

Report On  
Early Involvement of Supplier in Construction Design Phase and  
Managing the Framework Agreement and Financial Criteria  
throughout the Project Cycle.

By

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An Internship Report submitted to the Department of Procurement and Supply  
Management in partial fulfillment of the requirements for the degree of  
Masters in Procurement and Supply Management

BRAC Institute of Governance and Development (BIGD)  
BRAC University  
August, 2021

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## **Declaration**

It is hereby declared that

1. The internship report submitted is my/our own original work while completing degree at BRAC University.
2. The report does not contain such material which is published before or written by a third party, except where is discussed, is appropriately cited through full and accurate referencing.
3. The report does not contain such material which has been accepted, or submitted, for any other degree or diploma at a university or other institution.
4. I/We have acknowledged all main sources of assistance to complete this report.

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## Letter of Transmittal

Shah Eyamin- UI Islam  
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**Subject: Letter of transmittal.**

Dear Sir,

I am glad to inform you that, I have collected the primary data from essential resources as you have suggested and completed the analysis based on the best practices available in the modern research methodology.

I have attempted my best to finish this report with the essential data and recommended proposition in a significant compact and comprehensive manner as possible.

I trust that the report will meet the standard as expected.

Sincerely yours,



---

Ananya Abduhu  
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Date: August 22, 2021

## Non-Disclosure Agreement

Sabina Yesmen  
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Subject: Non-disclosure agreement.

Dear Ma'am,

I am glad to inform you that, I have collected the primary data from essential resources as you have suggested and completed the analysis based on the best practices available in the modern research methodology.

I hereby give this assurance that neither I nor BRAC University will disclose this confidential information of company collected for the sake of this research to any other medium or entity.

It will be kept safe under the university authority.

I trust that the report will meet the standard as expected.

Sincerely yours,



---

Ananya Abduhu  
Executive (Overseas Cum Commercial)  
Elevator Engineers Ltd.  
Date: August 22, 2021

## **Acknowledgement**

I would like to express my gratitude to the Almighty Allah to give me this opportunity to complete this report in a good health during this pandemic situation. My sincere thanks go to my academic supervisor for his excellent guidance to establish this report in a proper way. It is a great deal of cooperation that has made it possible to reinforce this report with such strong data analysis. I would also like to thank to my workplace supervisor for her great assistance and permission to use the confidential data for this research purpose. Last but not the least I would like to thank my family who has made it possible for me to come this far and support me all the way.

## **Executive Summary**

The world is modernizing day by day. With the pace of this modernization, every industry is trying to adopt digital process or appliances. So as in construction industry also. The accuracy and safety are given the most priority in construction industry. Now this has become easier to detect clash or problems by using software. For a high-rise building construction, elevator is one of the important product for doing the life easy. There is a connection between building design and construction and elevator. Standard size elevators ensure qualitative service as those are determined after several testing. In Bangladesh context, there arise conflicts regarding space and other criteria of elevator as most of the clients approach to the elevator suppliers at the finishing stages of building construction. This research highlights the advantages of supplier involvement in design phase and proposes a way of integration of end consumer to supplier.

**Keywords:** Elevator; Sourcing strategies; Early Supplier Involvement (ESI); Framework Agreement (FA); Integrated system

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## **List of Acronyms**

MR	Machine Room
HW	Hoistway Width
CW	Car/Cabin Width
OP	Opening
OH	Overhead
JFI	Japan Fuji International
CO	Center Opening
JIT	Just In Time
CRM	Customer Relationship Management
FA	Framework Agreement
ESI	Early Supplier Involvement

**Chapter 1**  
**INTRODUCTION**

## 1.1 Background of the Study

Most of the clients in our country are reluctant in involving the suppliers in early design or planning phase. In many cases, architect or building designer keep spaces of elevator at their own prediction. This creates uncertainty of getting the standardized elevators also. Usually, elevator cabin size can be modified as per hoistway size. But it is better to use the standard cabin size for a particular hoistway size and capacity. Because for that certain cabin size, the motor power, control capacity etc. are examined. There contain many reports to ensure and check the quality. Final adjustment records of progressive type safety gear, product qualified certificate and test report for speed, certificate of quality for motor, certificate of quality for cabin according to report are some of them.

Type	Speed(v)	Loading Capacity	OPxLH	Lift Car	Hoistway	Machine Room	OH	Pit	R1	R2	R3	R4
Passenger	m/min	(kg)	(mm)	CWxCD(mm)	HWxHD(mm)	HWxHD(mm)	(mm)	(mm)	(kg)	(kg)	(kg)	(kg)
TKJ-450	60	450	700x2100	1300x1000	1700x1650	2200x1650	3900	1350	4000	3200	3100	2600
TKJ-630	60	630	800x2100	1400x1100	1850x1750	2300x1750	3900	1350	6000	5400	4500	3900
	4100						1500					
TKJ-800	60	800	800x2100	1400x1350	1850x2000	2300x2000	3900	1350	7500	6000	4700	4200
	4100						1500					
TKJ-1000	60	1000	900x2100	1600x1400	2100x2050	2500x2050	3900	1350	9300	7000	5500	4900
	90/105						4200	1500				
	120						4500	1600	9900	7500		
TKJ-1150	60	1150	1000x2100	1800x1400	2300x2050	2500x2050	4100	1400	11500	8800	6000	5500
	90/105						4300	1600				
	120						4600	12000	9500			
TKJ-1250	60	1250	1100x2100	2000x1400	2500x2050	2500x2050	4100	1400	11500	8800	6000	5500
	90/105						4300	1600				
	120						4600	12000	9500			
	150						4700	2100	13000	11500		
TKJ-1350	60	1350	1100x2100	2000x1500	2500x2150	2500x2150	4200	1500	12000	9500	7000	6500
	90/105						4400	1600				
	120						4600	1700	12500	9800		
	150						4700	2100	13500	12100		
TKJ-1600	60	1600	1100x2100	2100x1600	2600x2250	2600x2250	4200	1500	14500	11500	7900	7300
	90/105						4400	1600				
	120						4600	1700	12000			
	150						4700	2100	15000	12500		

**Figure 1.1: Standard Dimension for MR Passenger Lift (OTIS Brand)**

Figure 1.1 shows a table of standard measurements for MR passenger lift of OTIS brand. Figure 1.2 shows a table of standard measurements for MR passenger lift of Japan Fuji International brand. If we compare for 450 kg elevator, for HW 1700mm, OTIS brands' standard CW is 1300mm and OP is 700mm. On the other hand, for HW 1750mm, JFI brands' standard CW is 1400mm and OP is 800mm. For only 50mm HW, there has 100mm changes

in CW and OP. Similarly, there is differences in OH and PIT dimensions also. If CO is 800mm, then there needs minimum  $(800*2+100) = 1700\text{mm}$  of HW. Despite of remaining that space, OTIS brand has chosen 700mm CO after testing the product quality.

TYPE	CAPACITY	SPEED	DOOR OPEN	ENTRANCE DIMENSION		CAR INTERIOR DIMENSION			HOISTWAY		MACHINE ROOM	
	(KGS)	m/min	TYPE	JJ	HH	AA	BB	HC	X	Y	AM	BM
P	450	45-60	CO	800	2100	1400	850	2300	1750	1450	2000	2900
	550	45-105	CO	800	2100	1400	1030	2300	1750	1590	2000	3100
	600	45-105	CO	800	2100	1400	1100	2300	1750	1660	2000	3200
	700	45-105	CO	800	2100	1400	1250	2300	1750	1810	2000	3400
	750	45-105	CO	800	2100	1400	1350	2300	1750	1910	2000	3500
	820	45-105	CO	800	2100	1400	1400	2300	1750	1960	2000	3600
	900	45-105	CO	900	2100	1600	1350	2300	2100	1930	2500	3500
	1000	45-105	CO	900	2100	1600	1500	2300	2100	2080	2500	3700
	1150	45-105	CO	1100	2100	2000	1350	2300	2500	2100	2900	3800
	1350	45-105	CO	1100	2100	2000	1500	2300	2500	2250	2900	4100
1600	45-105	CO	1100	2100	2000	1750	2300	2500	2500	2900	4500	

TYPE	ITEM	SPEED			
		45m/min	60m/min	90m/min	105m/min
P	OH(mm)	4200(4000)	4400(4100)	4600(4200)	4800(4300)
	PIT(mm)	1250(1350)	1550(1500)	1850(1800)	2150(1950)

**Figure 1.2: Standard Dimensions for MR Passenger Lift (JFI Brand)**

Then comes different choices before the table of the clients about which one brand they will choose. There involves lots of factors which needs to think about for elevator at the planning stage. Some of the key factors are-

- a) Brand choosing
- b) Supplier sourcing
- c) Supplier selection
- d) Required capacity/space of elevator
- e) Price
- f) Terms and Conditions
- g) Currency rate

- h) Construction period
- i) Contract period
- j) Framework agreement
- k) Breach of agreement

## **1.2 Research Objectives**

The objectives of this study are-

- a) To involve supplier/vendor early in planning phase to mitigate the risk of the elevator quality.
- b) To establish a framework agreement for repeat buyer-supplier to avoid financial complexities.
- c) To introduce a way for smooth operation from planning to finishing stage of construction in respect of elevator.

## **1.3 Research Organization**

Chapter (1) upholds the background of the study. It also shows how measurements of elevator dimensions differ from one to another which can also affect on the quality of the product.

Chapter (2) introduces with several aspects of the research.

Chapter (3) comprises of the proposed methods and tools to achieve the research objectives up to the desired level of satisfaction.

Chapter (4) represents the outcomes from the proposed methods.

Chapter (5) concludes the research study leaving recommendations for upcoming researchers.

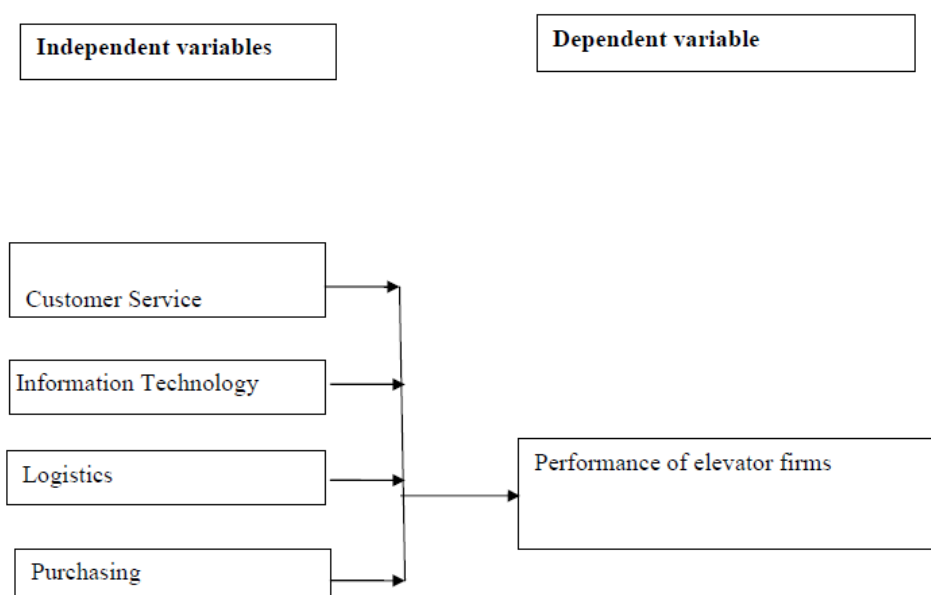
**Chapter 2**  
**LITERATURE REVIEW**



## 2.1 Supplier Sourcing and Supplier Selection

At the planning stage, one of the most enigmatic part is to make the right choice; i.e. to select the desired brand. In this case, supplier sourcing and supplier selection are the most significant phases. In (Okuogume, 2011), “naturally, speaking, cost is the main driver of total cost in sourcing decision-making. On one hand, elevator manufacturers are already well known, and it is easy to get sufficient and reliable supplier information in a particular market. On the other hand, foreign and local product regulations are becoming aware of various safety issues, but it is still a challenge to ensure that goods and services purchased meet the domestic and foreign requirements. To do so, the key to success will depend on choosing the right supplier and setting accurate quality control and safety rules suitable for both parties.” Gosling et al. (2010) consider that flexible sourcing should involve the adoption of a larger supplier base and constantly redesigning and reconfiguring the supply chain. The variables for measuring the performance of an elevator firm can be determined as below figure 2.1, indicated in (Masila, 2013).

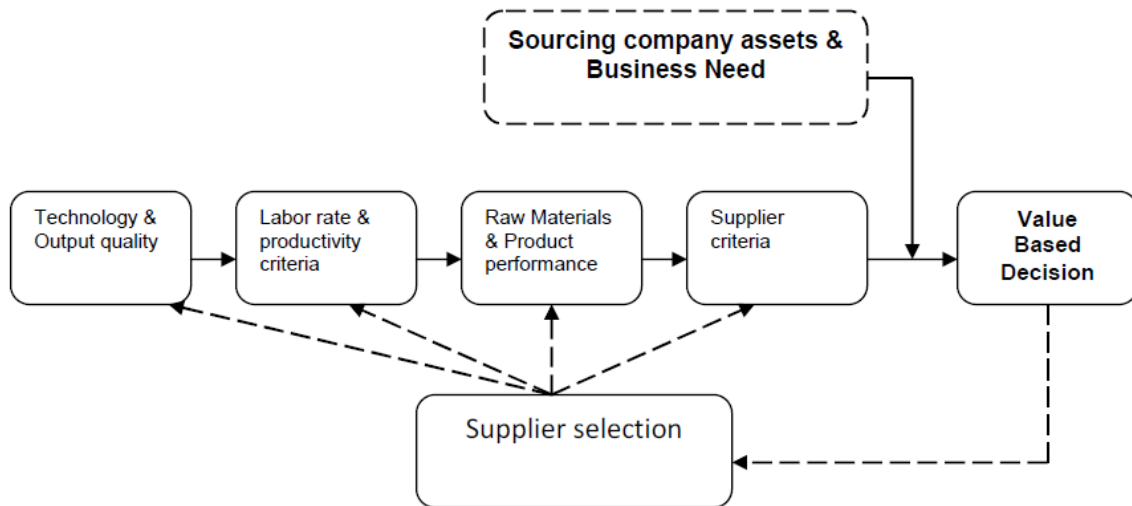
In (Okuogume, 2011), it is shown what criterion need to be considered for supplier sourcing



**Figure 2.1: Variables of an Elevator Firm**

and supplier selection, which is represented in figure 2.2.

Weber et al. (1991) refer to supplier selection as the search for potential providers, for such a



**Figure 2.2: Criteria for Supplier Selection**

search, the providers are sorted (evaluated) into potential and non-potential providers. For example, suppliers may be evaluated on price structure, delivery (timeliness and costs), product quality and services.

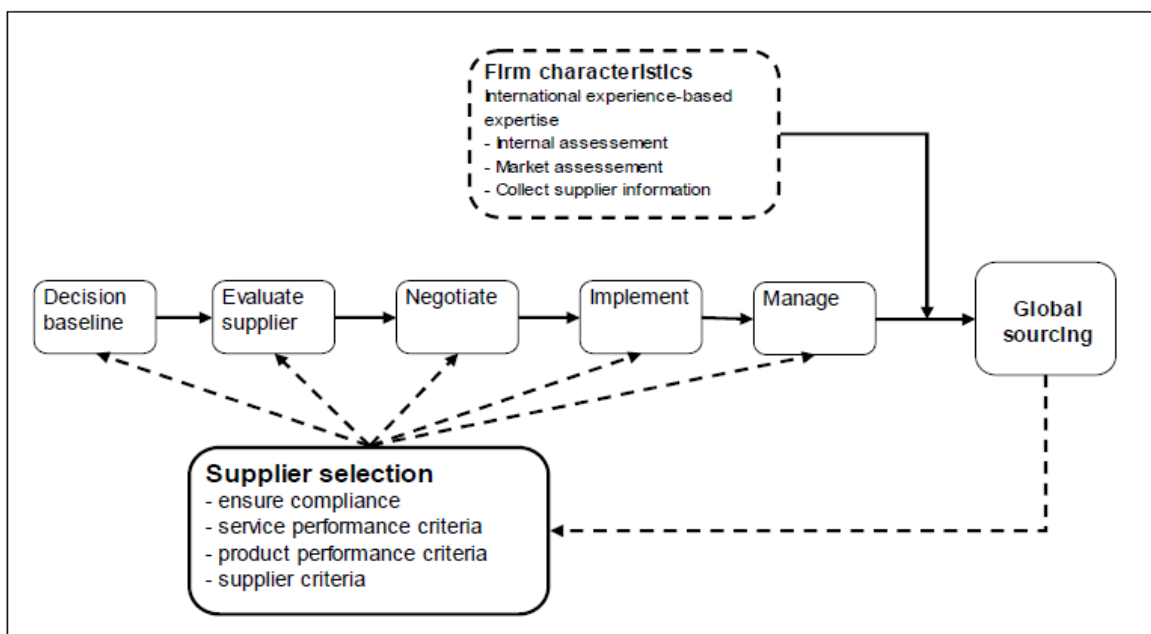
## 2.2 Framework Agreement

Framework agreements demonstrate recognition of the benefits of the strategic partnering approach where strategic suppliers are selected for key elements, or work packages, delivered by the supply chain (Gosling et al., 2010). Organizations compete globally by working with international suppliers, outsourcing, and marketing to consumers worldwide. This global reality places even more importance on successful supply chain management (Masila, 2013). The key management challenge remain in the area of competence, getting new suppliers which is capable of adding value to overall operations and managing the huge network of global suppliers (Okuogume, 2011). According to Gosling et al. (2010), network coordinators can group their suppliers under three categories, framework agreement suppliers, preferred suppliers and approved suppliers, each with different flexibility implications. In

(Masila, 2013), under JIT purchasing, achieving product quality through a long term contract at a fair price receives the highest priority. Companies have placed high priority on quality and delivery in negotiation practices. However, they also rated response flexibility and competitive price reasonably high (Billesbach et al., 1991).

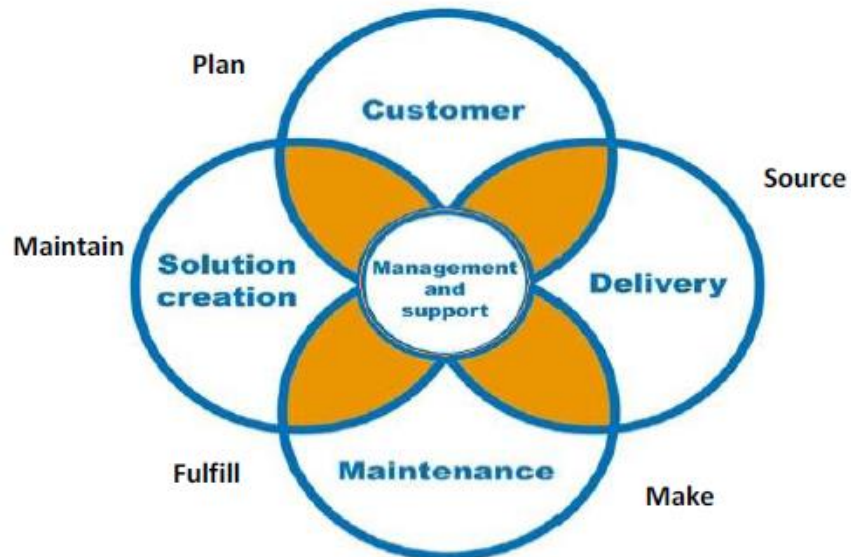
### 2.3 Integrated Supply Chain

According to Ireland and Webb (2007), in today's competitive environment, managing transportation, inventory, product plans and schedules, and information flows are critical to satisfying customers and creating competitive advantages. According to Croxton et al. (2001) operating an integrated supply chain requires a continuous information flow. Customer relationship management (CRM) process provides the structure for how relationships with customers are developed and maintained (Hines, 2004). Business operation will then be integrated from initial material purchase to delivery of products and services to customer (Mutia). In (Okuogume, 2011), there shows a partial relationship of integrated supply chain process, which is indicated in figure 2.3.



*Figure 2.3: Partial Supply Chain Process*

In this paper, there also shows the supply chain relationship of KONE elevator company, which represents in figure 2.4.



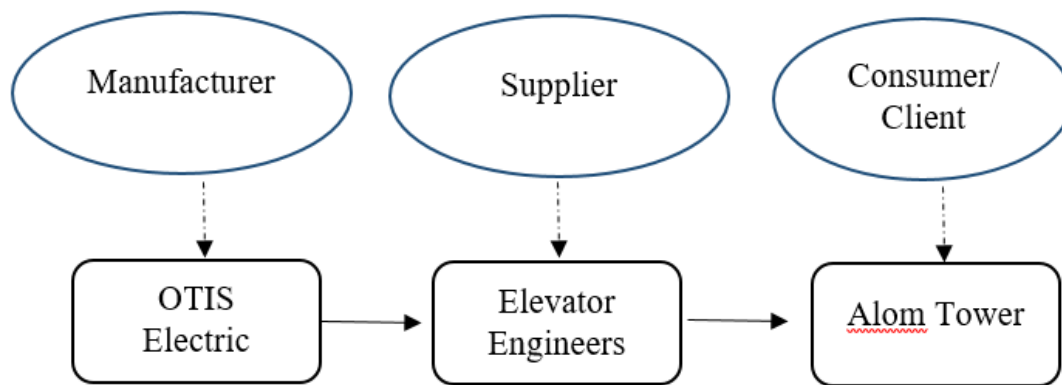
*Figure 2.4: The KONE Way (KONE Intranet, 2011)*

**Chapter 3**  
**METHODOLOGY**

### 3.1 Data Collection

At first, some data has been collected from a reputed elevator firm. The main purpose of collecting the data is to show the necessity of this research work. In broad, to make a survey about the significance of early supplier involvement to maintain the quality of the product.

Here, figure 3.1 demonstrates the flow diagram of the supply chain relationships. That elevator firm imports elevator from the manufacturer and then supplies their clients. So that elevator firm works as a supplier/vendor.



*Figure 3.1: Supply Chain Flow Diagram*

However, a list has been tabulated from the organization including the client's requirements and their approaching time. Table 3.1 shows the data. Here three types of client have been selected.

- a) The first ones are those who came at planning or design stage.
- b) The second ones are those who came at middle stage, means after finishing the construction of hoistway but can be modified.

- c) The third ones are those who came after completing the finishing works except lift related works.

**Table 3.1: Cases of Approaching Time (OTIS Brand)**

Case Type	Serial No.	Client Name	Quantity of Products	Product ID	Capacity	Special Features	Standard Hoistway/Required Size	Actual Hoistway/Existing Size	Deviation (Yes/No)	Clients' Approach
Standard Case	1	MBH	Lift- 1 Nos.	MBHL-1	630 Kg	MRL, 7/7/7	1850mmW * 1750mmD	1850mmW * 1750mmD	No	Design Stage
	2	RFPAB	Lift- 5 Nos.	RFPABL-1	630 Kg	MR, 15/15/15	1850mmW * 1750mmD	1850mmW * 1750mmD	No	Planning Stage
				RFPABL-2	630 Kg	MR, 15/15/15	1850mmW * 1750mmD	1850mmW * 1750mmD	No	
				RFPABL-3	630 Kg	MR, 15/15/15	1850mmW * 1750mmD	1850mmW * 1750mmD	No	
				RFPABL-4	630 Kg	MR, 15/15/15	1850mmW * 1750mmD	1850mmW * 1750mmD	No	
				RFPABL-5	1250 Kg	MR, 15/15/15	2500mmW * 2050mmD	2500mmW * 2050mmD	No	
			Escalator- 2 Pairs	RFPABE-1	9000 per./hr.	Single Arrangement, 35 Degree	9830mm	9830mm	No	
				RFPABE-2	9000 per./hr.	Single Arrangement, 35 Degree	9830mm	9830mm	No	
	3	RAM	Lift- 3 Nos.	RAML-1	800 Kg	MR, 15/12/12	1850mmW*2000mmD	1850mmW*2000mmD	No	Planning Stage
				RAML-2	630 Kg	MR, 15/12/12	1850mmW * 1750mmD	1850mmW * 1750mmD	No	
RAML-3				800 Kg	MR, 5/5/5	1850mmW*2000mmD	1850mmW*2000mmD	No		
Slight Deviated Case	1	LFB	Lift- 1 Nos.	LFBL-1	6000 Kg	MRL, 3/3/3	5500mmW * 5750mmD	5000mmW * 5500mmD	Yes	After Construction Stage
Traditional Case	1	BS	Lift- 1 Nos.	BS-1	1600 Kg	MR, 2/2/2	2550mmW * 2900mmD	2100mmW*2050mmD	Yes	After construction and at the time of ordering lifts
	2	AT	Lift- 1 Nos.	AT-1	450 Kg	MR, 6/6/6	1700mmW * 1650mmD	1220mmW * 1930mmD	Yes	After construction and at the time of ordering lifts

Here it is seen, clients who has come at initial stage, are recommended the standard hoistway sizes against their preferred capacity of lift. Then they start the construction with the suggested hoistway which has no deviation with standard.

The clients who communicated with lift supplier at middle stage and final stage, have already constructed their hoistway. And there occurs deviation from standard sizes. However, the results of each type of approach have been discussed in the results and discussion sections.

### 3.2 General

This research has been divided into several methodologies targeting each objectives. There are three objectives in this research and have the mapping of several methods under each

objectives' methodology. The main objectives of this research can referred as risk mitigation, minimizing financial complexities and introducing a way for smooth supply chain operation in brief. The methods against each objectives' methodology are listed in the table below.

**Table 3.2: Proposed Methodologies & Methods**

<b>Sl. No.</b>	<b>Objectives</b>	<b>Proposed Methodologies</b>	<b>Proposed Methods</b>
01	Risk mitigation	Early supplier involvement	Market Analysis
			Supplier Base
			Tendering Process
02	Minimizing financial complexities	Establishing framework agreement	Currency Rate Analysis
			Terms and Conditions of the agreement
			Meeting and Negotiation
03	Introducing a way for smooth supply chain operation	Effective communication	A Shared Cloud Platform

### **3.3 Early Supplier Involvement**

#### **3.3.1 Market Analysis**

Clients always concern about what brand of product they will choose. The quality of the product, price, service etc. are wondering at their heads. In this case, a market analysis can help them to understand the product and their nature a lot. They can search in website and go through desired brands features. In website, they can explore each brands technical specifications, client list, contact details etc., which can help them to choose the right one within their budget.



Table 3.3 represents some renowned brand of lifts and their origin. This random list can give opportunity to the clients to explore each lifts official website and get an idea of their questionnaires. This list is not based on ranking of the brands.

**Table 3.3: List of Lift Brands**

<b>Sl. No.</b>	<b>Brand Name</b>	<b>Origin</b>
1	Schindler	Switzerland
2	OTIS	USA
3	Hyundai	Korea
4	Kone	Finland
5	Fujitec	Japan
6	I-Elevator	Korea
7	ThyssenKrupp	Germany
8	Mitsubishi	Japan
9	Sigma	Korea
10	Schumacher	USA
11	Walton	Bangladesh
12	Hitachi	Japan
13	Movilift	Italy
14	LM	Germany
15	Cibes	Sweden

### **3.3.2 Enlisted Suppliers**

Based on the market analysis, the client can prepare a list of enlisted suppliers. At first, they will have to choose the brands, they are interested. Then they have to find out the representatives of the country. After that, they can make an enlisted supplier list of lift suppliers and arrange the list through the hierarchy of their preferences.

Generally, Govt. entity or developer companies, who have lots of projects in hand, this enlisted supplier list help them to achieve their objectives within their stipulated time.

### 3.3.3 Tendering Process

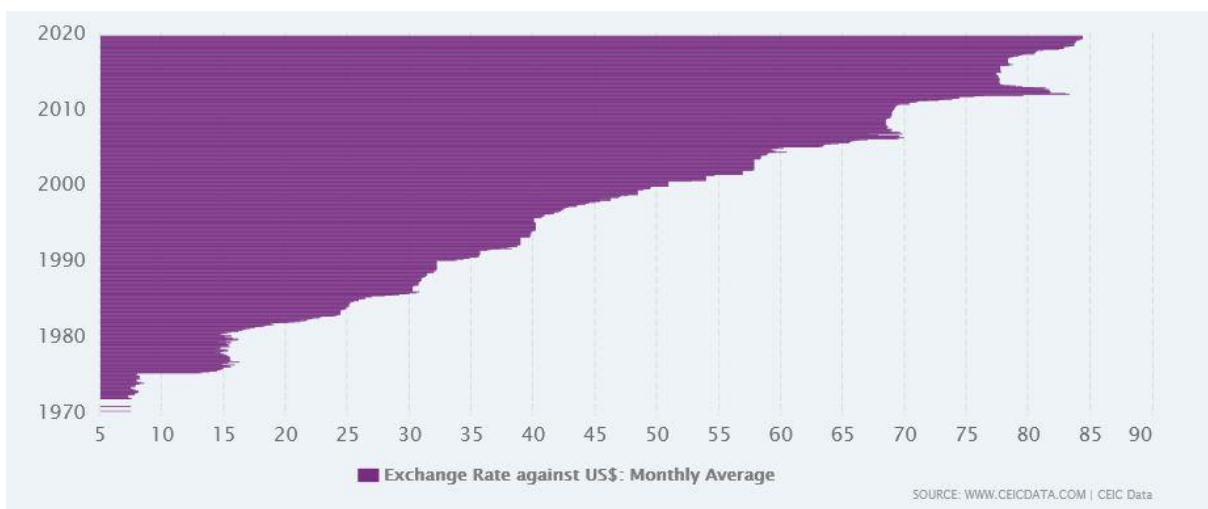
Following to the enlisted supplier list, the clients can go for tender process for the selection. To accelerate this work, two tendering process can be implemented in two different cases.

- a) Limited Tendering Method (LTM) - If clients want to know the information from each of the supplier/vendor of the enlisted supplier list. They can mention only those brands in the ITT, they have selected in the supplier base.
- b) Request for Quotation (RFQ) – If clients have chosen specific brands, they can invite only those brands for quotation submission. The rest procedure will be as same as completing the tendering process.

## 3.4. Establishing Framework Agreement

### 3.4.1 Currency Rate Analysis

It is necessary to do the currency rate analysis before going to any contract. Sometimes the suppliers/vendors face to great loss, especially when it is for bulk amount purchasing. It can also create conflict between both parties for this changeable situation. For a long contract period, it is important to forecast currency fluctuations.

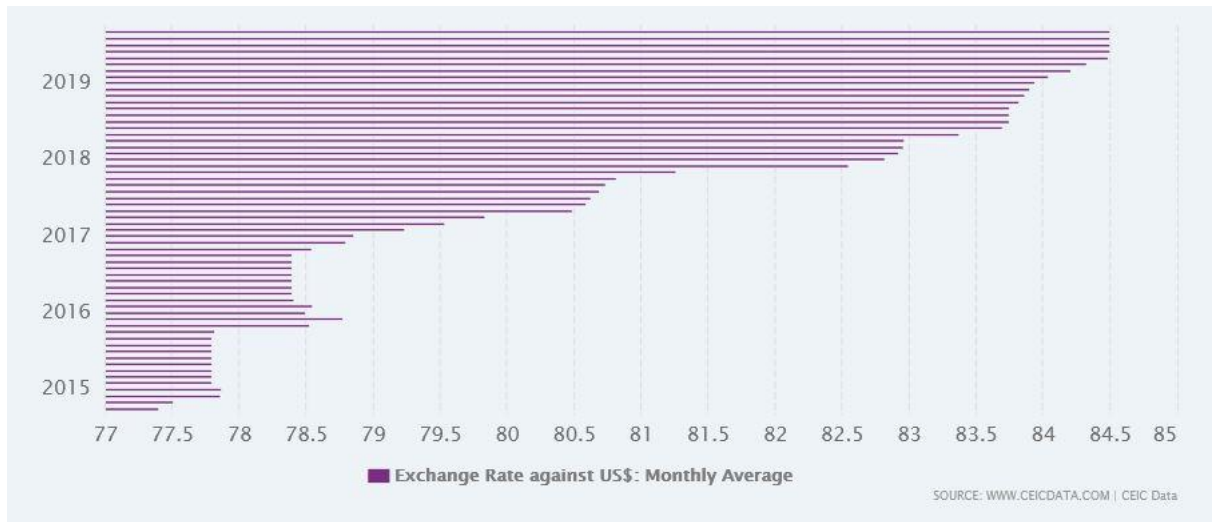


**Figure 3.2: Currency Rate of Last 50 Years**

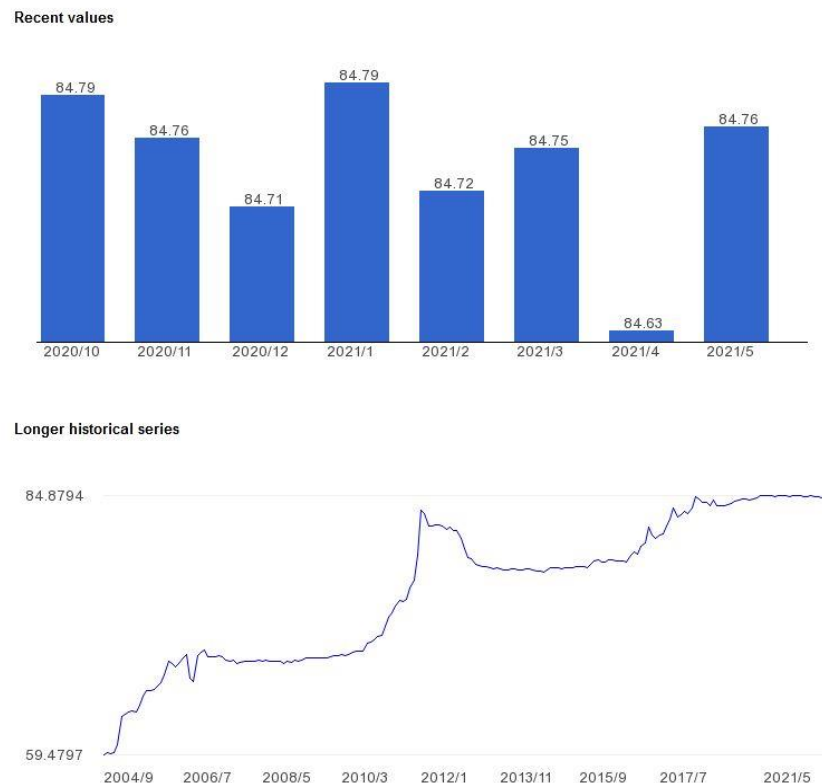
Here BDT vs USD rates have analyzed.

From figure 3.2, it can be assumed that in 2000, the approximate value was 1 USD=50.2 BDT while in 2020, this value is 1 USD=84.2 BDT.

Figure 3.3 represents the currency status of 4 years. Here it can be seen that within this 4 years, almost 7 BDT has been gone up and down. This gives the prediction of



**Figure 3.3: Currency Rate Difference of Four Years**



**Figure 3.4: Monthly Currency Rate Analysis**

concentrating currency rate analysis for long term contract as well.

Figure 3.4 illustrates the close monitoring of currency rate shifting. In 2021, this rate is above 84.70 BDT. But in the month of May, it suddenly falls to 1 USD = 84.63 BDT. Though this decimal digits doesn't affect in small amount, when it comes to huge transaction, it can impact there. If an amount of 1,00,000.00 USD is considered, then the rate difference for this value is shown below.

In March, 2021- 1 USD = 84.75 BDT

So, 1,00,000 USD = 84,75,000 BDT

In April, 2021- 1 USD = 84.63 BDT

So, 1,00,000 USD = 84,63,000 BDT

The difference is 12000 BDT. Just in month, for a huge amount of dollar, the supplier/vendor can face financial risk.

### ***3.4.2 Terms & Conditions of the Agreement***

There lies several terms and conditions in a framework agreement. This terms and conditions should be agreed on mutual agreement. Some common terms and conditions are highlighted below.

- a) Price
- b) Currency Rate (Especially for bulk amount of purchasing)
- c) Construction Period
- d) Contract Period
- e) Warranty Period
- f) After Sales Service

g) Total Working Time (From L/C opening to installation and hand over the project)

h) Breach of Agreement

### 3.4.3 Meeting and Negotiation

This terms and conditions can be finalized after several meetings and negotiation.

This meeting can be done physically or online based.

### 3.4.4 Communication

After confirming with supplier/vendor, it is necessary to keep communication or update of the respective projects. The more supplier/vendor will co-operate, the more supply chain accuracy will increase. In that case, the design of the client will be more absolute.

## 3.5 Effective Communication

### 3.5.1 A Shared Cloud Platform

After completing all the formalities, architect and lift supplier or manufacturer can be communicated together through a shared cloud platform only for design purpose. In

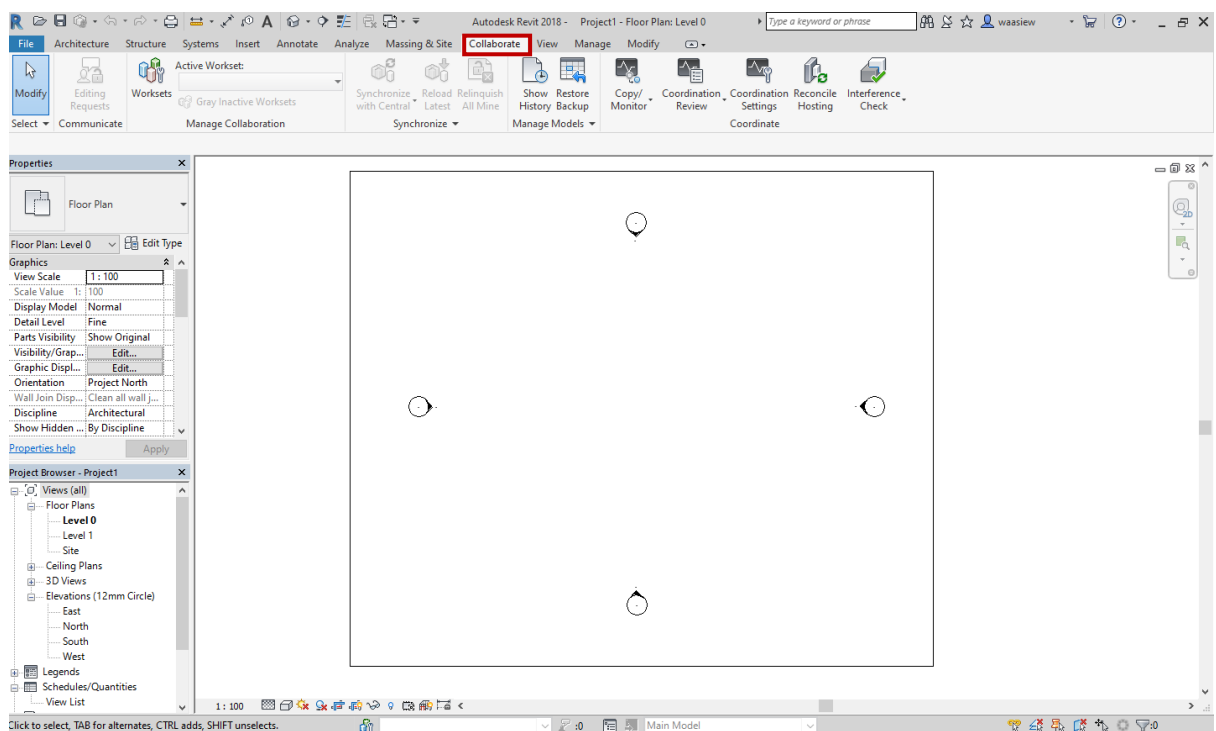


Figure 3.5: Shared Cloud Platform

that platform, if architect make any changes in lift hoistway size, lift supplier or manufacturer can be notified. They can suggest their required space. Thus a qualitative product can be made in this way and supply chain tier becomes one step strong.

The cloud sharing platform can be BIM modelling resources. Revit, Autodesk Navisworks etc. are few tools of BIM Technology.

Figure 3.5 indicates a shared cloud platform named Autodesk Revit. Under this software, the tab collaborate helps to share worksheets to review and check. The BIM software offers this type of advantage to increase the accuracy of the construction.

**Chapter 4**  
**RESULTS AND DISCUSSIONS**

## 4.1 Data Collection

From Table 4.1, it can be seen, those who make early approach faced less design issue. They had to face unpredictable calamities which has no control. Unlikely standard case, the clients had to compromise with design and quality which also made impact on their projects negatively in slightly deviated and traditional cases.

**Table 4.1: Impact on Projects**

Case Type	Serial No.	Client Name	Quantity of Products	Product ID	Deviation (Yes/No)	Clients' Approach	Challenges	Present Status	Remarks
Standard Case	1	MBH	Lift- 1 Nos.	MBHL-1	No	Design Stage	No	Running successfully	N/A
	2	RFPAB	Lift- 5 Nos.	RFPABL-1	No	Planning Stage	Vessel scarcity due to port congestion	Running successfully	The challenge was unpredictable because of covid-19 situation but it is not related to design phase
				RFPABL-2	No				
				RFPABL-3	No				
				RFPABL-4	No				
				RFPABL-5	No				
				RFPABE-1	No				
				RFPABE-2	No				
	3	RAM	Lift- 3 Nos.	RAML-1	No	Planning Stage	Currency fall due to covid-19 situation	Project becomes hold for days	Still pending
				RAML-2	No				
RAML-3				No					
Slight Deviated Case	1	LFB	Lift- 1 Nos.	LFBL-1	Yes	After Construction Stage	Hoistway needs to be reconstructed	Installed successfully but required call back after running some days	There was a scope of increasing the hoistway size because of steel construction
Traditional Case	1	BS	Lift- 1 Nos.	BS-1	Yes	After construction and at the time of ordering lifts	Cabin size had to be adjusted within this hoistway size	Project cancelled	This was supposed to MR cargo lift but the client constructed as hydraulic lift while inspected at site
	2	AT	Lift- 1 Nos.	AT-1	Yes	After construction and at the time of ordering lifts	Cabin size had to be adjusted within this hoistway size	Difficulties during installation and call back after running few days	There was no scope of increasing hoistway size and the client was adamant to fit cabin in this shorten hoistway size

Also in Table 4.2, it gives indication on the performance and maintenance on the basis of clients approach. Both table highlights the importance early supplier involvement.

**Table 4.2: Qualitative Comparison Based on Performance**

Sl. No.	Case Type	Deviation from Standard	Emergency Call Back Frequency			Servicing Required
			No	Less Frequently	Frequently	
1	Standard Case	No	√			Depends on Clients
2	Slight Deviated Case	Yes		√		Depends on Clients
3	Traditional Case	Yes			√	Yes

## 4.2 Framework Agreement

Framework agreement gives benefit by reducing tendering cost, conserving time, continuous improvement within long-term relationships, eliminating repetitive works, reducing risk etc.



How a framework agreement can give advantages than a single tender or individual contracts, it can be illustrated through a comparison given below.

**Table 4.3: Comparison between Single Tender and Framework Agreement**

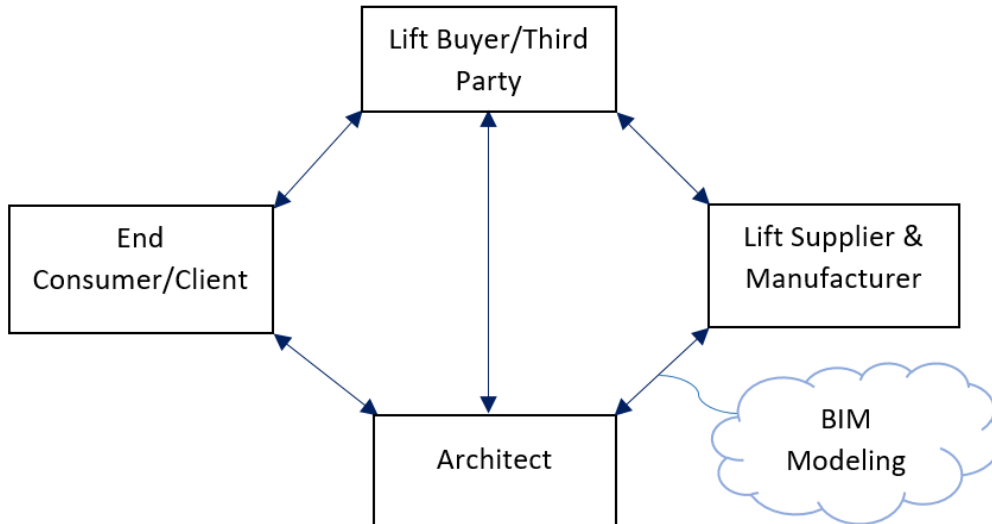
<b>Sl. No.</b>	<b>Particulars</b>	<b>Single Tender</b>	<b>Framework Agreement</b>
01	Contract duration	It is only entered into if the order is placed and each order is a separate contract.	It can provide a healthy long-term revenue stream relationships between supplier and buyer.
02	Agility	It slows down the project work.	It enhances the speed of the project.
03	Design Complications	It takes time to build up a relationship with the new supplier after completing all the processes and thus it affects the design negatively in many cases.	The supplier can involve in the planning or design phase and helps to minimize the design risk.
04	Total Working Time	The total working time from lift order to installation is lengthy.	The total working time from lift order to installation is comparatively less.
05	Price Negotiation	It takes time for price negotiation for each tender. Then comes the adjustment of payment schedule. So enough time is consumed for this stage.	In an established framework agreement, price has been already finalized. So it saves time and accelerates the payment procedure.

### **4.3 A Shared Cloud Platform**

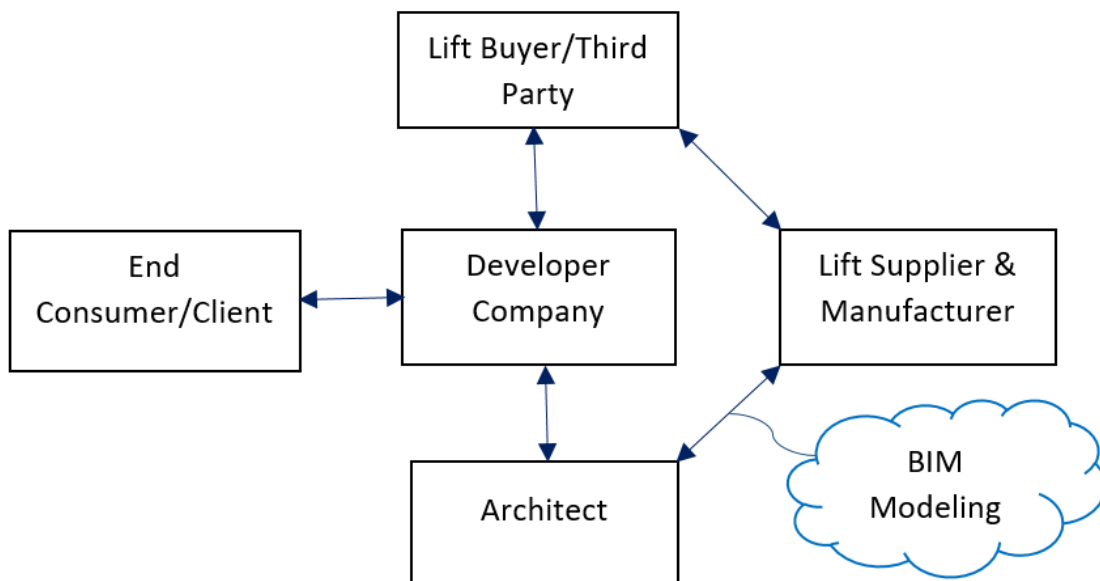
A shared cloud platform can facilitate to exchange the drawings and suggestions if the existing drawings are tended to change between the representatives so that no quality issue can occur in future.

Figure 4.1 represents the proposal of the part of the supply chain stakeholders if client directly contacts with lift buyer/third party.

Figure 4.2 represents the proposal of the part of the supply chain stakeholders if client chooses developer company as medium for lift purchasing activities.



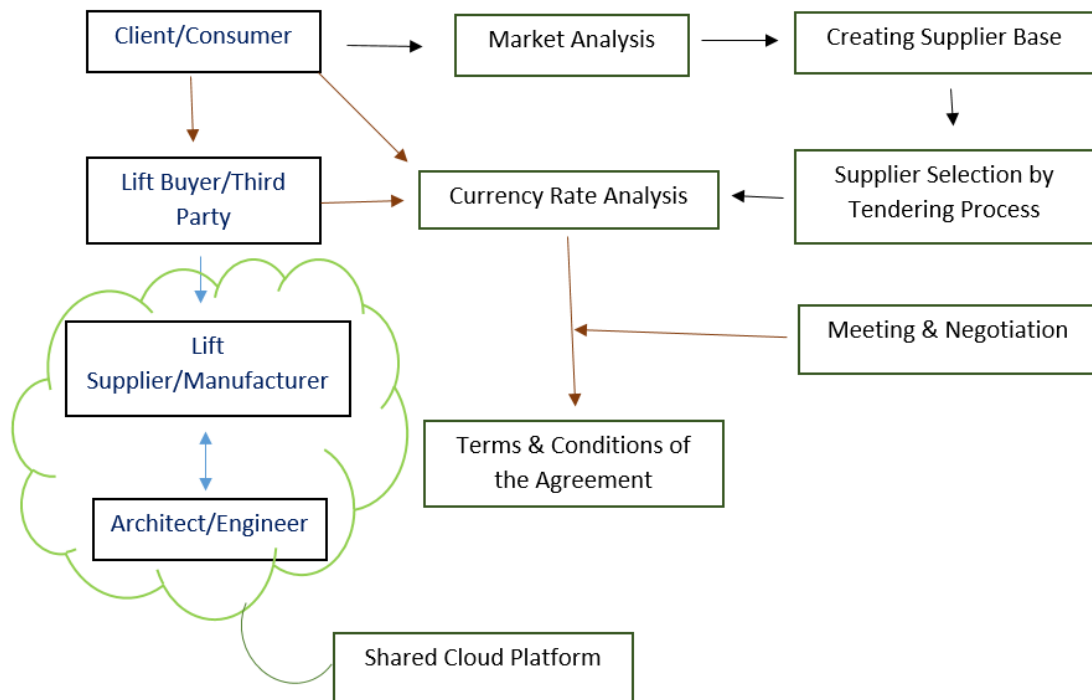
**Figure 4.1: Proposed Model-1**



**Figure 4.2: Proposed Model-2**

#### 4.4 Proposed Way for Smooth Supply Chain Operation

Finally figure 4.3 has been proposed on how to increase efficiency and effectiveness of supply chain activities of lift.



*Figure 4.3: Proposal for Smooth Supply Chain Operation*

## **Chapter 5**

# **CONCLUSIONS AND RECOMMENDATIONS**

## **5.1 Conclusions**

In the context of Bangladesh, maximum client or developer Company is reluctant to involve their respective suppliers at the planning or design stage. Without acknowledging their expertise in their respective fields at the initial stage, it becomes difficult to approach in an economic and efficient way. For this reason, creating awareness for minimizing the design risk can be the foremost liability. If a lift supplier is involved at the design stage, he can suggest the standard hoistway size according to the client's preference. Then the architect can plan the rest design of the building. In this research, a way has been suggested on how to establish a contractual agreement considering all the relative factors to make a long term relationship to maintain quality as well as commitment.

## **5.2 Recommendations**

- a) Further research can be carried out on the accuracy of the proposed way.
- b) It can also be observed which cloud sharing platform gives best performance on the basis of the research demand.

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