirement in any procurement. While concrete evidence of the impact of this policy notification is unknown, it is likely that this may have augmented production capacity of many Indian firms.

3.7. Relaxing standard procuring rules at central level

Almost all the rules were tweaked at the central level, with little allowance recorded at the local sites. In April 2020, the government issued a circular invoking the Disaster Management Act 2005, that asked state governments not to pursue any procurement of safety kits like PPE, mask, gloves and ventilators, which will all be done by the Centre, and later supplied to the state government (Suryawanshi 2020). It stated, '*The state government has to put forward their demands of crucial medical devices for COVID-19 management like personal protection equipment, N95 mask, ventilators rationally and fortnightly demand to the central government. The state governments will not go for the procurement of these essential medical types of equipment that will be done centrally by the Ministry of Health and Family Welfare and then it will distribute to states. The state should ensure distribution of this given equipment at the field functionary.*'

This type of planning raised serious concerns in provincial administration.

The government released a memorandum in March 2020, which triggered the emergency provisions of public procurement in the General Financial Rules 2017, whereby the concerned ministries were allowed to invoke Rule 166 (procurement from a single source in emergency) and Rule 204 (procurement by simple nomination), even if the products were available on the GeM. While the flexibility awarded was praiseworthy, this memorandum was valid only at the central level, for only some select Ministries, and indeed just for almost a month. The memorandum however, was valid only until 30 April. This relaxation therefore, reflects huge institutional reluctance. A welcome policy change was to strike down one of the clauses in the Manual for Procurement of Goods 2017, which required bidders to be profitable in last three years (Jayaswal 2021; Verma 2020a). The requirement for profitability – which is anyway unjustifiable in many respects – was particularly damaging for small and medium scale enterprises who had suffered severe losses due to the pandemic-driven lockdown.

Another issue was about what to do with existing contracts that may be breached on account of the pandemic. The Manual of Procurement of Goods 2017 only had a 'force majeure' clause (Acts of God) and not 'change of law' (Acts of Government/Men). While the former allow supplier to seek time extensions or termination of the contract without any damages or escalation in prices, the latter can allow the supplier to even seek higher prices. But the relevant provision in the law is complex, and does not allow an easy exit from the contract without suffering some financial dent, and that is why, while some ministries and departments read it very narrowly, others, like the ministry that manages renewable energies gave time extensions too (Verma 2020a). Later, in May 2020, the Ministry of Finance sent out anther comprehensive guideline in which it allowed for a penalty-less time extension and a partial refund to those contractors who wanted to exit, proportional to the amount of work completed. This indicated reform-mindset of the government, although there was no significant intervention in public procurement that took place. This also highlights the need to insert 'change of law' clause in the Rules as well, although it has not happened so far.

3.8. Divergences in state level procurement experiences

There was a divergence in various state level initiatives, given the range of implementation methods and practices employed at local levels. For instance, while states like Kerala had a relatively impressive performance due to state-market interaction and participatory governance in the region, the local politics dampened the early gains made in the fight against the pandemic (Chathukulam and Tharamangalam 2021). In Telangana, the government offered several relaxations in procuring medical supplies upto a certain value, and even allowed limited tendering (ET Government 2020).

But of more significant importance are the state-level decentralized offices of State Medical Corporations Ltd. (SMC), which are tasked with range of procurement functions at state level. Over here also, matters differed from state to state. In Uttar Pradesh, the most populous province of India with over 200 million

people, UPSMC's Covid-19-related procurement has been tainted with allegations of corruption (Rashid 2020). In Odisha on the other hand, a state of 41 million people in eastern India, the Odisha SMCL took active interest in intervening in public procurement processes (Sarangi 2020). It set up an Emergency Procurement Committee, along with Special inter-departmental committees to finalize purchase indents, audit documents, authorize different processes and even track the movement of materials. The standard advertising for open tenders, the Odisha SMCL aggressively pursued other strategies like single sourcing (with or without tender inquiry), off-the-shelf purchases, even employed existing rate contracts; even renewing some expired rate contracts to fast track the procurement during unpredictable and ever-increasing vulnerability of supply chains. The most important aspect here was that the OSMCL was granted full financial powers. Going against the standard practice, the OSMCL also offered special incentives for faster supply by ensuring payment within 24 hours of delivery, bearing transportation costs and testing charges, waiving penalty clauses on delayed supplies, lifting stocks from the open market, and many others. Other states should have learnt from this. The officials of OSMCL met routinely to finalize procurement decisions. They executed all these contracts and operations keeping all the protocols intact with auditable document (even ratification by Empowered Group of Ministers) and paper trails to ensure accountability.

3.9. Public procurement during/for the second wave

The discussion cannot be summed up without taking a peep into the second wave and the healthcare crisis it has triggered, most notably in the shortage of oxygen for hospitals. One of the explanations – which puts public procurement at the center – is that despite the early warnings of the first wave, the government took eight long months to invite bids for setting up of 162 oxygen plants in various cities, and even after six months, only 20% had been set up (Lalwani 2021). This is perhaps the most telling instance of the failure of public procurement policy, which, far from being used at the time of crisis to revamp the health infrastructure, even failed to make up for the shortfall that the pandemic itself demanded. These tenders were floated by (again, centrally) Central Medical Services Society (CMSS), autonomous body under Ministry of Health and Family Welfare with an outlay of around INR 2 billion (not considered to be a large amount) only in October 2021, despite early warnings that the first line of preparedness against the pandemic is medical oxygen supply. Investigations only brought contracted firms and hospitals blaming each other for their part of responsibilities (Lalwani 2021) but one needs to dig deeper and in addition to finding out how did underperforming firms get the contract, question the monitoring mechanisms of the government itself.

As a result of this procurement failure, governments in India were scrambling for medical oxygen and even other medicines, floating large-value global tenders for import, sometimes even without the requirement of earnest money deposit from the applicants (PTI 2021a; ANI 2021). A comparative read between this global tender and CMSS' October tender reveals ironic impressions of governmental attitude towards procurement. The CMSS tender is 154 pages long, gives 20 days for bidders to apply, has stringent clauses on earnest money deposits, requires a 10% security deposit, The global tender (floated by

HLL) was 63 pages long, expected applications in 4 days, had waived off the earnest money deposit criteria, required a 3% security deposit. This was arguably the biggest irony. The rigidity with which public procurement takes place in India stands at a stark contrast with the unprecedented flexibility it offers – except that it is not done in preparing for an emergency; only when the emergency has struck and lives have begun dying. Judging by procurement attitudes, it seems that the lack of sense of preparedness is a characteristic color that policymaking in India may have adopted. In fact, as the state came to realize this is a crisis of public procurement, Delhi government deployed teams to monitor procurement of goods in high demand, including oxygen and drugs (PTI 2021a).

4. Conclusion

Rummaging through records and reports on a range of policy decisions governments in India took to resolve the pandemic, and distilling those that relate to public procurement, this paper offers a glimpse on how did India fare. At some level, it shed some light on the attitude of public procurement in India in general, at another, how much importance does it give to public procurement as a strategic tool in emergencies. The pandemic was a useful entry point to understand these motivations. Through this paper, the author hopes to contribute to the nascent literature on public procurement's role in disasters and emergencies, as well as nudge policy makers for procurement reforms, particularly in India.

Simply going by the size, public procurement is an important an area to study. According to some estimates, the average share of public procurement in EU's GDP is 16%; the figure for OECD being 12% (Djankov, Islam, and Saliola 2016). Estimates for US go to 20%. Globally, this figure may hover around 12-20% (Frøystad et. al. 2010). In emerging economies, like south Asia, spending on public procurement is easily 15-20% of their total GDP on an average (Djankov, Islam, and Saliola 2016; Nicol 2003). In developing countries, 50% of total government expenditure is on public procurement. India spends considerably on public procurement taking up 25% of its GDP, thus imposing huge efficiency and distribution impacts on the society at large.

The last two decades have witnessed a growing interest in the field, and although there are valuable country-specific studies, the scholarship suffers from relatively fewer India-focused assessments. Since the sector is itself governed by an institutional inertia and heaviness of bureaucracy, reforms are not easy. There is indeed a continuous tension about reforms in public procurement in developing countries in particular. Public procurement is subject to strong political currents, has competing managerial and regulatory goals, and incongruous performance goals and processes given the very nature of its design; and that is why its traditional reform may well be unlikely beyond going about minimal governance benchmarks (Schapper, Malta, and Gilbert 2006). But the pandemic has highlighted an urgent need for its structural reform or at least brought to surface, a strategic view of public procurement. In that context, our study puts forth, valuable policy lessons and agenda for the future.

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A Systematic Approach to Environmentally Sustainable Public Procurement in Road Construction

SUNIL KUMAR CHAUDHARY*

ABSTRACT

Environment degradation issue has been a worldwide problem. Road sector has been pointed as one of the major contributors to Greenhouse gas emission. Hence Environmentally Sustainable Road construction is the need of hour to minimise the problem of environmental degradation. Various efforts have been made to minimise the problem worldwide. Environmentally Sustainable Public Procurement (ESPP). It can be considered as an environmental strategy to integrate the environmental practices into the construction delivery. ESPP is in its initial stage and not widely used by stakeholders. This paper reviews the concept of Environmentally Sustainable Public Procurement, practices related to it and identification of some barriers in the adoption of the process. The outcome of this research findings provides a basis for understanding the concept of Environmentally Sustainable Public Procurement and the further development of ESPP. The listed ESPP practices identified from this paper can serve as guidelines for industry practitioners to design, implement, and benchmarking the Environmentally Sustainable Procurement practices in their procurement delivery.

Keywords: sustainable public procurement (SPP); green public procurement (GPP); sustainability; challenges

JEL Classification: H57, H41, J18

1. Introduction

The Road Construction industry is under constant pressure to improve environmental performance (Yu, Yevu, and Nani 2020). A new policy is vital to fulfil the requirements of the continuous development by considering the importance of environment. Thus, the need for sustainable development concept is to be implemented. Energy efficiency is employed on construction project with

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either the design, management or quality of the construction itself as the part of sustainable development agenda (Vatalis, Manoliadis, and Mavridis 2012). Thus, green construction is established to achieve sustainable development (Appolloni, Coppola, and Piga 2019). Green construction comprises green design, procuring environmentally friendly material, construction and maintenance which must be sustainable. Green Public Procurement (GPP) is defined as "a process whereby public authorities seek to procure goods, services and works with a reduced environmental impact throughout their life cycle when compared to goods, services and works with the same primary function that would otherwise be procured" (Litardi et al. 2019; Cheng et al. 2018; Appolloni, D'Amato, and Cheng 2011). In this paper author has presented a Systematic Approach to Environmentally Sustainable Public Procurement in Road Construction.

2. Why Green Public Procurement

Consolidating all the gains accrued in so far as environmental policy reforms is concerned, adopting Green Public Procurement bring us not only environmental, but also societal and economic benefits (Ghisetti 2017). Figure 1 below shows the advantages of implementing GPP.

Figure – 1: Advantage of implementation of GPP (Green Public Procurement Framework, Ministry of Environment and Forestry, Government of Kenya 2021)

Specifically, India needs to adopt Green Public Procurement so to accrue the benefits including but not limited to;

- Provide cost savings,
- Demonstrate environmental leadership

- Catalyse innovation
- Support emerging environmental technologies

3. Procurement by the phase of activity

An overview of the different phases for development and implementation of a road project and the related procurement phases is shown in Figure 2. For each activity the key issues to consider when seeking to use GPP criteria. Early inclusion of GPP criteria requirements into contracts is visstal to ensure that sustainability considerations are fully integrated into the project and to limit additional costs.

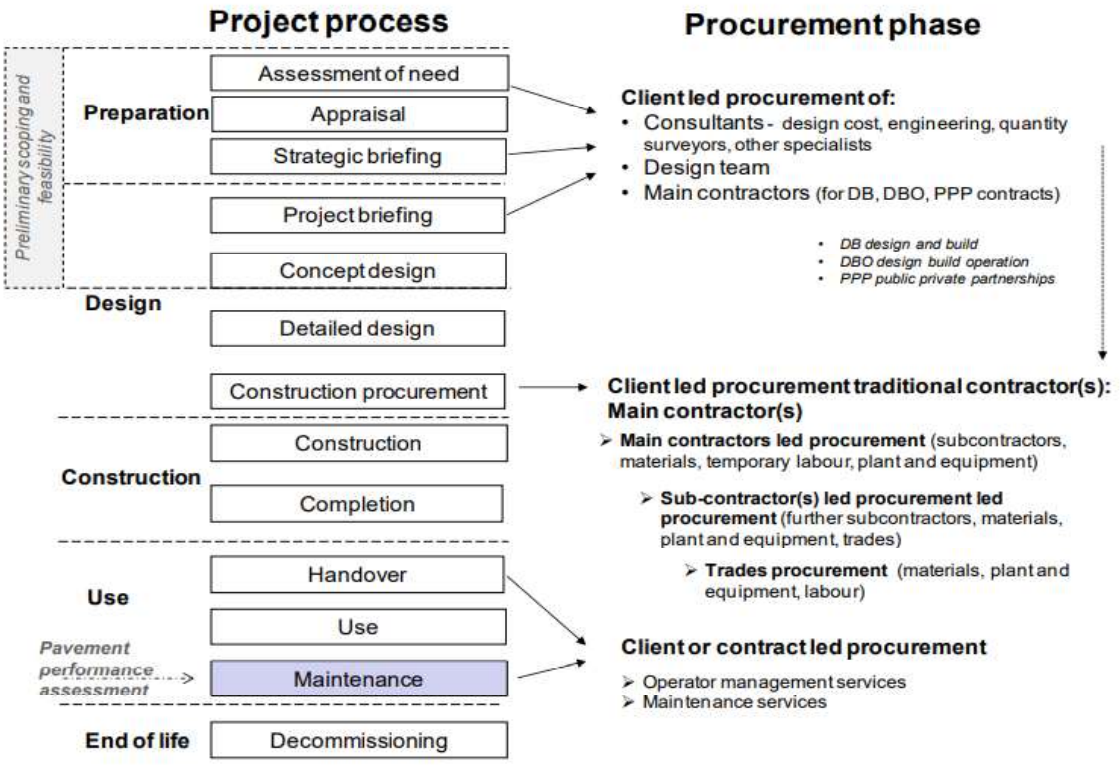

Figure – 2: Project process and procurement phases for road infrastructure (Garbarino et al 2016)

3.1 Preliminary scoping and feasibility

Preliminary appraisals and outline designs may be carried out in-house with support from external consultants to make up for gaps in expertise. Support to be procured could include environmental impact assessments, transport assessments, LCC, sustainable design, etc (Uyarra et al. 2017; Bleda and Chicot 2020).

3.2 Strategic briefing

The project definition should include the environmental priorities of the contracting authority, as reflected in policies and plans, at a corporate level and in local planning policies. At this stage, each project option is examined in terms of construction methods and service life costs and environmental, social and economic impacts.

3.3 Project briefing

A preferred option is developed and a so-called 'project briefing' is prepared for the design team. The contracting authority can set the parameters for this process and incorporate environmental considerations, to be taken into account by the designer. This may be done through a further procurement process for a design team, a design and build team, as a technical brief to in-house staff or as part of a contract management process with a consultant.

3.4 Concept design

It is required to develop a 'concept design' as part of the feasibility study in sufficient detail including inputs (materials, alignment and transport requirements) for the CBA, LCC and LCA analyses and for the Strategic Environmental Assessment (SEA) and the Environmental Impact Assessment (EIA) of design concepts and options. The concept design takes a first view on the contracting authority's requirements that will include Possible environmental constraints during construction.

3.5 Establishing environmental performance objectives

It is recommended that the contracting authority evaluates its actual needs and possibilities for incorporating environmental issues at each step of the procurement process. Each project is unique; therefore, some criteria might have to be strengthened, others omitted. Moreover, the degree to which the procurement process includes the various phases (design, construction, maintenance and operation) will also determine choice and formulation of GPP criteria. Therefore, it is important that both minimum technical requirements and possible areas of focus for award criteria are established during this preliminary phase. This will ensure their clear communication throughout the tendering process and will help build a common understanding. Initially the focus could be dedicated to a few key strategic environmental targets, for example related to pavement performance or construction materials. Further environmental targets may be added in further procurements steps.

3.6 Environmental planning considerations

To benefit from the possible reductions in energy consumption and GHG emissions during construction of major roadworks, design should not be separated from the opportunity to optimise the length of the road, earthworks and materials transportation. The length of the road is vital to the total impacts caused by a road. The reason is that the use phase is typically the most significant parameter and causes the largest environmental impact for road with a considerable traffic volume. Typically, the road alignment is decided upon at the feasibility stage and assessed by the EIA. Thus, it is assumed that the length of the road is decided before the GPP criteria come into play. It is recommended that the contracting authorities are aware of the importance of this parameter and include this knowledge when choosing the alignment of the road construction. The environmental impacts associated with the extraction and transportation of large volume, high weight materials such as aggregates may be a consideration, and can be incorporated into the tenders' documents. This should always be done based on an understanding of the market conditions and, when using award criteria by establishing and clearly specifying in the ITT weightings that will ensure effective competition and reward bids that offer

the best overall environmental performance (Bleda and Chicot 2020). This is particularly the case if it is chosen to link criteria on recycled content with CO2 emissions from aggregate transportation.

3.7 Specifying the design brief and performance requirements

It is important in the contract that GPP criteria are fully addressed within the performance requirements (Vatalis, Manoliadis, and Mavridis 2012). It may be necessary to procure expertise at this stage in order to prepare the performance requirements. The performance requirements to be communicated to potential contractors are therefore important in formally specifying GPP requirements.

3.8 Preparation of the tender documentation in contract

The detailed design forms the basis for the ITT which will be used to procure the main Road construction contractor. It is therefore important that it incorporates GPP requirements. This could include requirements relating to:

- Design performance, such as structural parameters, rolling resistance, noise and drainage;
- Material specifications,
- Execution of the contract, including waste management.

3.9 Selecting the main construction contractor

It is important that the contractor has a clear understanding of the GPP performance requirements and has the capability to implement them.

3.10 Quality of the completed road

A number of GPP criteria require the contractor to monitor performance and report on progress as the road work progresses. For example, the rolling resistance and the low-noise pavements performance parameters have to be tested for compliance with the design claims after the construction, before the road opening and few months after the opening. Furthermore, criteria on inspection of water pollution control components and storm-water retention capacity in drainage systems and for wildlife passages are also proposed. It is therefore important that requirements such as these are clearly communicated in the Invitation to Tender (ITT) and that agreement is reached on any interim monitoring as construction progresses.

3.11 Use of the road

Monitoring is performed during the use phase of the road. Road asset management is a holistic approach that integrates the strategic and systematic process of operating, maintaining, upgrading and expanding physical assets effectively throughout their life cycle. A road asset management includes pre-investigation, planning, design, building, daily operations, planned maintenance, improvement and decisions on recycling or removal (Figure 3). Furthermore, the road user perspective has become a target area to be considered.

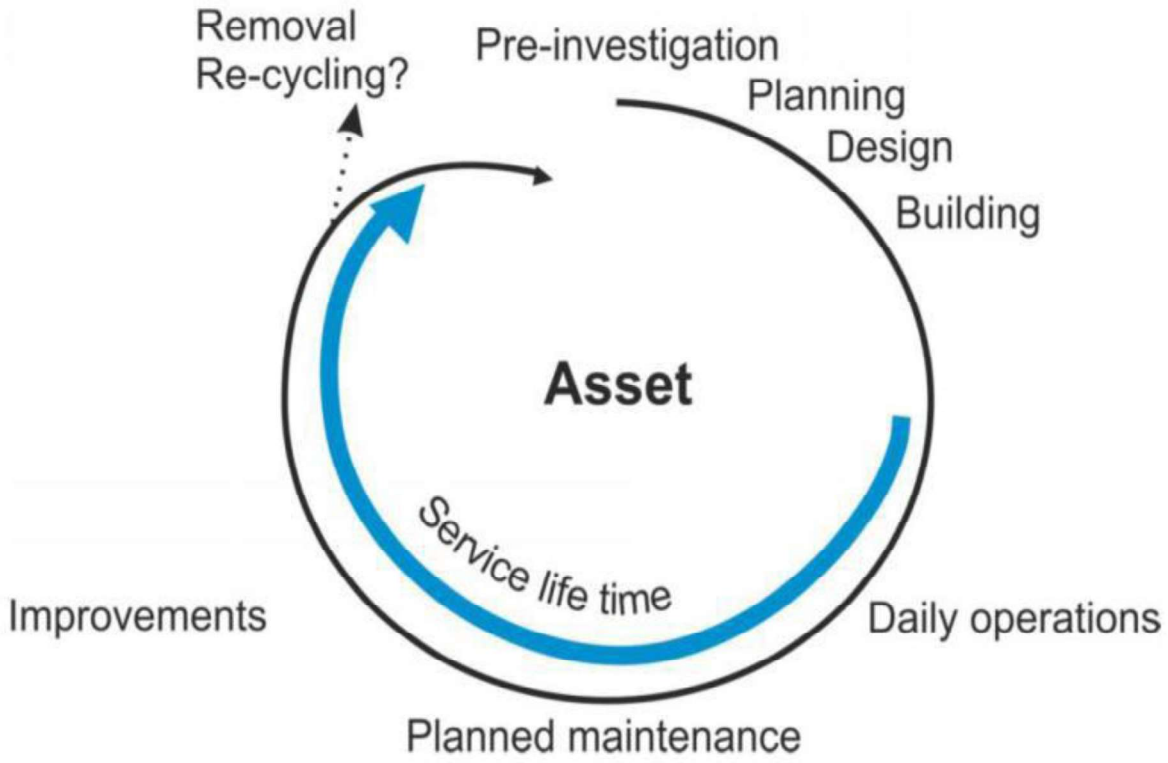

Figure 3: The life time stage of an asset (Sjögren et al., (2012) quoted in Garbarino et al., 2016)

3.12 Maintenance and operation

Figure 4 shows the typical intervention points for network maintenance.

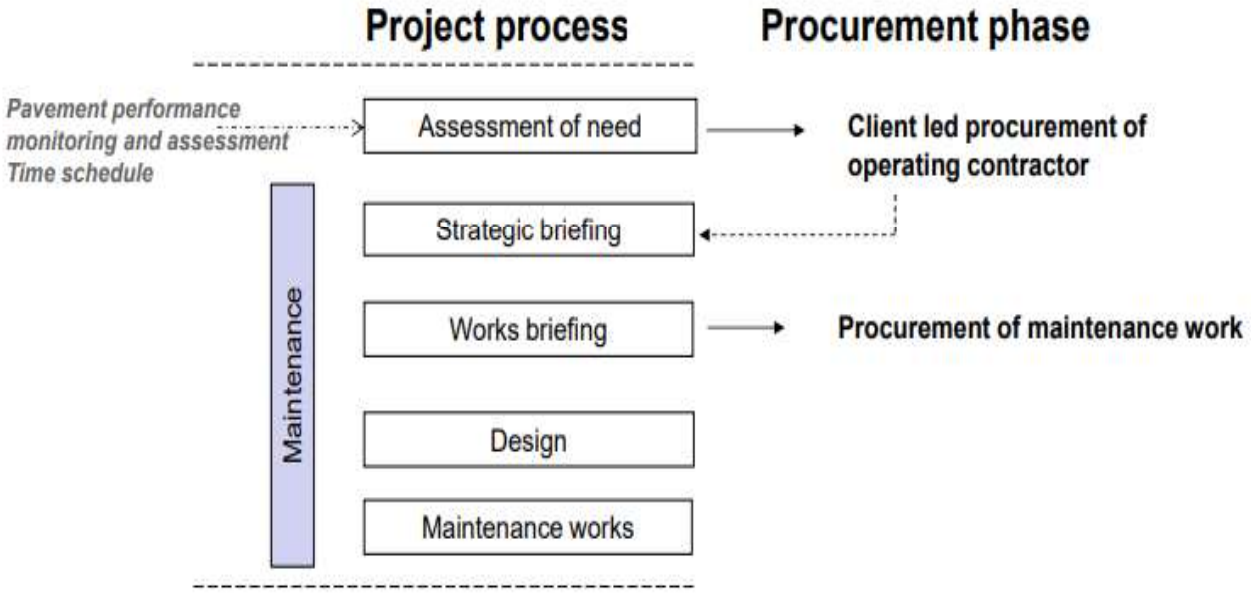

Figure 4: Project process and procurement phases for maintenance (Garbarino et al., 2016)

3.13 End of Life i.e., road decommissioning

A range of works contracts may be required for the road decommissioning and they may be let as a separate contract to a specialist company. The GPP criteria require that contractors carry out a pre-demolition audit in order to identify the key construction materials and to determine what can be re-used, recycled or recovered. The materials, products and elements identified shall then be itemised in a Demolition Bill of Quantities. A waste management plan shall identify how recovery for re-use or recycling will be maximized.

3.14 GPP Process Implementation

The procurement process is divided into the following stages;

- Procurement Planning
- Development of bidding Documents
- Inviting Tenders
- Tender Process Management
- Tender Opening
- Tender Evaluation
- Tender Process Debriefing, Award and Contracting
- Contract management

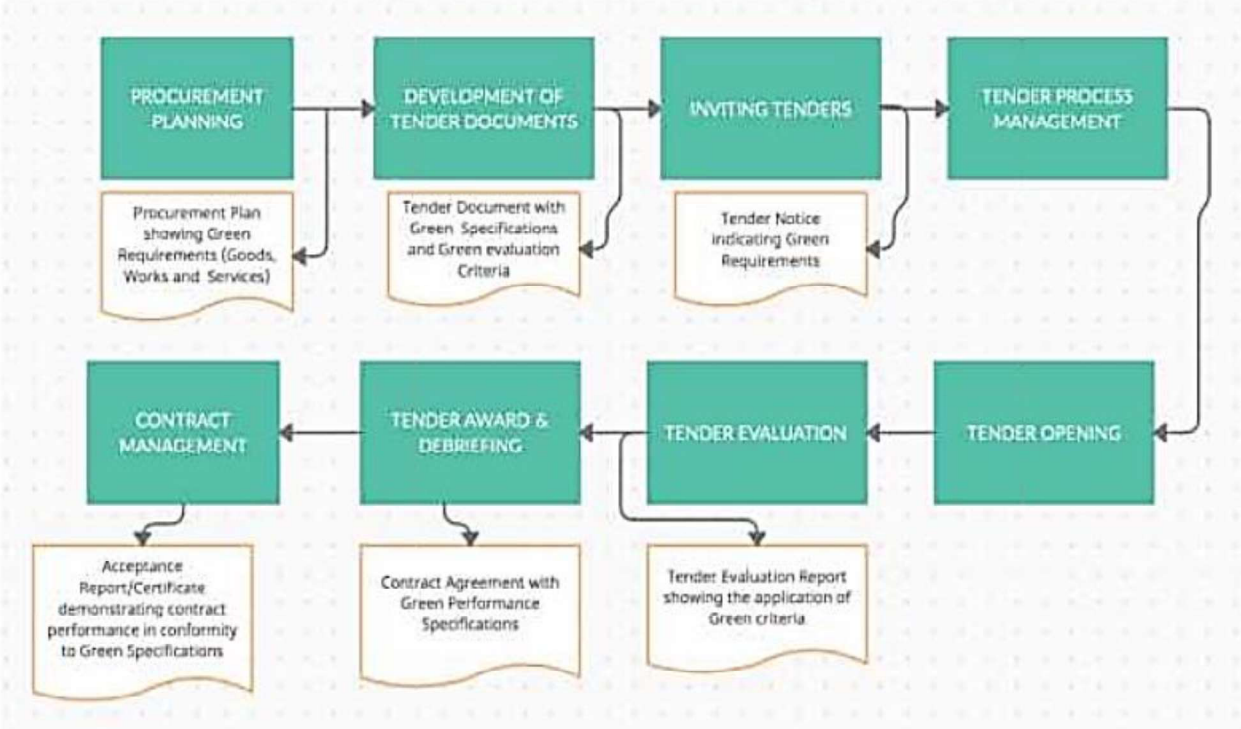

Figure – 5: Stages of GPP implementation (Green Public Procurement Framework, Ministry of Environment and Forestry, Government of Kenya, 2021)

4. Conclusion

i. Green procurement is an important tool to promote sustainability for road construction project
ii. Project stakeholder is the key to determine project success
iii. Green concept must be included in each step of procurement process

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