

SUPPLIER SELECTION OF IDB FUNDED PROJECTS

A Dissertation by

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Batch # 3

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BRAC Institute of Governance and Development (BIGD)

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LETTER OF TRANSMITAL

January 26, 2015

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Sub: Submission of Dissertation Report.

Dear Sir,

I am grateful to submit herewith my dissertation report on "SUPPLIER SELECTION OF IDB FUNDED PROJECTS." as a partial requirement for achieving the degree Masters in Procurement and Supply Management. It is a great opportunity for me to work under your active supervision, care and guidance. I had concentrated my efforts to prepare this report in most realistic and proficient way. If any mistake is found please see in the eye of forgiveness. I will be available enthusiastically at any clarification when required. I believe and hope that you would be kind enough to accept my report for assessment and oblige thereby.

Sincerely yours.



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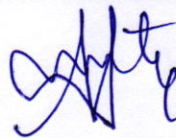
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SUPPLIER SELECTION OF IDB FUNDED PROJECTS

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Masters in Procurement and Supply Management
BRAC University, Dhaka

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Md. Mizanur Rahman

Abstract

Supplier selection is an essential task within the purchasing function. A well-selected set of suppliers make a strategic difference to an organization's ability to reduce costs and improve the quality of its end products. This realization drives the search for new and better ways to evaluate and select suppliers. This helps decision makers reduce a base of potential suppliers to a manageable number and make the final selection and order quantity allocation by means of multi-criteria techniques, such as the ideal solution approach, analytical hierarchy process (AHP), and goal programming.

This is a study on factors affecting the selection of suppliers and supplier selection procedure of the project funded by IDB. The main objective was to identify the factors affecting supplier selection; the supplier selection process has also been identified. Factors affecting selection of suppliers were identified as cost, technical capability, quality assessment, organizational profile, service levels, supplier profile and risk factors.

This paper concludes that, cost criterion is a key factor affecting supplier selection. It dictates among many elements i.e. the profit margins. Technical capability, quality of materials and the profile of the supplier are also closely considered. From the findings, we recommend that supplier selection should be an open and transparent process, carried out by experts from all key departments and should be done in time to avoid stock outs.

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Abbreviations

AHP	: Analytic Hierarchy Process
CA	: Cluster Analysis
DEA	: Data Envelopment Analysis
GA	: Genetic Algorithm
GPN	: General Procurement Notices
ICB	: Investment Corporation of Bangladesh
IDB	: Islamic Development Bank
ISO	: International Organization for Standardization
KPI	: Key Performance Indicators
MAUT	: Multi Attribute Utility Theory
MPM	: Mathematical Programming Models
RFQ	: Request For Quote
SCRM	: Supply Chain Risk Management
SPN	: Specific Procurement Notices
SPS	: Strategic Purchasing Scheduling
TCO	: Total cost of ownership

Chapter 1

Introduction and Overview

1.1 Introduction

Many factors in today's global market have influenced companies to search for a competitive advantage by focusing on their entire supply chain. Of the various activities involved in supply chain management, purchasing is one of the most strategic because it provides companies with opportunities to reduce costs and, consequently, increase profits. An essential task within the purchasing function is supplier selection. In most industries, the cost of raw materials and component parts represent the largest percentage of the total product cost. For instance, in high technology firms, purchased materials and services account for up to 80% of the total product cost. Therefore, selecting the right suppliers is the key to the procurement process and represents a major opportunity for companies to reduce costs across its entire supply chain.

For many years, the traditional approach to supplier selection has been to select suppliers solely on the basis of price. However, as companies have learned that the sole emphasis on price as a single criterion for supplier selection is not efficient, they have turned into a more comprehensive multi-criteria approach. Recently, these criteria have become increasingly complex as environmental, social, political, and customer satisfaction concerns have been added to the traditional factors of quality, delivery, cost, and service.

The realization that a well-selected set of suppliers can make a strategic difference to an organization's ability to provide continued improvement in customer satisfaction drives the search for new and better ways to evaluate and select suppliers. This research reviews the supplier selection literature concerning existing models and methodologies supporting the supplier selection process, identifies some important opportunities, and presents new and efficient decision-making tools aimed at helping companies select the most effective suppliers.

1.2 Background of the Study

The role of purchasing in supply management has received and continues to receive increasing attention as the years go by. Purchasing enhances efficiency and competitiveness among other benefits but to realize these benefits it is imperative to select and maintain competent suppliers. However, many factors affect an organization's ability to choose the right supplier. There is a need to understanding of the supplier selection criteria. Some of the factors that organizations consider include trust and commitment, adequate finance, quality, reliable delivery times and adequate logistic technological capabilities. Material delivery, quality, cost/price, financial position, communication and technology are recognized as the commonly used criteria – that is confirmed from empirical results as well as in previous literature. However, other criteria such as ISO certification, reliability, credibility, good references and product development were are also necessary. This shows that focus is shifting from solely relying on quantitative factors to include qualitative criteria.

***Source:** Ruth Mwikali and Stanley Kavale\Factors Affecting the Selection of Optimal Suppliers in Procurement Management.*

1.3 Supplier Selection Process

The quality of the final set of suppliers largely depends on the quality of all the steps involved in the selection process. The first part of this research proposes a methodology for supplier selection that integrates the various steps of the selection process.

1.3.1 Step 1: Recognize the Need for Supplier Selection

The first step in supplier selection usually implies the identification of the need for a specific product or service. Different situations may trigger the need for supplier selection. For example, new product development, modification to a set of existing suppliers due to a bad performance, the end of a contract, expansion to different markets, lack of current suppliers' capacity to satisfy increase in demand. These situations are particular to every company.

1.3.2 Step 2: Identify Key Sourcing Requirements and Criteria

Supplier selection is complicated because of the multiple criteria involved in the decision process. Additionally, these criteria may conflict with each other. Therefore, defining the proper criteria becomes critical. Some of the most widely used criteria in supplier selection are supplier's capacity, quality, and purchasing price. However, the set of criteria to be chosen largely depends on the organization's objectives and the type of industry in which the company competes.

1.3.3 Step 3: Determine Sourcing Strategy

Sourcing requires that companies clearly define the strategy of the approach to be taken during the supplier selection process. Examples of sourcing strategies are: single versus multiple suppliers, domestic versus international and short term versus long term supplier contracts. This research assumes that single sourcing may not be an appropriate strategy in most purchasing situations. Single sourcing tends to minimize total costs by determining the best supplier for each purchased part or product. However, dependency on a single supplier exposes the buying company to a greater risk of supply interruption. An example of realized supply risk resulting from a single sourcing strategy is the case of Toyota's 1977 brake valve crisis. Toyota's assembly plants in Japan were forced to shut down for several days after a fire at its only supplier's (Aisin Seiki) main plant. This facility was the only source for valves that were used in all Toyota vehicles. The estimated cost of this single event was \$195 million and 70,000 units of production. Thereafter, Toyota sought at least two suppliers for each part. Multiple sourcing strategies provide a greater flexibility due to the diversification of the organization's total requirements. In addition to ensuring product availability, working with multiple suppliers is important because suppliers are motivated to be competitive in factors such as price and quality.

Source: Treece, J. (1997) *Just-too-much single-sourcing spurs Toyota purchasing review: Maker seeks at least 2 suppliers for each part,* *Automotive News*, 3, p. 3.

1.3.4 Step 4: Identify Potential Supply Sources

The importance of the item under consideration influences the resource spent on identifying potential suppliers. For example, major resources are spent when potential suppliers are needed for an item of high strategic importance.

1.3.5 Step 5: Limit Suppliers in Selection Pool

Given the limited resources of a company, a purchaser needs to pre-screen the potential suppliers to reduce their number before proceeding with a more detailed analysis and evaluation. The supplier selection criteria determined in Step 2 plays a key role in this reduction process. This reduction process can be defined as the process by which suppliers satisfy certain 'entry qualifiers' before further analysis.

1.3.6 Step 6: Determine Method for Final Selection

There exists many different ways to evaluate and select suppliers. Since this research is devoted to developing effective decision-making methodologies and models capturing important aspects of the supplier selection problem, Chapter 2 presents an extensive literature review on different methods and models for final supplier selection.

1.3.7 Step 7: Select Suppliers and Reach Agreement

The final step of the supplier evaluation and selection process is to clearly select those suppliers that best meet the organization's sourcing strategy. This decision is often accompanied by determining the order quantity allocation to selected suppliers.

Source: AbrahamMendoza-FinalDissertation

1.4 Objectives of the Study:

- a) To ensure transparency and accountability in the procurement of goods, works and services using of IDB funds.
- b) To find out the extent of compliance of IDB guidelines.
- c) To find out the gap of compliance and scope of improvement for implementation of IDB guideline.
- d) To find out the problems of supplier selection of IDB funded project.
- e) To improve the supplier selection of IDB funded project.

Chapter 2

Literature Review

2.1 Uncertainty in Supplier Selection

Supplier selection in supply chain systems is made even more difficult because supply chains are operated in uncertain environments where disruptions can affect the short and long-term performance of an organization. Supply chain risk management (SCRM) is the area concerned with the study of supply chain risks. SCRM is defined as: "*The management of supply chain risks through coordination or collaboration among the supply chain partners so as to ensure profitability and continuity*" (CIPS). Risks affect supply chain management in two ways: (1) operational risks arising from coordinating supply and demand (e.g. uncertain customer demand), and (2) disruption risks arising from disruptions to normal activities (e.g. natural disasters). For the purpose of this research, the focus is on those operational risks found within supply management.

Even though risks can be modeled quantitatively, it is difficult to completely avoid disruptions in practice. Successful organizations are those that are able to positively react to the disruptions in a quick manner. Although the importance of considering uncertainty in the supplier selection problem is briefly addressed in the preceding paragraphs, modeling risk is beyond the scope of this research.

2.2 Recent Trends in Supplier Selection

Most recently, the internet and related information technology systems began impacting purchasing operations. Internet-based procurement, commonly referred to as e-procurement, is being used by both suppliers and buyers to manage their procurement relationships. E-procurement involves the use of the internet for activities such as procuring materials, transportation, and warehousing. In addition, e-procurement is concerned with selecting suppliers among different alternatives and determining the nature of contracts with them.

A typical e-procurement system consists of the following major steps:

- (1) request-for-quote (RFQ) generation and distribution by the buyer company to all potential suppliers;
- (2) the submission of bids by interested suppliers, and
- (3) The evaluation of bids to determine the winning bids.

The business logic used in current e-procurement systems is broadly categorized as:

- *Reverse auctions* are “auctions in which the auctioneer, on behalf of a buyer, solicits bids from a group of potential suppliers”. The primary objective is to drive purchase prices down allowing the lowest bidder to win. Typically, reverse auctions have focused on price as a single attribute. Efficiencies resulting from the implementation of reverse auctions come from matching suppliers' capabilities or specifications.
- *Multi-attribute auctions* combine multi-criteria decision analysis and auction mechanisms. The proposal of a multi-attribute auction mechanism where bidders can specify price and levels of quality and lead time and the performance of this mechanism are compared to a price-only auction mechanism.
- *Optimizations techniques* take into account various business rules and constraints, e.g. exclusion constraints, aggregation constraints, exposure constraints, business objectives constraints.
- *Configurable bids* “enable suppliers to specify multiple values and price markups for each attribute”. This is basically an extension of multi-attribute auctions allowing for configurability in bids.

2.3 Factors Affecting the Selection of Suppliers

Supplier selection is usually a time consuming process that evaluates suppliers on several criteria such as cost of production, raw material cost, quality assessment, organizational goal, quality staff, delivery system, personal facilities etc. Selection of

suppliers is a complicated process by the fact that numerous criteria must be considered in the decision making process. Therefore, different criteria are usually considered during the supplier selection process. Quality and on-time delivery are the most important attributes of purchasing performance evaluation. Apart from optimum cost, joint development, culture, forward engineering, trust, supply chain management, quality and communication were also important. The suppliers' history of supply, production price, technical capability and transportation cost also play important role during suppliers' selection. Cost, quality and service are the most important factors in supplier selection process. Therefore, it is important to note that cost and quality dominate more in the supplier selection process.

In the supplier selection process, a data bank containing an authorized list of suppliers with their profiles as well as their detail background is crucial. Important information should include technical capability, quality assessment and organizational profile. Suppliers' data regarding this criterion should be stored in a case structure consisting of a number of fields representing the criteria in each with the relevant numerical performance values of the corresponding criteria of suppliers.

2.3.1 Analysis of Factors Affecting Supplier Selection

2.3.1.1 Cost Criteria

The aim of this criterion is to identify vital element of cost associated with purchase. The most common cost related with a product is purchase price, transportation cost and taxes. Operational costs are inclusive of transaction processing; cost of rejects etc. and these are also being considered during the supplier selection. Cost is a very important criterion for selection of right suppliers. The cost factor has been measured based on the importance of the following cost/price dimensions in supplier selection in telecommunication industry: raw material cost, cost due to delay, cost of inspection, after sales service, rework cost, engineering cost and labor cost. Profit maximization cannot be achieved without the cost minimization. The Factors (attributes) affecting this criterion includes:

2.3.1.1.1 Price

The target is to minimize price of the product to increase the profitability. Therefore, they must find a low-cost supply base, where it can minimize manufacturing cost related to the production of the product. Basically, price containment leads to supplier attractively.

2.3.1.1.2 Distribution Cost

This contains the lengthy distribution channel cost, transport expenses, inventory cost, handling and packaging cost, damages during transportation and insurance costs. Since, every business enterprise is out to procure goods and services at minimum cost possible, cost management brings a lot of business to suppliers who offer least cost, holding other factors constant.

2.3.1.2 Technical Capability

Suppliers' need competent technical ability to provide high quality product or service, ensure future improvements in performance and promote successful development efforts. Especially, this is very important when the firm's strategy include development of a new product or technology or access to proprietary technology. These technical criteria insist company to shift into the global market place. This factor has been measured on the basis of the importance of the following technical dimensions: compliance with quantity, compliance with due date, compliance with packaging standard, production planning systems of suppliers and maintenance activities of suppliers, plant layout and material. The production facility and ability of the supplier to increase its capacity should also be taken into account to judge the best one. The potential production capability of each supplier should be analyzed to meet a specified production plan and also to develop a new product according to the market demand.

2.3.1.3 Quality Assessment

Quality assessment is a key factor of suppliers by which they can improve and maintain quality and delivery performance. It is very important for the company and suppliers. Quality and availability of product depends on this criterion. This factor has been measured on the basis of the importance of the following quality dimensions: management commitment, product development of suppliers, process improvement of suppliers, quality planning and quality assurance in supply chain, quality assessment in production, inspection and experimentation and quality staff of supplier. The rejection rate of the product is defined in the terms of the number of parts rejected by the customers in fixed time period because of some quality problems. It also includes the defective parts detected in the incoming products. This encounter the issues like whether or not the frequent quality assessment of the parts has been done by the supplier.

2.3.1.4 Organizational Profile

This factor has been measured on the basis of the importance of the following organizational dimensions: achievement of sales and marketing goals, financial performance, achievement of current organizational goals and strategy for technology age. Good suppliers should have high organizational power and advanced coordination skills.

2.3.1.5 Service Levels

The performance of the supplier in providing service to the manufacturer is the prime criteria to decide its suitability for a particular product. The good service given by the supplier may help to increase the customer base and therefore, this criterion is important in global supplier selection. It is analyzed based on the following attributes:

2.3.1.5.1 Delivery

The ability of the supplier to follow the predefined delivery schedule is always the prime criteria for selection in this fast moving world. This means that suppliers who keep their promises are easier and profitable to work with.

2.3.1.5.2 Lead Time

This is the time between order and placement of material and the actual delivery. The shorter the lead time; the better the supplier. Every purchasing firm will be comfortable when the lead time is shortest possible. Long lead time has the impression that the specific supplier is less efficient or he just has more customers than he can serve, thus delaying deliveries.

2.3.1.5.3 Ease of Communication

The ease of communication and negotiability with the suppliers decide the long-term relation between the supplier and manufacturer. Since languages, business customs, ethics and communication devices vary from country to country, good suppliers should be the best communicators.

2.3.1.6 Supplier's Profile

The performance and past history of the suppliers help in taking decisions for its selection. The components of a suppliers profile are summarized below:

2.3.1.6.1 Financial Status

The financial status of the supplier can be analyzed by getting the information about the annual turnover of the supplier and their financial structure based on the past history. The economic status of the supplier's country may affect the currency exchange rate, local price control and so forth. This can result in higher hidden costs for international sourcing and into during the supplier selection. A good supplier should have a good financial base so that incase of delayed payments, supply is not hindered.

2.3.1.6.2 Response of Customers

The response of the customers towards the supplier is one of the important factors to decide the performance of the supplier. Suppliers with good customer base should be preferred than the others. Customer numbers cannot lie, where the customers are, the deal is good.

2.3.1.6.3 Performance History

The performance history of the supplier should be analyzed carefully keeping in mind the competitive nature of the supplier, its past production schedule, response to market, and its ability to make commercial relations and business references. It is easy to get a profile of ageing supplier easier than new suppliers. Research shows that, old suppliers are more experienced and more stable in business.

2.3.1.7 Risk Factor

Owing to a number of exogenous factors influencing international sourcing, global supplier selection is much riskier than its domestic counterpart. Consequently, the global supplier selection decision is most strongly affected by perceived risks. They can be stated as below:

2.3.1.7.1 Geographical Location

The location of the supplier and its physical and social status should be analyzed properly before selection of global partner. The home country of the supplier, the location of plant, the nature of natural calamities, and other factors should be checked before the selection because for long-term relation it may create problems in the supply of the goods.

2.3.1.7.2 Political Stability

The political status of the supplier's country and its nature towards the business policies may affect the long-term relationship between the supplier and the manufacturer. The more stable government should be preferred. During change of political leadership, different foreign country's policies may be changed. This may

create big problems in further maintaining the relationship with suppliers. In this connection, this must be analyzed in great precision with the help of the relevant experts.

2.4 Pre-qualification of Potential Suppliers

Pre-qualification is the process of reducing an initial set of potential suppliers (pre-screening). Narrowing down the options facilitates an effective analysis and a further comprehensive investigation of the remaining suppliers. This reduces the possibility of rejecting good suppliers early in the supplier selection process. The methods employed for pre-qualification are: categorical methods, data envelopment analysis, and cluster analysis.

Categorical methods are qualitative models that help decision makers evaluate their suppliers' performance on a set of criteria using historical data and buyers' experience. First, the suppliers' performance on each criterion is categorized as 'positive', 'neutral', or 'negative'. Second, and after the set of criteria has been evaluated, the suppliers receive an overall rating, again labeled as either 'positive', 'neutral', or 'negative'.

Data Envelopment Analysis (DEA) is a classification system that splits suppliers between two categories, 'efficient' or 'inefficient'. Suppliers are judged on two sets of criteria, benefits (output) and costs (input). A supplier's efficiency is described as the ratio of the weighted sum of its outputs to the weighted sum of its inputs.

Cluster Analysis (CA) is a method for statistical data analysis. Its purpose is to separate a set of potential suppliers into smaller clusters where those grouped together are most similar to each other and unlike those from other clusters. This classification is used to reduce a larger set of suppliers into smaller more manageable subsets.

2.5 Final Selection

Most decision models are final selection models. They are primarily concerned with the allocation of final order quantities to selected suppliers.

Linear weighting models place a numerical weight on each selection criterion (generally subjectively determined) and provide a total score for each supplier by summing up the supplier's performance on the criteria multiplied by these weights. Although these approaches are very simple, they heavily depend on human judgment and proper scaling of criteria values.

The analytic hierarchy process (AHP) is considered one of the most widely used linear weighting techniques. AHP provides a framework to cope with multiple criteria. A hierarchical structure captures the criteria, sub-criteria, and alternative suppliers. The final AHP outcome is a score for each supplier. The main advantage of AHP is that it handles both quantitative and qualitative criteria.

The multi-attribute utility theory (MAUT) is also considered a linear weighting technique. MAUT handles multiple conflicting criteria and allows decision makers to evaluate "what-if" scenarios.

Total cost of ownership (TCO) models look beyond price to include other major costs affecting purchases. The Cost-ratio method collects all costs related to quality, service, and delivery, and expresses them as a percentage of the total unit price.

Statistical models capture the uncertainty related to the supplier selection problem, for example, uncertain demand and stochastic lead times. As an approach to capture uncertainty, some researchers proposed a simulation optimization methodology for supplier selection. The methodology consists of three modules:

- 1) a genetic algorithm (GA) optimizer that continuously searches for new supplier portfolios;
- 2) using the output from the GA optimizer, a discrete-event simulation model is run to evaluate suppliers on pre-selected key performance indicators (KPI's);
- 3) After simulation runs, a fitness value is calculated based on the KPI's.

The fitness is returned to the GA optimizer to search for the next supplier portfolio. More recently, researchers presented a multi-objective supplier selection model under stochastic demand conditions with capacity and demand satisfaction constraints. They developed a GA algorithm to find alternative solutions.

Mathematical programming models (MPM) allow decision makers to consider different constraints in selecting the best set of suppliers. Some of these constraints are the minimum or maximum number of suppliers to be selected, limits on quantities allocated to suppliers, and quality levels. Most importantly, mathematical programming models are ideal for solving the supplier selection problem because they can optimize results using either single objective models or multiple objective models.

Single objective models focus mainly on minimizing costs or maximizing profits. This research separates them into the following categories:

- *Linear programming:* Price, quality, and delivery are important criteria for supplier selection. Linear programming can be used in the decision making process. A single objective linear programming model was developed to support strategic purchasing scheduling (SPS). This model minimizes the total cost (purchasing and storage) while considering purchasing budget and suppliers' capacities as constraints. Another researcher employed a single objective linear programming model for evaluating alternative suppliers and allocating order quantities to them. This model minimized the total discounted price by considering, as constraints, suppliers' capacities, maximum and minimum order quantities, demand, and regional allocated bounds. Pan proposed multiple sourcing to improve the reliability of supply for critical materials. He formulated a single objective linear programming model to select suppliers based on: price, quality, and service.
- *Nonlinear programming:* The analysis of the problem of determining order quantities for multiple items was done by considering all-units quantity discounts on the purchasing price. The proposal was included with a nonlinear mathematical model with the objective of minimizing purchasing, holding, and

ordering costs. Additionally, they developed a Lagrangian relaxation procedure to solve the model.

- *Mixed integer programming*: A single objective programming was applied to develop a commercial computerized model for supplier selection at IBM. They used mixed integer programming to minimize purchasing, transportation, and inventory costs. Narasimhan and Stoyhoff applied a single objective mixed integer programming model to a large manufacturing firm in the Midwest to optimize the allocation procurement for a group of suppliers.

2.6 Sourcing & procurement

In most cases, purchases account for one of the largest if not the largest part of the total cost. Thus, the importance of sourcing and procurement is self-evident. Though many times the terms sourcing and procurement are used inter-changeably, they actually represent two fundamentally different concepts. Sourcing refers to the value added process of selecting suppliers and the respective cooperation scheme and it must be supported by advanced analytics & market intelligence, supplier performance information and a concrete and well-developed strategy. On the other hand, procurement refers to the transactional of the relationship and should be streamlined as much as possible in order to achieve efficiency. Some common process of sourcing and procuring are:

2.6.1 Spend Analysis

Before implementing any sourcing/procurement initiatives, it is very important to analyze past, current & projected spending patterns. The analysis must span the entire enterprise and include data that is often collected from various departments and locations and must also identify sourcing barriers & limitations (i.e. single/sole source, legal/contract restrictions etc). Such an analysis of direct and indirect spend gives the company the information and decision-support required to develop supply strategies that are aligned with the objectives of the organization and to identify and prioritize sourcing & procurement improvement initiatives.

Key business Issues

- What is the saving potential in each commodity/material category?
- In what commodity/material category should we focus first? How should we prioritize our efforts? What should be our first action?
- In which areas are there the highest potential for e-enabling?

2.6.2 Strategic Sourcing

The overall goal of strategic sourcing is to achieve large and sustainable cost reductions, long-term supply stability and minimization of supply risk. The strategies to achieve such goals can be as wide as rationalizing supplier base, leverage spending across departments, business units and geographical regions, reconfiguring supply specifications, and/or developing strategic partnerships/alliances with selected suppliers. However, the task of strategic planning within sourcing is often not performed properly despite the fact that supply-base management processes contribute extensively to business-unit and company-wide goals. This results in “disconnected” sourcing from company goals. Furthermore, when no clear directions and formalized/standardized processes exist to develop and apply a sourcing strategy, buyers commonly apply their own way of thinking and patterns of buying often resulting in sub-optimal use of company’s resources.

Key Business Issues

- How we should manage each commodity/ material category depending on spending and supplying characteristics?
- What is the optimal portfolio of suppliers that satisfies our supply requirements per commodity / material category?
- What our outsourcing / make or buy strategy should be?

2.6.3 Supplier Management

Active supplier management is an integral part of strategic sourcing. Organizations are increasingly moving away from the traditional approach of selecting the “lowest cost supplier” to a “total cost of ownership” approach. This approach presupposes

extensive knowledge of supplier performance and its impact on enterprise operations, knowledge that can be acquired only through institutionalized processes that capture and analyze supplier performance data. This data need to be incorporated into the selection and negotiation process to arrive at sourcing decisions that actually ensure the lowest total cost.

Key Business Issues

- How do we measure supplier performance? What criteria & performance target should we use? Are we taking steps to improve it?
- How do we develop, manage and control approved supplier lists?
- How can we use supplier performance knowledge in our selection procedures?

2.6.4 Procurement Optimization

In procurement optimization, the main focus is on transactional efficiency and on squeezing process-related costs and inefficiencies throughout the purchasing cycle that begins with the identification of the need for the material and ends with its receipt. The blur between the concepts of sourcing and procurement has lead some organizations, especially those operating under strict regulatory restrictions, to burden the procurement process with controls and supplier selection tasks that normally belong to the sourcing process, thus increasing supply lead times, process cost and inventory levels. Best practices suggest that the procurement process should be as simple as possible or even non-existent, as in Vendor-Managed-Inventory environments.

Key Business Issues

- How can we decrease the cycle time of the procurement process? Are there low-value-added controls, paper works and delays?
- Do we scale process complexity based on the material to be purchased? How is the process cost compared to the material cost?
- How do we leverage available technology in optimizing procurement processes?

Chapter - 3

Analysis and Findings of the Study

3.1 General Provisions

The selection of a supplier is primarily based on the assessment of the quality and Judgment of the services that the supplier offers for the project and the price being commensurate with the consultant's input to be able to formulate the criteria for the selection procedure. It should be borne in mind that:

- a) Although the consultancy fees constitute only a small part of the total cost of the project, the quality of consulting service has an important bearing on the satisfactory implementation of the project and on the project costs in general.
- b) The terms of reference should have room for the consultant's capability for creative and cost-effective solution and designs.
- c) When price becomes the sole consideration, proposals may not offer the expected intellectual reflection and innovation. This means that price should not be the sale factor in the selection of a consultant and that a balance between quality and price is needed, taking into account the nature of the services required and the type of the project in question.

2.2 The selection and appointment of Suppliers

2.2.1 *Tendering Procedures*

As a general rule, the IDB adopts the international competitive bidding as the tendering procedure of preference. However, procedures other than international competitive bidding are permitted in exceptional circumstances (Section III paragraphs 3.3, 3.4 and Section IV 4.1 of the BPPP):

- a. *International competitive bidding*: Every procurement of works, goods and services to be financed totally or partially with foreign exchange from a Bank loan, the amounts of which equals or is higher than the threshold amounts (\$5,000,000 for works, \$350,000 for goods and related services, and \$200,000 for services), must be carried out in accordance with international competitive bidding following the procedures established by the Bank.

- b. Competitive bidding restricted to national firms:* The Borrower may restrict bidding to local firms only when the bid to be awarded will be financed: exclusively with local currency from the Bank loan; exclusively with the Borrower's funds; or with a combination of the Borrower's funds and local currency proceeds from the Banks loan. This occurs in situations in which there is little probability of foreign participation in a given bidding. Generally this procurement method is governed by national legislation, if it is not in conflict with the Banks policies and procedures. The Borrower should establish procedures that permit the participation of several bidders and should pay special attention to aspects of economy, efficiency and reasonable prices. Under these conditions the Borrower may establish a period of 30 calendar days to submit bids.
- c. Limited international bidding:* While similar to international competitive bidding, limited international bidding involves express invitations to predetermined firms rather a public announcement. These firms must be qualified firms, selected in a non-discriminatory manner, including eligible foreign firms, when available. The Borrower must invite a sufficient number of firms to ensure competitive prices. In general, the same principles and policies are applied to limited bidding as to competitive bidding except, as mentioned above, with regard to publicity. In addition, the rules for margins of preference do not apply. Limited bidding, which must be authorized in advance by the Bank, may be appropriate in cases such as:
- i. Contracts for small quantities;
 - ii. The failure of competitive public bidding;
 - iii. The acquisition of highly complex specialized products;
 - iv. A limited number of suppliers of a specific article or service;
 - v. An urgent need for key materials;
 - vi. The need to standardize equipment.
- d. International / national shopping:* In this type of limited bidding, price quotations are obtained, generally from three or more national or foreign suppliers, with the goal of obtaining the most competitive price. Formal

bidding documents are not required. This procedure may be appropriate for the procurement of off-the shelf goods that are warehoused and readily available to the public, for goods of standard specifications or low value, or for the contracting of small and uncomplicated works.

- e. Direct contracting:* Direct contracting consists of the contracting of firm without following a competitive procedure. Direct contracting may be appropriate in circumstances such as the expansion of contracts for works or the acquisition of goods, when compatibility of equipment and spare parts is required, or in emergency cases.

- f. Force account:* Force account is not, properly considered, a tendering procedure itself. Rather, force account is the procedure under which the Borrower itself undertakes a specific construction task, utilizing its own personnel and equipment. The Bank accepts this method if it will clearly produce savings, such as when:
 - a) The quantities of the work involved cannot be defined in advance;
 - b) Works are small and scattered or in remote locations where mobilizations cost for contractors would be unreasonably high;
 - c) Work must be carried out without disrupting ongoing operations;
 - d) The risks of unavoidable work interruption are better borne by the Borrower than by a contractor;
 - e) No contractor is interested in carrying out the works.

In these cases the Bank must approve the corresponding budget.

2.2.2 Qualification of suppliers

The IDB's Basic Procurement Policies and Procedures contain several provisions relating to the equal participation of suppliers and non-discrimination between suppliers originating from member countries. Participants must be treated equally. This principle requires avoiding any type of preference or discrimination that favors or jeopardizes one bidder on the detriment or benefit of others. In this sense,

participation of the maximum number of qualified bidders is encouraged. No requirement for the prequalification or registration of bidders can be established that would impede or make difficult the participation of foreign firms or that would tend to violate the principle of equal treatment to bidders. In addition, technical qualifications, financial guarantees and commercial capacity of suppliers shall not be as high as to discourage competition or include requirements which make it difficult for qualified contractors to participate.

2.2.3 Publication / Invitation to participate (General Procurement Notices):

These notices, which are prepared by the Borrower with the collaboration of the Bank, are intended to provide advance notice to interested parties regarding future possibilities for the procurement of works or goods under new Bank-financed projects.

- The GPN contains basic information about the project concerned, including the name of the country in which it will take place; reference to financing by the Bank; the amount and objective of the loan; the threshold amounts above which international competitive bidding is required; a tentative schedule of procurement of works and goods; and the address, telephone and facsimile numbers of the Borrower, in order to permit those interested to obtain more detailed information. The Bank undertakes the publications of these notices, on behalf of the Borrower, in the United Nations publication "Development Business".
- The publication of the GPN takes place well in advance of the first notice for prequalification or bidding issued with respect to the corresponding project. This may in cases of Bank financing that is expected but not yet approved; require publication of the GPN before the date of approval by the Bank. GPNs are also published in the Bank's journal, *IDB Projects* and on the Internet at <http://www.iadb.org>.

- *Notices for specific bidding opportunities (Specific Procurement Notices)" SPN" (paragraph 3.6 (b) of the BPPP).* The announcement of prequalification or registration -- and the announcement of bidding, when prequalification does not take place -- shall be published in the following manner:
 1. *National publicity:* All bidding for goods, works or related services includes national publicity. This publicity requires that the public notice of prequalification or registration, and that of the invitation to bid, when invitation is not restricted to prequalified firms, must be published at least on two occasions in a newspaper of wide national circulation, or at the discretion of the Borrower, on one occasion in two different newspapers of wide national circulation.
 2. *International publicity:* In the case of bidding with a value estimated to be equal to or above the thresholds set forth for international competitive bidding, in addition to the national publicity referred to above, the Borrower must carry out international publicity. In such cases, the public notice of prequalification or registration and that of submission of bids, when there has been no prequalification, must be published in the United Nations Journal *Development Business*. For large or complex works, additional publicity may be required at the discretion of the Bank and with the concurrence of the Borrower, in news paper or recognized technical journal of wide international circulation.
- The text of procurement notices require the approval of the Bank and must specify, as a minimum the following:
 - a) A description of the project, purpose of the bidding, and source of funds destined to finance the cost of the procurement of goods or works;
 - b) The fact that the project for which bidding is carried out is being partially financed by the Bank and that the procurement of goods or contracting of works payable from said financing will be subject to the provisions of the corresponding loan contract;

- c) The general description of the equipment, machinery, and materials required, as well as of the works, the volume or quantity of work, its principal parts, and the deadline for its completion;
- d) The office or place, date, and time at which the bidding documents, including the bidding guidelines, plans specifications and draft contracts, may be obtained.
- e) The office where the bids are submitted and the authority responsible for their approval and award; and
- f) The place, date and time at which the bids will be opened in the presence of the bidders or their representatives.
 - It is preferable that the publicity be in one or more of the Bank's official languages (Spanish, English, French and Portuguese) in order to facilitate competition both locally and internationally. When a document is produced in more than one language, it is necessary to indicate which language governs in case of conflict among the versions (paragraph 3.5 of the BPPP).

2.2.4 Selective Tendering Procedures

For large or complex works, the Bank requires that prequalification be carried out. The Borrower may also require prequalification for the procurement of very specialized goods or services, or whenever it may determine that this procedure is pertinent. Prequalification should be based exclusively on the ability of the potential contractors to carry out the works in satisfactory manner. The criteria to evaluate this ability are:

1. Experience and results obtained in similar jobs.
2. Personnel and equipment available.
3. Financial soundness.

4. The existence of other obligations or of pending or future obligations, or undertakings that may compete with execution of the works involved in the bidding.
5. Any litigation or arbitration resulting from prior contracts or contracts under execution, during the last five years.
 - In the prequalification procedures, and those for registration of bidders, no requirements for qualification or registration can be established that would impede or make difficult the participation of foreign firms or that would tend to violate the principle of equal treatment of all bidders of the BPPP.
 - The registration of potential bidders is a form of prequalification acceptable to the Bank. Registers must: I) be open permanently or be opened on a frequent basis, whether for updating information on registered firms or adding new firms; II) be open for each bidding to be carried out for projects financed by the bank; III) include no requirements that would impede or render difficult the participation of foreign bidders.

2.2.5 Time limits for tendering and delivery

The date for presentation of prequalification documents should be at least 45 calendar days after the date of the last announcement of prequalification.

- For international competitive bidding, not less than 45 calendar days must be allowed from the date of publication of the last notice of invitation to bid or the date of availability of bidding documents, whichever is later, until bid opening.
- Where large or complex civil works are involved, not less than 90 calendar days must be allowed for contractors to familiarize themselves with national laws and working conditions, complete technical investigations and determine the availability of labor at the site. The determination whether a 45 or 90 calendar day bidding period will be followed is made during the project

analysis period and incorporated in the loan documents presented to the Bank's Board of Executive Directors.

- The time limit for consulting services is 30 calendar days from the date of publication.

2.2.6 Tender documentation

- *Clarity and content:* The documents should describe carefully and in full detail what is required in the way of works or goods and related services to be provided; they should not include requirements which make it difficult for qualified contractors to participate and they should clearly indicate the criteria to be used in the evaluation and comparison of bids. The detail and complexity of the documents may vary according to the nature of the bidding, but in general, the documents should include: the invitation for bids; general instructions to bidders; special instructions to bidders; general condition of contract; special conditions of contract; technical specifications; a list of goods, related services and delivery schedule; criteria for the evaluation of bids; sample forms; and list of member countries of the Bank.
- *Price of the Documents.* If a price is fixed for the purchase of bidding documents, it should reflect reproduction costs of those documents and in no case be so high as to discourage competition.
- *Free access to the Borrower.* The Borrower must be available, once the bidding documents have been collected by bidders, up to a reasonable time (e.g., 10 calendar days) before the bids are opened, to answer questions or clarify the bid documents for bidders. Inquiries must be answered promptly by the Borrower, and clarifications made known to other interested parties that have acquired the bidding documents and to the Bank. The names of the firms which requested clarifications remain confidential.

2.2.7 Submission, receipt and opening of tenders and awarding of contracts

- IDB's Basic Procurement Policies and Procedures, bids should be presented in writing in sealed envelopes and must be safeguarded in a secure place. They must be signed by legal representatives of the bidder and comply with the requirements established in the bidding documents. Bids must be opened in public and at locations, dates and hours previously announced.
- Representatives of the bidders and of the bank must be permitted to be present at the opening of bids. Bids received after the date and hour established for presentation of bids must be returned unopened.
- The name of each bidder, the price of each offer, and the time period should also be read during the public session but after the presentation of the principal offer. Minutes of the complete proceedings must be prepared and signed by the representative of the borrower and by those representatives of the borrower who desire to do so.
- The award should be made to the bidder whose offer has been determined to be the lowest evaluated bid and has been determined to be substantially responsive the bidding documents, and which meets standards of capacity and financial responsibility. The Bank's approval is required prior to the awarding of a contract.

2.2.8 Negotiation with Suppliers

Negotiation procedures with all suppliers allowed in the context of direct contracting. In addition, negotiation is used in the context of competitive bidding for the procurement of consulting services with the bidder who obtained the best evaluated technical offer to determine the price of the contract. If an agreement is not reached

with the bidder whose offer was the best evaluated offer the entity may negotiate with the second.

2.2.9 Limited tendering

While similar to international competitive bidding, limited international bidding involves express invitations to predetermined firms rather a public announcement. These firms must be qualified firms, selected in a non-discriminatory manner, including eligible foreign firms, when available. The Borrower must invite a sufficient number of firms to ensure competitive prices. In general, the same principles and policies are applied to limited bidding as to competitive bidding except, as mentioned above, with regard to publicity. In addition, the rules for margins of preference do not apply. Limited bidding, which must be authorized in advance by the Bank, may be appropriate in cases such as:

- a) contracts for small quantities;
- b) the failure of competitive public bidding;
- c) the acquisition of highly complex specialized products;
- d) a limited number of suppliers of a specific article or service;
- e) an urgent need for key materials;
- f) The need to standardize equipment.

Chapter - 4

Conclusions and Recommendations

4.1 Conclusions

From the findings, this paper concludes that

- a) Cost criterion, technical capability, quality assessment, organizational profile, service levels and risk factors, in that order of relative importance, are key factors affecting supplier selection in procurement management.
- b) Cost criterion is the most important factor that firms consider before engaging suppliers. Cost directly affects the profit margins which is a key objective not only in materials management, but also in business organizations.

This research addresses the strategic importance of supplier selection and order quantity allocation, emphasizing the impact of such decisions on the different stages comprising a supply chain.

4.2 Recommendations

This paper recommends that

- a) Supplier selection should be an open and transparent process, thorough and detailed to identify the salient and most important aspects of suppliers.
- b) Due to its nature, supplier selection should be done by experts who are knowledgeable and have expertise to conduct the exercise professionally.
- c) The supplier selection process should involve all key departments in the organization for the best qualified suppliers to be identified and engaged.
- d) A good and conclusive supplier selection process takes time. Thus, prequalification should start early to avoid stock outs.

4.3 Further Recommendations

4.3.1 Use of Procurement Agents and Management Contractors

Where Beneficiaries lack the necessary organization, resources, and experience, Beneficiaries may wish (or be required by IDB) to employ, as their agent, a firm specializing in handling international procurement. The agent shall strictly follow all the procurement procedures outlined in the Financing Agreement on behalf of the Beneficiary, including the use of IDB Standard Bidding Documents, review procedures and documentation. Management contractors may be employed in a similar manner for a fee to contract for miscellaneous works involving reconstruction, repairs, rehabilitation, and new constructions in emergency situations, or where large numbers of small contracts are involved. If this procedure is funded by IDB, IDB's Guidelines for the Use of Consultants shall be used to acquire the services of the Procurement Agent or a Management Contractor on a competitive basis.

4.3.2 Inspection Agents

Pre-shipment inspection and certification of imports is one of the safeguards for the Beneficiary, particularly where the country has a large import program. The inspection and certification usually covers quality, quantity and reasonableness of price. Imports procured through open or limited ICB procedures shall not be subject to price verification, but only verification for quality and quantity. However, imports not procured through open or limited ICB may additionally be subjected to price verification. The inspection agents are ordinarily paid for on a fee basis levied on the value of the goods. Costs for certification of imports shall not be considered in the evaluation of bids under open or limited ICB.

4.3.3 Procurement in Loans to Financial Intermediaries

Where the Financing Agreement provides for the use of IDB funds through an intermediary institution such as an agricultural credit institution or a development finance company, to be used by Beneficiaries such as private sector enterprises, or autonomous commercial enterprises in the public sector for the partial financing of subprojects, the procurement is usually undertaken by the respective Beneficiaries in accordance with established local private sector or commercial practices, which shall

be acceptable to IDB. However, even in these situations, open or limited ICB may be the more efficient and economic procurement method for the purchase of large single items or in cases where large quantities of goods can be grouped together for bulk purchasing.

4.3.4 Procurement under BOT and Similar Private Sector Arrangements

Where IDB is participating in financing the cost of a project procured under a BOO/BOT/BOOT20 or similar type of private sector arrangement, either of the following procurement procedures shall be used, as set forth in detail in the Financing Agreement:

- a) The entrepreneur under the BOO/BOT/BOOT or similar type of contract shall be selected under ICB or LIB procedures acceptable to IDB, which may include several stages in order to arrive at the optimal combination of evaluation criteria, such as the cost and magnitude of the financing offered, the performance specifications of the facilities offered, the cost charged to the user or purchaser, other income generated for the Beneficiary or purchaser by the facility, and the period of the facility's depreciation. The said entrepreneur selected in this manner shall then be free to procure the goods, works and services required for the facility from eligible sources, using its own procedures. In this case, the Financing Agreement shall specify the type of expenditures incurred by the said entrepreneur towards which IDB financing will apply.

Or,

- b) If the said entrepreneur has not been selected in the manner set forth in subparagraph (a) above, the goods, works or services required for the facility and to be financed by IDB shall be procured in accordance with open or limited ICB or LIB procedures.

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