CHAPTER TWO

LITERATURE REVIEW

This chapter presents review of literature related to various issues of the public procurement. It presents broad themes as well as associated sub-themes of the extant literature. This is followed by detailed review of issues pertinent to public procurement.

2.1 Meaning of Public Procurement

Terms procurement and purchasing are often interchangeably used, however, purchasing refers to the process of acquisition in manufacturing, while procurement is a term used in governmental circles for acquisitions (Quayle, 2000; Bowersox et al., 2002). In recent decade's public procurement have received greater attention due to emergence of the concept of New Public Management (NPM) (Pollitt and Bouckaert, 2000; Hood, 1991) which focuses on how the public sector can be more effective.

2.2 Public Procurement and Supply Chain Management

Across economies public procurement encompasses greater share of public sectors overall budget. The size of public procurement in terms of purchasing volume and value is at the same level or even higher than volume and value dealt with by private actors. The theoretical development of Supply Chain Management (SCM) is primarily derived from insights of private organizations. The dominating focus in SCM has been related to the physical movement of tangible products as well as intangible products. The public sector primarily produces services and can also benefit from a SCM orientation on the dual objectives of service improvements and cost minimization. Public procurement includes entities such as communication and Information Technology (IT), stationery, power, utilities, insurance, cleaning and maintenance, capital expenditures, and consultants. Public enterprises enter into many business relationships, both upstream and downstream. However, the objectives of the public sector, and thus also for public procurement, are wider than a single company's profit (Murray, 1999; Larson, 2009). Such objectives include the effective delivery of a wide range of public services, including law and order, health, social services, education, defence, transport, and the environment. The scope of most public sector organizations is, therefore, much wider than the scope of private companies in terms of the diversity and needs of customers being served (Erridge, 2007).

Table 2.1: Broad Themes of the Literature

Themes/Sub-themes	Author(s)
Strategy and partnerships	
Strategic aspects of public procurement	Lyne (1996), Quayle (2000), Erridge and Murray (1998a, 1998b), Thai (2001), Erridge and Mcllroy (2002), Murray (2007), Murray (2009a, 2009b), Matthews (2005)
Public-private partnerships	Essig and Batran (2005)
Public procurement partnerships	Erridge and Nondi (1994), Parker and Hartley (1997), Bovaird (2006), Lawther and Martin (2005), Erridge and Greer (2002)
Sustainable public procurement	Sanderson (1998), Li and Geiser (2005), Preuss (2009), Walker and Brammer (2009)
Public vs Private purchasing/Outsourcing practice	Murray (1999, 2001), Lian and Laing (2004), Burnes and Anastasiadis (2003), Larson (2009)
SME as suppliers in public procurement processes	Karjalainen and Kemppainen (2008)
Organizational design in public procurement (design elements: Policies (P), Organization (O) and Processes (P))	McCue and Gianakis (2001), Johnson et al. (2003), Kamann (2007)
Modelling cooperative public purchasing	McCue and Prier (2008)
Legislation	
Public procurement directives/policies	Furlong et al. (1994), Cox and Furlong (1997), Erridge et al. (1998)a, Martin et al. (1999),Williams and Smellie (1985)
Impact of European Union (EU) on public procurement	Cox (1994), Martin et al. (1997), Jones (1997)
Non-compliance of EU tendering directives	Gelderman et al. (2006)
Regulatory, commercial and socio-economic goals	Erridge (2007)
A public procurement perspective on managing markets for competitiveness	Caldwell et al. (2005)
Corruption and public procurement	Csa´ki and Gelle´ri (2005)
Organization, innovation and learning	
Acquisition processes	Schiele (2005a, 2005b, 2009)
Inter-organizational procurement of shared services	Murray et al. (2008)
Public procurement of public services	Bryntse (1996), Roodhooft and Van den Abbeele (2006)
Public procurement and innovation	Hommen and Rolfstam (2009)
Certification and learning in private-public projects	Prier et al. (2010), Zheng and Caldwell (2008)
e-Procurement	Vaidya et al. (2006)
Conceptual hygiene	Prier and McCue (2009), Murray (2009c)
Benchmarking	
Precisely defined and communicated Strategy, Senior management support for Procurement, Procurement as driver for company-wide saving activities, Early involvement of procurement in development projects	Frehner and Bodmer (2000)
Right key performance indices	Frehner and Bodmer (2000), Aberdeen Group (2006)
Early involvement of key suppliers in development projects, Advanced cost cutting methods/levers	A.T. Kearney (2004)
Risk management with respect to future evolution possibilities of suppliers	A.T. Kearney (2004), Aberdeen Group (2006) and Schuh et al. (2007)
Corporate thinking and cross-functional responsibility for all expenses	Aberdeen Group (2006) and Schuh et al. (2007
Global sourcing with respect to total cost of ownership, Central coordination and local	Schuh et al. (2007)

execution, Specialized procurement roles Cost reduction by supplier, Supplier value integration, Management of sub-suppliers	
Standardized procurement processes, Procurement hand book, Intranet as procurement knowledge base, Continuous establishment of data, transparency, e-Procurement, Shared e-platform with suppliers	Frehner and Bodmer (2000)
Methods for forecasting, inventory management, and replenishment	Aberdeen Group (2006)
Highly qualified buyers, Procurement personnel must be on face value with members of other units (as development, production, etc.)	Frehner and Bodmer (2000)
Structured supplier portfolio	Frehner and Bodmer (2000), A.T. Kearney (2004) and Schuh et al. (2007)
Holistic supplier evaluation	Frehner and Bodmer (2000) and Schuh et al. (2007)

2.3 Procurement

2.3.1 Purchase as a Driver of Supply Chain

Level of involvement of purchasing department in an organization is generally found to be low. In public procurement the purchase professionals are more concerned about adherence to policies and procedures then meaningful contribution. Purchasing department has been commonly referred as clerical process oriented function that adds little value to purchase (Schiele and Clifford, 2006). Purchasing department involvement in an organization can range from none to documentary to professional to meaningful. No involvement means the purchase department is a bypass. Documentary involvement represents very basic administrative activities like preparation of Request for Quotation (RFQ), collection and distribution of proposals. Professional involvement indicate that purchasing perform higher order activities. Meeting with clients and understanding their requirements require higher level of skill and knowledge. Meaningful involvement occurs when purchasing department is professionally involved considering the interrelationship between the various purchasing activities and their impact on long term need and strategies of organization.

Purchasing departments meaningful involvement depends on its trustworthiness, capability and benevolence. The client department trusts its perception that the purchasing department is capable of adding value and its own knowledge and experience. The authors carried out the survey and the important findings suggest that client department involve purchase department in its decision if they trust ability and benevolent intention of the purchasing department otherwise they find ways to bypass them. The purchasing departments identified factors are soft skill such as tact, respect, openness and friendliness, initiative, service based approach

and benevolence. The factors categorized under client department for meaningful involvement of purchasing department are positive relationship with the client department, positive perception about the value offered by purchasing department, lack of knowledge and experience of client department and heavy work load. Meaningful involvements require team approach in decision making to achieve common and not mutually exclusive goal. Management should therefore invest in developing capabilities of purchasing department personnel.

In the September 1983, Peter Kraljic wrote a classic paper "Purchasing must become Supply Chain Management". In this paper the strategic importance of purchasing function is highlighted. The approach of the purchasing organizations for making transactional purchase of all type of items was criticized. In this paper the items were classified into 2x2 matrixes on the basis of the supply complexity and the purchase importance. Supply complexity is measured by scarcity, monopoly/oligopoly, entry barrier, technological complexity and purchase importance is measured by strategic importance of purchase in terms of value added and total expenditure as per cent age of Bill of Materials (BOM).

High	**Leverage items:** Decentralize purchase, JIT, Stay in touch with market, annual purchase, target précising	**Strategic items:** Long term contracts, joint ventures, correct quantity forecast, backward integration, early involvement of supplier, diversify, vendor meeting, problem solving, contingency plan.
Purchase importance	**Routine items:** Product standardization, inventory optimization	**Bottle neck items:** Centralize purchase, buffer stock, keep low profile for price negotiations, volume insurance, search suppliers
Low		

Low **Supply Complexity** ***High***

Figure 2.1: Purchasing Portfolio analyses

The each category of items as per the portfolio required different approach for purchasing management. The basic idea is to minimize the supply risk and optimally exploit the purchasing power. Following the portfolio approach of the purchasing management the business organizations can make up to 10 per cent saving in bill-of-material. But this approach is gradual and has many surmountable obstacles (Kraljic, 1983).

After Kraljic matrix other scholars like Bensaou (1999), Caniel1 and Gelderman (1985), Olsen (1997), Syson (1992), Weele (2000) refined the original matrix carried out further research on each portfolio and made tactical and operational recommendations for developing overall purchase strategy in each category. Martinez-De-Alb'eniz (2005) further reinforced the finding that the portfolio approach increases the profit and reduces the supply risk.

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Gelderman and Arjan (2005) have added a new dimension to the portfolio approach by combining the original criteria of supply complexity and purchasing importance with power and importance. And a new model which is dependence based purchasing portfolio is created. Other author like, Caniëls (2007), Padhi and Aggarwal (2012),Dubois (2002) have further refined the purchase portfolio approach.

Murat and Huang (2009) have added a new dimension to the purchase portfolio with respect to long-term and short-term contracting approach. They concluded that when price variability increases the long term contract will be beneficial and when demand variability increases the short term contracts are better. Federgruen and Yang (2011) have written above dealing with unreliable supplier, number of supplier and their share of business. Mieghem (1999) has discussed the opportunity of outsourcing and system coordination to improve financial performance. He has recommended that sometimes it may be better to leave some contract parameter undefined and agree to negotiate afterwards.

Simchi and Levi (2004) have written about analysis of portfolio of contract. Petrovic and Braglia (2001)developed a model for analysis of supply chainbehaviour and performance in uncertainty. Corbet (2005) have discussed writing of supply contract under information asymmetry. Tomlin and Schmi (2011)in his book have described and analysed various types of possible disruption and strategies for mitigation. They have also discussed diversifications strategies as well as emergency backup strategies.

Tallurai and Narasimhan (2004)wrote about Supplier Relation Management and Strategic Sourcing. Suppliers are classified on the basis of performance. This helps to develop long term partnership and pruning of supplier base. Sislian and Satir (2000)defined a framework for long-term partnership on the basis of primary factor which are demand flexibility, competitive advantage and secondary factors such as process capability, maturity and risk. This framework helps in sourcing decision making. Ellram (1998)described the concept of

Total Cost of Ownership (TCO). Beall (2003)found the growing expectance and importance of e-reverse auction for highly standardize products where price is the only decision making criteria. They have studies on four multinational firms.

Cachon (2003) discussed numerous supply chain models in order of increasing complexity. Different types of contract were discussed along with merit and demerit. The areas discussed are:

- Single supplier to single retailer applying news vendor model.
- Extension of this model to justify retailers' efforts to increased demand.
- Next extension is single supplier to multiple competing buyers.
- Infinite horizon stochastic demand.

Different types of contracts described are buyback contract, wholesale price contract, quantity flexibility contract, revenue sharing contract, sell rebate contract etc.
In a research paper "Evolution of the supply chain in the Italian Railway industry" Esposito and Renato (2009) have analysed the Italian Railway industry with respect to the role of different player in the supply chain and whether the supply chain is in line with other industrial sectors. In the supply chain of the Railway industry the leader firm carries out the assembly and is responsible for the programme. This firm designs the product; coordinate the flow of document, information, products and materials of the whole programme. The first tier of large and medium scale firms with specific technological specialization take part in the programme for example mechanical sector will have the task of planning and producing the structure of locomotive, electro-mechanical and electronic sectors are responsible for planning and production of propulsion system. The second level of pyramid consists of Small and Medium Enterprise (SME) which supply components and perform activities of lower cost and a specialization level.

2.4 Public Procurement

The public procurement is defined as purchase for people by agent of people by using public funds i.e. taxes (Murray, 2009c). Generally a role of politician in public procurement is not well researched. The purchasing professionals are required to appreciate the difference between political interference and political mandate. The politicians are answerable to local people who elect them therefore they may influence the policy in their favour.

In the research paper "Procurement issues in Malaysia" Hui et al., (2011) described the procurement process prevalent in Malaysia by means of interview of 18 persons dealing with procurement. In Malaysian context, the red book highlights five common weaknesses of public procurement system in the Malaysian procurement system (Hui et al., 2011). These are:

- Failure to buy the right quality in right quantity at right time resulting into higher cost of acquisition.
- In-efficient and in-effective procurement process resulting into higher cycle time.
- Lack of transparency and ambiguity in the procurement process resulting into leakage and corruption.
- In adequate infrastructure to support procurement including flaw in organization and government.
- Ineffective and in-efficient vendor development and management.

The issue such as accountability, transparency, integrity and cronyism are areas of concern which result in huge wastage of public funds. Some of the important findings entails lack of transparency which result into inflated cost, thus, the emphasis should be on transparency rather than confidentiality, there are ample evidence of direct political interference, the corruption activities exist at every stage of the procurement starting from procurement planning, budgeting, invitation of tender, contract award, and contract acquisition. Procurement reforms are suggested such as devising higher ethical standards for procurement officials, asset discloser and Right to Information (RTI).

It is generally seen that Public procurement professionals pay more than they should for goods they buy and doing so support sub-optimal enterprise (Martin and Keith, 1997). Taking some empirical evidences of the public purchasing in the European Union it has been brought that public enterprise has to pay higher due to protectionist sentiments. The bureaucrats do have close working relationship with domestic suppliers. Politicians play critical important role. Vote sensitive government can always justify preferential purchase from domestic source in terms of claim about jobs, technology and balance of payment benefit. This paper suggested more competition by inviting open tender for all high value purchases. However, this paper has not discussed the pros and cons of the open tender. It does not talk about the underlying supply chain

2.5 Importance of Public Procurement

Public procurement is an important tool for strategic change (Stykes, 2007) and it is very much different from private procurement(Kelman, 2005). It has more systematic and strategic approach. However complex set of rules, procedure and structure make it more difficult (Thai, 2001). Public procurement is affected by several factors which may be internal as well as external. The role of society, media and politician plays important role (Pegnato, 2009).

Public procurement is an important tool to drive the economy of the country. (Murray, 2000a) wrote an article "public procurement strategy for accelerating the economic recovery" in the context of United Kingdom (UK) and highlights how public procurement can help the Small and Medium Enterprises (SMEs) to deal with economic down turns. It also gives a hint that the approach of long-term perspective on supply chain is to be preferred over one time negotiation of lowest/best deal. Lean working, simple tendering procedures, following best practices and ensuring timely payment to contractors and subcontractors will help both buyer and sellers. Single sourcing and long-term contract however require high level of dependency and trust which few organizations have. Longer term contract requires significant responsibilities for a supplier including the provisions of guaranty and liabilities in the event of contract failure. Co-operative purchasing is considered good practice in reducing cost and risks and maximizing economies of scale. Murray (2009) suggest following four themes as procurement strategy:

- Providing leadership and building capacity
- Partnering and collaboration
- Doing business electronically and
- Stimulating markets and achieving community benefits.

Public procurement is a government policy tool where the basic objective of public procurement is to deliver government policy (Harland et al., 2003). The objectives of public procurement are economy, efficiency, transparency and accountability (World Bank, 2003). Thus, beside value for money there are other principles like efficiency, transparency and accountability which are sometime contradictory in nature.

Public procurement is the driver of the policy tool of the government. The total public procurement in India contributes to almost 30 per cent of Gross Domestic Product (GDP). Current Indian prime minister has announced his vision "Make in India" which needs to be incorporated in the public procurement framework. Almost all developed countries have used

variety of policy tools to encourage domestic bidder participation thus enhancing indigenous domestic content in government supply, clever use of outsourcing for encouraging local employment. To achieve these objectives the policy framework include preferential treatment of domestic bidder/exclusive reservation for domestic bidder, imposing mandatory minimum domestic content in government supplies, imposing offset obligations etc. Government of India, Department of Electronics and Information Technology issued a policy (2012)for purchase preference to Domestically Manufactured Electronic Product (DMEP) policy were in a purchase preference (and not the price preference) is given to domestically manufactured electronic products

2.6 Quality in Public Procurement-

Åsa (2012) in his research paper on "Quality in public procurement process" has mentioned the importance of price and non-price criteria for vendor selection. The over emphasis on price has resulted into reduced and inferior service to the customer. It has prescribed four dimensions for assessing the quality of procurement process. These four dimensions are: Using Key Performance Indicators (KPIs) and developing a self-assessment model for assuring quality in the procurement tender:

- Balance between price and quality
- How tenders perform their self-assessment and
- Use of external and/or external examiner

The research has shown that self-assessment generates several improvement opportunities for tenderers. This paper does not suggest any model and how that model can be applied. Supplier development is possible through a continuous mentoring and it should fervour supplier in the short-term more than the buyer. Vendor development in public procurement cannot take place if we assume equivalence between buyer and supplier. Supplier development in public procurement is slow to develop due to accountability, deficit, commercial incentive and lake of skills. The public buyers are less focused on relationship building and more on how to obtain lowest price. Public buyers are generally risk averse. Finally rules and regulations impose certain constraints upon how and when public buyer interacts with supplier. A public buyer relies upon formal bid procedures such as competitive tendering rather than relational contracting. Due to frequent use of formal tendering in public procurement buyer supplier relationship are often formal (McKevitt and Paul, 2014).

2.7 Contract Management

Outsourcing is increasing in public enterprises and effective public sector management is becoming effective procurement and contract management. There is critical debate on trust and public sector procurement and contract management. In procurement contracts, the trust is defined as expectation of one party to exchange is that other party will not take advantage of commercial vulnerability even when there is an incentive to do so (Watson et al., 2012). For building trust the buyer should not be aggressive during pre-contract, there should be clear communication of interest of both the parties. It also argues that the formal contracts are incomputable with trust; contract designed should not be too restrictive and instead provide an opportunity for supplier to innovate for mutual gain.

For building trust the contract should get translated into a set of working procedures. Economics of tender is based on supplier opportunism. Supplier may underperform to earn higher profits, when buyer is not able to monitor under performance. (Watson et al., 2012) in his paper has provided data set about procurement and contract management practices by surveying 180 contract management situations. It suggests that there is no significant difference in supplier's opportunistic behaviour between public and private enterprises. The risk of supplier opportunism is significant when there is high uncertainty, high sunk cost, high complexity and less extensive management control. Higher the management control lesser is the risk of supplier opportunism. Contract management in India is poor (Verma, 2010). There is poor work management and poor relationship management. Often the decision of outsourcing is not correct (Schooner, 2010).

2.8 Financial Management

Financial management is the most important issue and often the most important barrier for sustainable procurement (Walker and Brammer, 2009). There is uncertainty of budget. Often there is a tendency to buy immature technology without taking into account, long term impact because of budgeting cycle (Schooner, 2010).

2.9 Important Factors in Public Procurement

2.9.1 Market Conditions

Public procurement especially of high value items operates in market condition where competition is distorted (Mckie, 1970). It is large buyer large supplier situation with barriers

to entry thus, competition is not perfect. Long term contracts favour large and monopolistic suppliers (Williamson, 1981).

2.9.2 *Political Environment*

The role of political head is important in public procurement (Murray, 2008) and public procurement strategy. There is direct and indirect role of politician in award of contract (Knight et al., 2007). Any attempt to reform public procurement is always constrained by political interference (Pegnato, 2009). Highlighting political apathy it is mentioned that the last effort for drafting model tender document for civil works took more than 14 years (Shourie, 2004). The political masters are responsible for their democratic accountability. The bureaucrats therefore required to understand the different between political interference and political mandate (Murray, 2009). However, the role of politician is taken in negative sense as serving their self-interest (Haruta and Radu, 2010).

There are empirical studies to prove the political connection and influence in decision making process of public procurement. The companies therefore try to have political connection (Goldman, 2008). In US there are political lobbying firms. The politics has become important integral part of decision making process in large value public procurement cases (Eisenhardt and Zbaracki, 1992). At times even the basic framework and provisions of contract are challenged by politician. This makes the entire progress in public procurement very slow (Goodman, 1988).The role of politician become more critical when we consider huge amount of money involved and many times the entire process of procurement is longer than the tenure of the political master (Bipindra, 2014).

Due to very high lead time of procurement, forecast of technological requirement becomes very difficult and it is subjected to political and organizational pressure (McNaugher, 1987). Such pressures situation become more vulnerable where there is lack of clarity on procurement specifications. Generally it is seen that indenting authority and contract enforcing authority are independent. They are interwoven but not integrated. Their perspective has distorting implications in the entire procurement process (Graells, 2010).

2.9.3 Organization Culture

Cultural is defined as collective, shared, believe and behaviourand cultural environment play very important role in functioning of an organization and impacts its efficiency and effectiveness (Casson, 1992). Efficiency of organization depends on combination of

organization cultural and market condition (Ghoshal and Moran, 1996). Public procurement is constrained by bureaucratic cultural, hierarchal setup and uniform policy for different situation (Henry, 2012). This unique culture should be taken into account while dealing with public procurement. Some authors have been very critical for public procurement and have considered it as outright toxic (Schooner, 2010).Organization culture also impacts its Performance Measures Systems (PMS)(Hall and Holt, 2003).

2.9.4 Individual Transaction Perspective

Public procurement are subjected to scrutiny of various constitutional and extra constitutional authority such as Central Bureau of Investigation (CBI), Central Vigilance Commission (CVI), Comptroller and Auditor General of India (CAGI) and Right to Information (RTI). Each transaction is subject to scrutiny individually for an efficiency, efficacy and correctness rather than overall transaction. For example one wrong decision out of hundred good decisions can create problems. The magnitude of hazard depends on attributes of transaction. Long term contracts have greater uncertainty and incompleteness therefore considered more hazards (Masten, 2006).

2.9.5 Make and Buy Decision

Outsourcing in public services is increasing on the basis that private sector can deliver the same quality of service as their public sector counterpart at lower price. The effective public sector management is therefore becoming effective contract management (Watson, 2012). A facility and infrastructure created for in house production many time has to be closed down because the same quality products were available from market at cheaper rate. It is generally seen that if there is in house production then cartel formation tendency of private supplier is kept under check. This leads us to the need for drawing a fine balance between the make and buy spectrum.

2.9.6 Rule of Law Codes and Manual

Often the legal process of public procurement dominates the whole character. It consists of multi-layer bureaucracy which is risk averse. Regulation codes and manual are sometime conflict the very basic objective of procurement. These regulations are seen as obstruction rather than facilitator (Callender and Schnapper, 2007).Risk reward ratio in doing business with public enterprise is higher because of complexity of rules. Over regulation act as a barrier to entry in the government controlled businesses. These regulations also contribute to

constraint in building up the relationship between buyer and seller (Knight et al., 2007). Over regulation, risk aversion and unpredictability of budget is one of the challenges of public procurement (Harland et al, 2007). Many times these over regulations contribute to delaying tactics for the bidders who are not able to win the bid. There has been tendency of representation and complaints by the losing bidder. This tendency frustrates the buyer (Lennerfors, 2007).

2.9.7 Key challenges in the Public Procurement

There is a general perception that public procurements are generally inefficient. High value contract specially are generally incomplete and require post contract modifications (Williamson 2007). Incomplete and poorly made contracts create procedural difficulties and risk. In a study conducted in the United States of America it is found that the regulations and over regulations prohibit the realization of best value for money and proper collaboration (Korosec, 2003).

Schooner (2010) highlight that the key challenges are to get right partner and realize the best value for money, achieving balanced outsourcing and neutralizing the adverse implication. In-adequacies in public procurement are asymmetry of information (Williamson, 2007), lack of trust, budget uncertainties and risk aversion by purchase professionals. The other challenges are lack of commercial incentives, lack of performance measure systems (Ergas and Menzes, 2004) and process complexity. It is generally seen that public procurement professionals are de-motivated and demoralized due to high work load, red tape and lake of appreciation (Kausal et al., 1999)

2.9.8 System Approach

Different situations, different type of items requires different procurement solutions. However in government it is generally seen that there is single uniform policy prescription. One size does not fit all and this creates systemic problems (Henry, 2012). Instead of system approach there is fragmented approach (Thai and Drabkin, 2007). Different departments can issue policy directives on a subject which are not coherent with each other. Suppliers are generally not consulted in the process of decision making. Several organizations share the vision with the supplier. Because of fragmented approach despite best of intensions the government procurement may end up with poor results (Berrios, 2006).

2.9.9 Multiple Stakeholders

In public procurement there are multiple stakeholder including society at large with conflicting interest. Achieving the cooperation between the stakeholders is a key challenge (Korosec, 2003). Incongruity of goals leading to complexity and inefficiency has also been highlighted (Ergas and Menzes, 2004; Ouchi, 1979).

2.9.10 Make in India

There are policy directives to prefer indigenously manufactured product even if it gives us less value for money and poor technology (Walker and Brammer, 2009). Democracy and protectionist policies create pressure to buy national (Kono & Rickard, 2014).

2.9.11 Value for Money

In high value purchases both the cost of purchase and cost on purchase are major issues. Developed countries take help of experts for assessing the cost of acquisition. In India inaccurate cost estimation is a major problem in large value public infrastructure project (Ministry of Statistics and Programme Implementation, April 2011). Cost estimation helps as negotiating tools to realize the value for money (Moore and White, 2005). The public procurement is budget driven and the risk of uncertainty of budget is charged as risk premium by the supplier.

2.9.12 Decision Making

The public procurement is handled by bureaucrats in layers of hierarchical setup. The bureaucratic setup runs the public administration in a country like India (Mises, 1944). A study on bureaucracy role in policy making (Haruta and Radu, 2010) highlights that the core values such as inclusiveness, transparency, fairness are compromised in policy making. Layers of hierarchical setup adversely impact the efficiency in public procurement (Henry, 2012). In one of the research it is found that the risk avoidance tendency is one of the prime inefficiency (Callender and Schnapper, 2007). Quick decision making has positive impact in strategic decision making is better as more efficient information processing and transmission is available (Baum and Wally, 2003). External interest group often tries to the derail decision (Nutt, 2002).

2.9.13 Human Resource Issues

The positions in public procurement organizations are considered sensitive. As a policy measure dealing purchase professionals are subjected to periodical transfer. This affects institutional integrity and knowledge management. Sometime this discontinuity can create serious financial repercussion. Lake of competent work force, their training is a challenge (Thai and Drabkin, 2007). Senior management support is most important factor in public procurement (Walker and Brammer, 2009). Work load, red tape and lack of appreciation demoralize and de-motivate the procurement officials (Kausal et al., 1999). There is a gap between the future requirement and present status of skill and leadership in public sector. Strengthening leadership will have positive impact (Stykes, 2007).

Client department involve purchase department in its decision if they trust ability and benevolent intention of the purchasing department otherwise they find ways to bypass them. The purchasing departments factors identified are soft skill such as tact, respect, openness and friendliness, initiative, service based approach and benevolence (Schiele and Clifford, 2006). The factors categorized under client department for meaningful involvement of purchasing department are positive relationship with the client department, positive perception about the value offered by purchasing department, of knowledge and experience of client department and heavy work load. Meaningful involvement of purchase department requires team approach in decision making to achieve common and not mutually exclusive goal. Management should therefore invest in developing capabilities of purchasing departments personnel.

Multilayer hierarchy and relationship between junior and senior has been area of study (Tullock, 1965). This hierarchy impacts the efficiency of public procurement bureaucracies. The role of individual personality also becomes significant in many cases (Biggart and Hamilton, 1984).

2.10 Ethics

Although public procurement is major instrument of public service delivery but it is having a poor image (Hui et al., 2011) due to failure to buy the right quality in right quantity at right time resulting into higher cost of acquisition. Inefficient and effective procurement processes result into higher cycle time. Lack of transparency and ambiguity in the procurement processes result into leakage and corruption.

Corruption negatively impacts the image of a country (Chang and Chu, 2006) and its ability to become a global player (DiRenzo et al., 2007). Transparency International (TI)ranks India as 76 out of 168 countries. It scores only 38 out of 100 for the year 2015.

Policy formulation, its implementation and lack of transparency and accountability are the reasons for corruption (Debroy and Bhandari, 2012). External factors contributing to corruption are organizational and social climate (Badenhorst, 1994). Greed and lack of respect to the law is the prime reason for corruption, resulting in leakage of billions of dollars every year (D'Souza and Kaufmann, 2011). Disturbing phenomena is that corruption is able to influence to the extent of policy making by the government (Hellman et al., 2000). For bringing efficiency in public procurement system the issue of corruption and transparency must be taken into consideration (Mori and Doni, 2010). Lack of transparency results in poor image of the buyer. This in turn manifests in terms of lack of interest and non-participation by various competent suppliers (Evenett and Hoekman, 2004). The dealing professionals tend to employ non transparent procedures (Søreide, 2006). The bid rigging and cartel formation by the supplier is another problem which has indirect support of government officials and suppliers (Baiman, 1990).

2.11 Supplier Relation Management

Xu and Dey (2010) in his study have suggested Multi-Criteria Decision making Approach (MCDA) over traditional cost based approaches. Chai et al., (2013) have used Analytical Hierarchy Process (AHP) to carry out Multi-Criteria Decision making Approach (MCDA). DeBoer et al., (2003) have reviewed the variety of procurement situation and the complexity involved, and concluded that this method does not address the contextual issues completely.

Sarkar and Mahapatra (2006) have discussed the importance of developing the partnership with small supplier base. They have also suggested the systemic process to reduce the supplier. The important factors under consideration are performance and capability. Performance is short-term and capability is the long term view of criteria of supplier selection.

DeBoer et al., (2003) considered two phases of supplier selection that is pre-selection and selection phase. Pre-selection phase is divided into (1) defining the problem (2) formulation of criteria (3) evaluation. The important has been attached to pre selection process.

Nrasimhan et al, (2001) proposed supplier performance evaluation using Data Envelop Analysis (DEA) technique. Capacity factor is taken as input and performance factor is taken as output. These analyses categories a supplier into 2x2 matrix of high and low performance and high and low efficiency. Degraeve and Roodhooft (2000) proposed the concept of Total Cost of Ownership (TCO) as criteria for compeering vendor selection. They have used case study of supply of ball bearing to the Belgian multinational company in the steel industry.

Sadigh et al., (2009) have used Taguchi loss function for supplier evaluation. After assessing the quality and expected value and integrating this function with cost of purchasing and transportation. A simple Linear Programming (LP) model was used. Pi and Low (2005) also used Taguchi loss function using four criteria i.e. quality, on time delivery, prize and service. Ordoobadi (2009) have further extended the use of Taguchi loss function by including intangibles in the evaluation criteria, such as trust, risk to perform outsourcing function.

Falagario et al., (2012) have taken case of supplier selection in public procurement environment. They proposed the tool of supplier selection maintaining the transparency and fair and equal chance to all bidders through a case study of the Italian Government Tender. Lee (2009) proposed analytical approach of buyer supplier relationship using Analytic Network Process (ANP) and Benefit, Opportunities, Cost and Risk (BOCR) concept. The paper suggests that the supplier maintain quality when good quality management is present in the buyer organization.

2.12 Performance Measurement System (PMS)

Performance Measurement System should save the purpose of identifying success, identifying whether customer needs are met, understanding of processes, identifying bottlenecks, identifying wastes, identifying problems, improvement opportunities, providing factual decision, enabling progress, tracking progress, facilitating a more open and transparent communication and co-operation(Gunasekaran et al., 2007).

Typical key performance indicator for supply chain suggested by Stadtler and Kigler (2008) are:

- Delivery performance: service level (event oriented a-service level, quantity-oriented B-service level, Y-service level), on time deliver, forecast accuracy, and order lead time.

- Supply chain responsiveness: planning cycle time
- Assets and inventories: asset turns, inventory turns, inventory age
- Costs: cost of goods sold, value-added employee productivity, warranty cost

There are hardly any established key performance indicators as a part of Performance Measurement System (PMS) in the area of public procurement (Ergas and Menzes, 2004). Sometime attempts are made to introduce the Performance Measurement System (PMS) but their authenticity and validity is always challenged (Hall and Holt, 2003). There is a need to introduce the acceptable norms of the Performance Measurement System (PMS) to manage this activity (Ouchi, 1979).

Hong and Sang (2005) proposed supplier selection to maintain continuous relationship through a mathematical programming model. Petroni and Marcello (2000) suggested a model to evaluate related performance of supplier with multiple input and output through a multivariate statistical method.

2.13 Material Management Information System (MMIS) and e-procurement

Asymmetry of information leads to in efficiency and corruption (Williamson, 1981; Ergas & Menzes, 2004). The asymmetry of information is taken care of by MMIS in the Indian Railways. While implementing the e-procurement system the existing procedures is mapped and replicated. Such practice may drive only some of the possible advantage (Thai & Drabkin, 2007).

2.14 Estimation of Optimum Number of Supplier

There are various analytical studies to find out the optimum number of suppliers (Agrawal and Nahmias, 1997; Bakos and Brynjolfsson, 1993; Weber and Current, 2000; Kauffman and Popkowski-Leszczyc, 2005; Jokar and Sajadieh, 2008). The classic paper in this regard is by Berger et al., (2004) which considered the risk of inbound logistics on the whole supply chain. Ruiz-Torres and Mahmoodi (2007) have considered various types of risk in their model and have the extended the work of Berger et al., (2004).

Sharma and Sarkar(2011)have studied the problem of supplier selection considering the probability of catastrophic risk. And a model is developed for different failure probability,

capacity and compensation. In this model on one hand they found out that service level increases with the increase in number of supplier but on the other hand supplier management cost and the probability of catastrophic event increases which adversely impact the service level also. Weber et al., (2000) have analysed multi-vendor in procurement situation of multi objective programming and Data Envelope Analysis. Abginehchi (2010) have done research on a supplier inventory and optimal order splitting under stochastic lead time. Yang (2008) has suggested a model to optimize the total cost that is cost of procurement considering quantity discount and supplier failure probability. The finding is that if supplier is reliable single sourcing is the best approach. As the supplier reliability decreases, additional supplier may be required. Nam and Kwata (2011) have discussed the reliable supplier base management under demand uncertainty with a view to maximize profit and agility. Determining the optimal size of supply base with the consideration of risks of supply disruptions, Sarkar and Mohapatra (2006) have developed the model considering the variables like small base shall reduce the cost but shall increase the risk, whereas large supply base shall increase the fixed cost of supplier management. They have considered the probability of occurrence of various risks.

2.15 Vendor Managed Inventory (VMI)

Vendor Managed Inventory (VMI) is like automatic replenishment programme where supplier is given access to customer's inventory level and demand. The main condition of an implementation is trust and transparent exchange of information. Vendor Managed Inventory (VMI) approach is suitable tool to decrease administrative cost, inventory carrying cost and improved production process. The vendor has an advantage of assigning the product and quantity for dispatch and also the product mix. He can better react to dynamic changes in the requirement minimizing „Bullwhip Effect". The idea of supply chain involves coordination of different partners to achieve higher level of service. The result of integration is positive and it not only ensures loyalty of customer but also ensures that all the logistics partners are alive in the whole supply chain (Dejnega, 2011). In February 2004 Volvo evaluated the result from Vendor Managed Inventory (VMI) relation with supplier and found that inventory level decrease by 67 per cent, the administrative cost also fell down (Gröning& Holma, 2007).

Vendor Managed Inventory (VMI) alters the fundamental structure of supply chain ordering. Objective of VMI is higher customer satisfaction at lower inventory cost. Responsibility is

transferred to supplier for monitoring specific level of inventory, there is better visibility of customer demand, speeding of the supply chain and reduced Bullwhip effect. This pull system replaces historical pull system. Vendor Managed Inventory (VMI) concept is defined as replenishment linked pull-system, where the supplier is responsible for the customer inventory replenishment following a collaborative pre established middle/long term protocol. The three levels of protocols are Partnering Agreement, Logistical Agreement and Production and Dispatch Process.(Marques et al., 2011)

Towill (2002) argues that implementation of VMI changes the fundamental structure of supply chain ordering. VMI ensures higher customer service at lower inventory and administrative cost. Customer delegates the responsibility of ordering and replenishment planning to supplier (Tang, 2006). It results in more accurate forecasting and more effective distribution of inventory. Due to this coordinated production and replenishment plan various cost such as production, logistics and transportation cost reduces. Thanks to better visibility supplier is able to smooth the peaks and the valleys in the flow of goods. Implementation of Vendor Managed Inventory (VMI) requires higher frequency of replenishment with smaller lots. Supplier obtains a great degree of freedom in deciding quantity and timing of replenishment.

Implementation of Vendor Managed Inventory (VMI) increases the frequency of replenishment. Mass Customize Distribution (MCD) provides logistic support to the supply chain. The principle behind mass customization is use of economies of scope rather than scale and modularization and standardization into area of distribution related activities (Robert and Lalwani, 2006). An economy of scope is also size economy but slightly different as they are generated by routing greater volume of compatible products through fixed asset by merging parallel value stream. The challenge of Vendor Managed Inventory (VMI)is incessant need to reduce the cost of distribution while coping with more accurate logistic demand of increasingly fragmented points, tighter delivery windows, more distribution frequency of smaller lots, providing distribution solution over extended distances working on smaller planning horizons, large variety of products and fluctuating demand. Mass Customize Distribution (MCD) aims to provide more efficient and more flexible customer focused, distribution solution. It is in contrast to concept of bulk shipping. This is invariably enabled by modularization such as trays, pallets, container etc. and standardization using IT which permits parallel supply to integrate across value chain. This sometime requires sharing of

assets across to or more competing supply chains. The concept of Mass Customize Distribution (MCD) is generically similar to Mass Customize Production where the decoupling point is pushed towards customer interface. The decoupling points where the bulk flow of pushed goods is relapsed by flow of pulled to a specific customer location (Robert and Lalwani, 2006).Main elements of Vendor Managed Inventory (VMI)system are inventory location, distribution model, inventory level monitoring and demand visibility, role of information system, replenishment decision and inventory ownership. These different elements are interrelated. For example inventory level monitoring, demand visibility and role of Information Technology (IT). These six elements are combined together to construct an evaluation frame work of Vendor Managed Inventory (VMI) (Sami, 2007).

2.16 Gaps in the Literature

After the detailed review of literature survey the following gaps were identified with respect to procurement function in the context of the upstream supply chain operating under public procurement environment. There is a lack of research covering procurement in the context of the Indian Railways. There is a lack of research which develops tools for vendor assessment and their rating. There is lack of research which details process redesign of procurement function in the context of large supply chains such as that of the Indian Railways. There is lack of research which conceptualizes inventory management of perishable items such as electricity and diesel consumption in the context of organization such as the Indian Railways.

In order to address some of these gaps, the study adopts an integrated approach which is depicted in figure 2.1.The approach is conceptualised on the basis of study of literature, value stream mapping of existing system, internal and external environmental factors and desired outcomes.

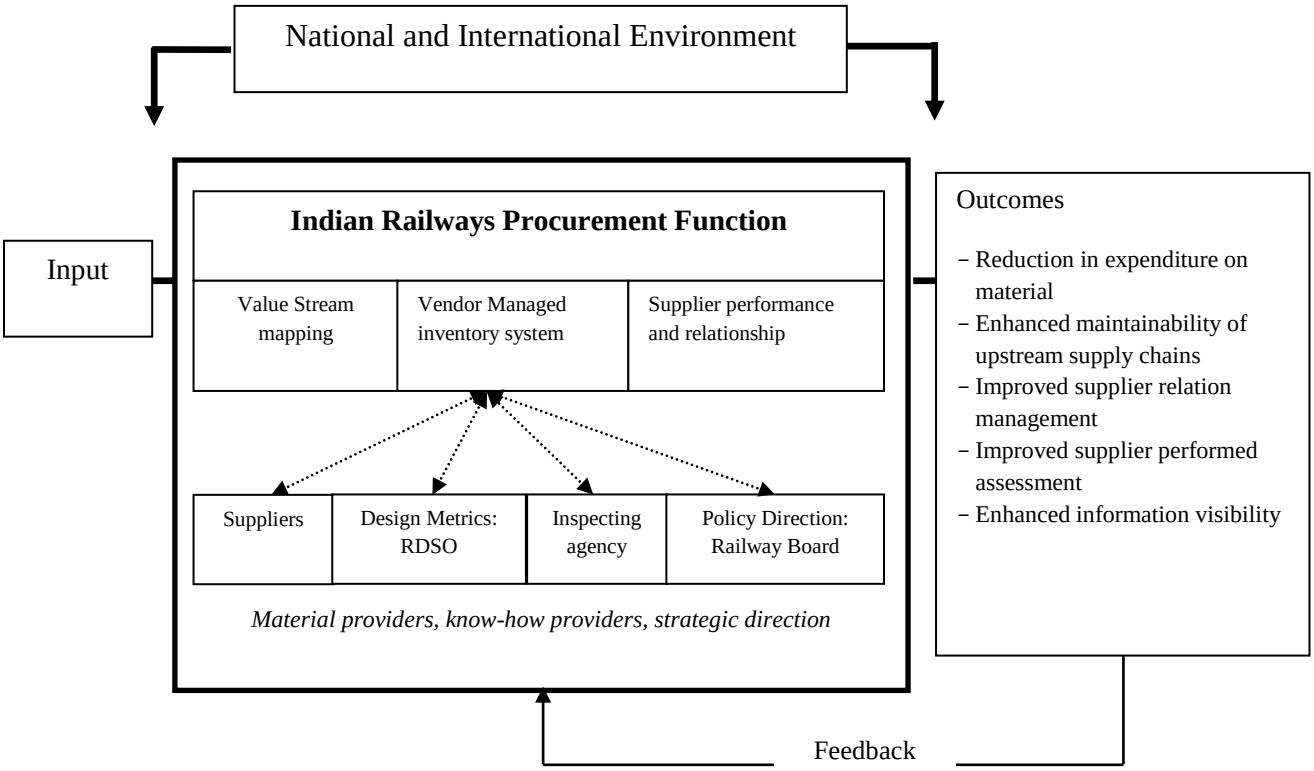

Figure 2.2 Integrated Approach of the Study
Source: Conceptualised by the researcher on the basis of Gap Analysis.

2.17 Research Questions

Through preliminary literature survey of procurement function, public management and supply chain following research questions have been identified for the present study:

- What are various issues related with procurement processes and their consequences on underlying supply chain management of the Indian railways material needs?
- How to develop a vendor managed inventory system so as to achieve cost reduction as well as enhanced level of service?
- How to suggest a model for vendor evaluation, relationship management and enhanced level of integration across the underlying supply chain?
- How to carryout portfolio analysis for carrying out risk management and finding out areas of vulnerability and device purchase strategy?
- How to redesign procurement processes of IR in the light of best practices of procurement and supply chain management so as to achieve enhanced level of functionality under public procurement environment?
- How to develop a model so as to make procurement as driver of supply chain management?

2.18 Chapter Summary

This chapter on literature review began by exploring procurement as the backbone for performance enhancement followed by literature review on public procurement and supply chain management. Further, the chapter covers issues such as transparency, value for money, vendor management inventory, ethics, supplier relationship management, portfolio analysis, contract management etc. The next chapter will outline research methodology that will be used for this study.

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