PROJECT APPRAISAL IN FINANCIAL INSTITUTION: IMPACT OF TECHNOLOGICAL ASPECT

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The Thesis work titled **"PROJECT APPRAISAL IN FINANCIAL INSTITUTION: IMPACT OF TECHNOLOGICAL ASPECT"** submitted by Md. Moktadir Hossain, Roll No. 100008115F, Session – October/2000 has been accepted as satisfactory in partial fulfillment of the degree of Master in Advanced Engineering Management on April 12, 2004.

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CERTIFICATE OF PROJECT WORK

This is to certify that the work presented in this dissertation is outcome of the investigation carried out by the candidate under the supervision of Dr. M. Anwarul Azim, Professor, Department of Industrial and Production Engineering, Bangladesh University of Engineering and Technology (BUET), Dhaka, Bangladesh.

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ABSTRACT

"Project Appraisal" means pre-investment analysis of an investment project with a view to determine its commercial and socio-economic feasibility. It is an essential tool for judicious investment decision and project selection. It is the prime steps in the process of decision-making in respect of sanctioning assistance by financial institutions.

Presently "Project Appraisal" in the Financial Institution especially in Banks gives emphasize on the financial aspect. Most of the project is technical but technological aspect is absent in the process of appraisal. As a result many project faces technological problem and become sick. Technological appraisal is very much important for any investment especially in Banks because project appraisal assist to ascertain expected rate of return of the project.

CONTENTS

Chapter I

INTRODUCTION

OBJECTIVE OF THE STUDY

Technological Appraisal seeks to determine whether the prerequisites for the successful commissioning of the project have been considered and reasonably good choices have been made with respect to location, size, process etc.

Technological appraisal helps to answer the following questions:

1. Whether the availability of raw materials, power and other inputs has been established?
2. Whether the production process chosen is suitable?
3. Whether the equipment and machines chosen are appropriate?
4. Whether the technology proposed to be employed is appropriate from the social point of view?
5. Whether the workforce is capable to run the process optimally?
6. Whether the organizational capability is enough to run the project?

DEFINITION OF A PROJECT:

The PMI has defined a project as "A temporary endeavor undertaken to create a unique product or service"

" The whole complex of activities involved in using resources to gain benefits" is a project according to Gittinger.

"Project is a specific investment activity on which we will spend capital resources to create an asset from which we can expect to realize benefits over a period of time."

The Project will have

1) A geographic location/geographic concentration
2) A specific clientele intended to reach
3) A well defined time sequence of investment and production activities
4) A specific group of activities which we want to finance and group of benefits, which we can identify and estimate values.

CLASSIFICATION OF PROJECTS

1. (a) M. D. Little and J.A. Mirrlees divide projects into two broad categories :

   i. Quantifiable Projects
   ii. Non – quantifiable Projects

   Quantifiable Projects are those in which a plausible quantitative assessment of benefits can be made.

   Non – quantifiable projects are those where such an assessment is not possible. Projects like industrial development, agricultural development, power generation etc. fall in the first category while projects involving health, education, defense fall in the second category.

   (b) Projects may be labor intensive or capital intensive.

   (c) The magnitude or size of the investment may make a project large scale, medium scale or even small scale.

   (d) The planning commission of India accepted a sectoral bias as the criteria for classification of projects. This is as follows .

   i. Agricultural and allied sector
   ii. Irrigation and Power sector
   iii. Industry and Mining sector

iv Transport and Communications sector

v. Social services sector

vi. Miscellaneous sector

(e) Bangladesh Planning Commission however, has classified projects under the following three Categories:

i Category "X" – Self financing projects i e projects which will earn revenue through the sale of their output.

ii. Category "Y" – Productive but non-revenue earning projects i.e. projects which will give rise to tangible output and benefits of which do not accrue directly to the projects themselves but to other parties.

iii. Category "Z" – Service sector projects i e projects which do not give rise to tangible output but provide service benefits to the community.

(f) Agricultural projects that are suitable in the context of our rural economy are :

i. Crop production
ii. Minor irrigation
iii. Farm mechanization
iv. Pisciculture/Fisheries
v. Poultry
vi. Dairy
vii. Goat rearing
viii. Beef fattening
ix. Bee keeping
x. Horticulture etc

CHARACTERISTICS OF A SOUND PROJECT

i. Existence of a well defined goal
ii. Consumption of significant resources

iii. To have definite starting and ending points

iv. Existence of causal relationship among inputs, outputs, purposes and goal

v. Capability of being planned and Controlled by an individual

vi Composition of a very rich project team

vii. To be easily valuable

viii. Production of socially desirable goods and services

ix Significant Contribution towards national development.

Chapter II

PROJECT APPRAISAL: WHY IT IS SO NECESSARY

"Project Appraisal" is simple terms, means pre-investment analysis of an investment project with a view to determining its commercial and socio-economic feasibility. It is an essential tool for judicious investment decision and project selection. It is the prime step in the process of decision making in respect of sanctioning of assistance by financial institutions

Project appraisal may be defined as the process of evaluating the salient features of managerial capability, marketing feasibility, technological competence, economic necessity and financial viability of a project. The objectives is to make sufficient information available to the decision makers to enable them to undertake a comparative appraisal of the project in relation to other projects and to determine the priority which the project should receive in the matter of resource allocations. The main objectives of project appraisal, specially in banks or financial institutions are:

a) To determine whether to accept or reject the investment proposal

b) To recommend, if the project is not designed properly.

Thus project appraisal assist to ascertain expected rate of return of the project.

STRATEGIES OF PROJECT PLANNING

The strategies of project planning are guided by the economic policies and objectives of the government In the context of a developing country like Bangladesh, the following strategies for project planning can be suggested.

1) Financing the disadvantaged segment of population

2) Development of underdeveloped areas

3) Diversified lending

4) Removing income inequality

5) Labor intensive projects.

6) Import substitution

IMPORTANCE OF PROJECT APPRAISAL

A. From the view-point of Bank/Financial Institution:

1. Identification of right borrower.
2. Evaluation of the commercial, technological, and socio-economic feasibility of a project.
3. Compliance with banking and legal laws of the country.

B. From the view point of the Borrower :

1. Being sure about the overall viability of a project to be undertaken
2. A way to receive suggestions to improve any shortcomings of the project.

Chapter III

PROJECT APPRAISAL: TECHNIQUES

TECHNIQUES OF PROJECT APPRAISAL

An appraisal is a systematic exercise to establish that the proposed project is a viable proposition. The various details submitted by the promoter are checked by the appraising officers. Generally a project to qualify for the assistance has to pass the following tests.

1. Marketing Aspect
2. Technological Aspect
3. Financial Aspect
4. Socio-Economic Aspect.

MARKETING ASPECT

It indicates evaluation of the project's feasibility in terms of market. The market analysis involves the search for and analysis of data that can be used to identify, describe and quantify the market. A market analysis should contain

1) Analysis of Past and Present demand
2) Analysis of Past and Present supply
3) Estimate future demand of the project
4) Estimate project share in the market et.

In a developing economy, the funds allocated must be used to increase investment rather than consumption but the direction of investment, as a whole must be such as to make the best use of available resources. This necessitates the appraisal of the investment plans. The appraisal of the projects have to be done from the point of view of Technological, Financial, Socio-

Economical aspects etc and marketing aspect is one of them. We must have to go for marketing appraisal because if one cannot market his goods the very viability of his project will be shaken and repayment of Bank's finance can not be guaranteed. That is, entrepreneur's objective as well as the Bank's objective will be frustrated So we see that from both the borrowers' and lenders' point of view the marketing appraisal is very much important

Marketing :

Apparently marketing means flow of goods from producer to consumer But actually this definition does not cover all about marketing. As we know profit motive is the main objective of any business organization. But if we analyze carefully, it would very clear to us that not profit motive but consumers satisfaction is the guiding principle of any organization. Because if one can not satisfy the customer through marketing his goods, then the revenue and consequently profit will not be accrued to the organization. But this does not mean that one will forego profit motive for satisfying the customers. So, the definition of marketing now stands as follows:

Marketing is the flow of goods from producer to customer with a view to earn profit for the organization and also satisfying the customers

The marketing analysis involves the search for and analysis of data that can be used to identify, isolate, describe and quantify the market.

A market analysis generally should contain :

a. A brief description of the market
b. Analysis of past and present demand.
c. Analysis of past and preset supply
d. Estimate future demand of the market
e. Estimate projects share of the market
f. Determine marketing channel

TECHNOLOGICAL ASPECT

Technology, contrary to the common belief, is neither a physical facility nor a process of manufacturing alone. It can be divided into two major areas:

1) Hardware Technology

   It is object-embodies form of technology, such as machines. instruments, appliances. The characteristics of these technologies can not be changed without changing in any physical change (of machines, instruments or appliances etc.). Hardware cannot work by itself and needs the support of software technologies.

2) Software Technology

   All technologies other than the hardware ones, that are needed to solve a practical task, are called software technologies. The software technologies have three components –

   a) Manpower (Humnware)

   b) Organization (Orgaware)

   c) Information (Infoware)

   In diagrammatically, classification of technology are as follows :

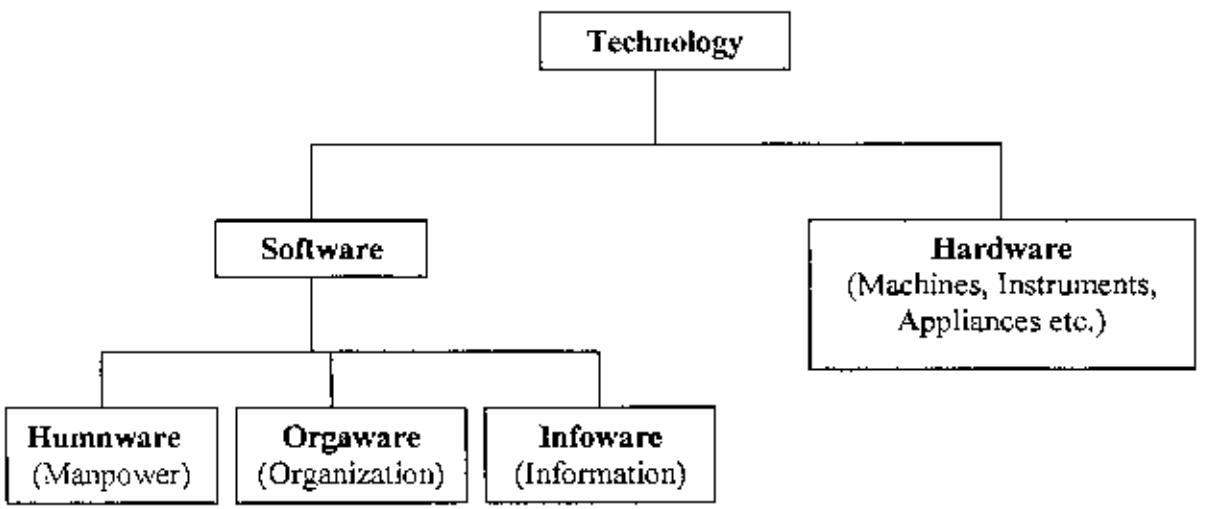

Fig : Technology classification

Hardware Technology

Hardware technological appraisal of a project broadly involves a critical study of the following:

1. **Location and Site** : Selection of the optimum location, therefore, revolves around the joint consideration and evaluation of the following factors :

    i. Raw material supplies
    ii. Transportation facilities
    iii. Power and Fuel supply
    iv. Water
    v. Manpower
    vi. Natural and Climate Factors.

2. **Size (Plant Capacity)** : The size of the plant or scale of operation is an important factor that determines the economic and financial viability of a project.

3 **Technology, Plant and Equipment** : The feasibility study should also consider some important technological factors with regard to plant and equipment viz. ;

    i. Adequacy and Suitability of the Plant and Equipments and their specification.
    ii. Plant layout
    iii. Balancing of different sections of the plant
    iv. Reputation of the machinery supplies etc.

4. **Building and Layout** : The operative efficiency of an industrial project also depends on the layout. Layout refers to the arrangement of physical facilities. The site, factory and plant layouts are important. They shall also ensure safety.

Software Technology

1) Overall Background of the Sponsors
2) Academic Qualification of the sponsors and other manpower who will run the project.
3) Business and Industrial Experience of the sponsors.
4) Past Performance of the sponsors.
5) Managerial Capability of the sponsors.
6) Organizational capability of the sponsors

FINANCIAL ASPECT

Analysis of financial Feasibility is an essential part of project appraisal. Financial feasibility seeks to ascertain whether the proposed project will be financially viable in the sense of being able to meet the burden of servicing debt and whether the proposed project will satisfy the return expectations of those who provide capital. The aspects looked into while conducting financial feasibility:

1) Investment outlay and cost of the project
2) Means of financing
3) Cost of Capital
4) Projected profitability
5) Break –even point
6) Cash flows of the project
7) Investment worthwhileness judged in terms of various criteria of merit
8) Projected financial position and flows
9) Level of Risk

SOCIO –ECONOMIC ASPECT

In case of certain rural projects like irrigation projects, power projects, transporting projects or other infrastructural projects –national profitability (i.e. the net socio-economic benefits) consideration are as important as, and sometimes more important than, commercial profitability considerations For evaluation of national or socio economic benefits, the following aspects are generally considered.

1.Opportunity Cost : In the social cost benefit analysis the relevant cost is the opportunity cost. The opportunity cost is the cost (i.e. the benefit) of the best alternative foregone due to a particular course of action.

2. Shadow prices : The prices of inputs and outputs of the project should be suitably corrected to reflect the real cost, if the market prices are characterized by distortion of any type. Shadow price, also known as accounting price, refers to such adjusted price of the input/output so as to reflect its real cost or value.

Thus a project should be updated for evaluation through the use of shadow prices

In addition to the above aspects, socio-economic feasibility evaluation, the following factors are also considered :

i. Generation of employment

ii Income distribution

iii. Self – reliance

iv. Development of Small scale and ancillary industries.

v Development of infrastructure

vi. Improvement of quality of life and well being

Chapter IV
Project Appraisal in Practice – Company X
(Appraised by financial Institution Y)

Financial Institution Y
Head Office, XXXX

Memo No : **Meeting No :**
Agenda No : **Date :**

Subject: **Proposal for Term Loan, CC (H) & L/C Limit**
A/C- Company X of XXXX Branch

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1. **Proposal** : This is a proposal for sanctioning of term loan of Tk 250.00 lac and following working capital limits:
   CC(H) : Tk 150.00 lac;
   L/C . US$ 1.00 lac eqv. to Tk 60.00 lac.

2. **Name of the Branch** : XXXX Branch.

3. **Name of the Project** : XXXXXXXX.

4. **Main Sponsors** : Mr. XXXXXXX

5. **Description of the project**

   5.01 Constitution : Private Limited Company.

   5.02 Location
   Factory : XXXXXXXXX
   Office : XXXXXXXXXX.

   5.03 Cost of the project and Means of finance :

   The proposed X company intends to setup a full fledge jute yarn, hessain manufacturing at XXXXXX. It will export 80% of it's product will be exported to Japan. The company will use jute as raw material to produce jute hessain tape, squire sheet, triangular sheet, gunny bag etc. The local market will consume rest 20% product of the proposed project.

Estimated cost of the project is as under:

Sl. No.	Head of Expenditure	Total cost in lac Taka
1.	193.50 decimal Land and land development	65.10
2.	33,000 sft factory building, 8,250 sft godown and 15,000 sft store room	107.88
3.	Imported machinery	167.09
4.	Local machinery	55.00
5.	Other expenses at preliminary stages	21.59
Total		**416.66**

The above cost is proposed to be financed as under:

(Amount in lac Taka)

	Revised	Percentage
Term loan	250.00	60%
Equity	166.66	40%
Total	**416.66**	**100%**

6.00 Product and capacity : The project, after implementation, at 100% capacity utilization will be capable of producing 1300 MT Jute yarn, 300 MT Blended yarn, 1200 MT Jute Hessain and 300 MT blended Hessain based on 2 shifts of 8 hours each per day and working for 300 days in a year.

6.01 Raw material and its source:

Raw materials of the company will be raw jute which will be purchased locally.

7. **CIB report** :

Bangladesh Bank has been asked for current CIB report. However, the company and its sister concerns are solely banking with Y financial Institution and all the accounts are unclassified.

8. **Security** :

(Amount in lac Taka)

Name of the security	Charge	Value
193.50 decimal factory land and building at XXXX and further addition, if any.	Registered Mortgage	172.98
Machinery and equipment	Hypothecation	220.09
Grand Total		395.07

9 **Earning forecast:**

After implementation of the proposed project, the company will sale jute yarn and jute hessain The earning forecast is made based on 50%, 60% and 70% capacity utilization respectively for consecutive 3 years fort the proposed project.

(Amount in lac Taka)

	Proposed unit		
	Year-1	Year-2	Year-3
Capacity utilization (%)	50%	60%	70%
Sales revenue	596.25	715.50	834.75
Cost of good sold	425.46	502.98	580.49
Gross profit	170.79	212.52	254.26
Admin. And selling exp.	18.00	19.80	21.78
Operating profit	152.79	192.72	232.48
Financial expenses	97.00	91.00	85.00
Net profit	**55.79**	**101.72**	**147.48**

11. **Operating results** :

Ratios	**Proposed whole unit**		
	Year-1	**Year-2**	**Year-3**
Gross Profit to Sales	**28.67 %**	**29.70 %**	**30.46 %**
Operating Profit to Sales	**25.62 %**	**26.94 %**	**27.85 %**
Net Profit to sales	**9.36 %**	**14.22 %**	**17.67 %**

Ratios	Proposed whole unit		
	Year-1	Year-2	Year-3
Debt Service Coverage Ratio	1.17	1.89	2.73
IRR	34.88 %		

12. Recommendation of HOCC :

Considering the prospect of the project HOCC recommended for sanctioning of term loan of Tk 250.00 lac and working capital limits as under:

CC(H): Tk 150.00 lac;

L/C : US$ 1.00 lac equivalent to Tk 60.00 lac.

Chapter V
Analysis of Existing Project Appraisal Method

The total loan liability of the project is 415.13 lac. In the appraisal process, all other appraisal has done except technological appraisal. But Technological appraisal seeks to determine whether the prerequisites for the successful commissioning of the project have been considered and reasonably good choices have been made with respect to Hardware and Software Technology.

1.0 Hardware Technology:

It is object-embodies form of technology, such as machines, instruments, appliances. The characteristics of these technologies can not be changed without changing in any physical change (of machines, instruments or appliances etc.). Hardware cannot work by itself and needs the support of software technologies.

Technological appraisal with respect Hardware Technology helps to answer following questions:

1.1 Whether the availability of Hardware inputs (raw materials, power and other inputs) has been established?

1.2 Whether the Hardware (Machinery) utilization is optimal?

1.3 Whether Hardware (Machinery) repair time is optimal?

1.4 Whether Hardware (Machinery) pricing is appropriate or not?

1.1 Availability of Hardware inputs (raw materials, power and other inputs)

Raw materials for the plant is jute which is available in the market but broad assessment of the utilities were not made at the time of formulating the project with respect to location and plant selection. As for example the unit required 200 KVA power which REB supposed to be made available. As the plant had no generator of its own, it faced acute power shortfall, because REB could not able to supply power in full capacity all the time. As the project had no alternative, so it had to seat idle for a handsome of time.

Sl. No.	Month Name	Available hour	Power failure hour	% of power failure
1	January	390	32	8.21
2	February	352	36.6	10.40
3	March	400	38	9.50
4	April	384	40	10.42
5	May	387	39	10.08
6	June	390	38.5	9.87
7	July	374	32	8.56
8	August	394	29	7.36
9	September	380	30	7.89
10	October	384	34	8.85
11	November	390	33	8 46
12	December	380	33	8.68
Average Power failure		**4605**	**415.1**	**9.01**

1.2 Hardware (Machine) Utilization

It was said that after implementation of the project , the company will sale jute yarn, jute hessain. The earning forecast was made based on 50%, 60% and 70% capacity utilization respectively for consecutive 3 years of the proposed project.

But in reality, due to power failure and problem in the machinery, the project could not utilize its full capacity, as for example, 43% is the highest capacity utilization against the estimated 70% .The another factor was second hand machinery which was purchased by the company from China that could not give optimum scale of production and suffered a loss. The following table shows the difference between capacity utilization and actual capacity utilization.

	2000		2001		2002	
	Proposed	Actual	Proposed	Actual	Proposed	Actual
Capacity Utilization (%)	50%	25%	60%	35%	70%	43%
Sales Revenue (Tk. in lac.)	596 25	289 78	715.50	410.67	834.75	480.45
Cost of Good Sold(Tk. in lac.)	425.26	205.87	502.98	296.56	580.49	356.28
Gross Profit (Tk in lac.)	170 79	83 91	212.52	114.11	254.26	124.17
Admin and Selling exp. (Tk.in lac)	18.00	19 00	19 80	18.89	21.78	21 75
Operating Profit (Tk. in lac.)	152.79	64.91	192 72	95 22	232.48	102.42
Financial expenses (Tk. in lac.)	97.00	96.43	91.00	93.00	85.00	90.00
Net profit (Tk. in lac)	55 79	-31.52	101.72	2 22	147.48	12 42

1.3 Hardware (Machinery) repair time

Hardware (Machineries) used in the plant is frequently undergone in under repair for a long time. The following table shows the % unused hour in a year.

Sl No	Name of the machinery	Year of Manufac.	Average Avallable hour in a year	Under Repair Hour in a year	% of unused hour in a year
1	Softener machine	1980	4605	345	7.49
2	Breaker cards	1980	4605	420	9.12
3	Finisher card	1980	4605	456	9.90
4	Waste teaser card	1980	4605	457	9.92
5	First drawing machine	1980	4605	432	9.38
6	Second drawing machine	1980	4605	445	9.66
7	Third drawing machine	1980	4605	412	8.95
8	Spg. Machine	1980	4605	498	10.81
9	Wp. Winder	1980	4605	452	9.82
10	Weft Winder	1980	4605	376	8.17
11	Twist machine	1980	4605	432	9.38
	Total		**92100**	**8338**	
	% of unused hour = 10.81%				

1.4 Pricing of Machinery

The cost of the imported machinery was too high considering their economic life. Their depreciation was not also considered. The machinery imported from china at a cost of 167 lac Taka. All the machines were manufactured in 1980 in China. A Bangladeshi Survey Company G.K. Adjusters Ltd. surveyed the imported machinery and found that a total of Tk. 9,629,889 was over priced. The following table shows the cost of the machinery and how it was overpriced:

Sl	Name of Machinery	Qty	Purchasing Price			Actual price as suggested by G.K. adjusters* (in Tk.)	Over Pricing (in Tk.)
			Unit price in USD	Value in USD	Converted in Taka		
1	Softener machine	1	6,600	6,600	389,466	207,000	182,466
2	Breaker cards C121	4	6,500	26,000	1,534,260	710,000	824,260
3	Finisher card C121	5	5,300	26,500	1,563,765	890,000	673,765
5	Breaker draw C261	4	5,300	21,200	1,251,012	780,000	471,012
6	Second drawing machine C262	2	5,700	11,400	672,714	442,000	230,714

Sl	Name of Machinery	Qty	Purchasing Price			Actual price as suggested by G.K. adjusters* (in Tk.)	Over Pricing (in Tk.)
			Unit price in USD	Value in USD	Converted in Taka		
7	Third drawing machine C263	3	5,200	15,600	920,556	319,000	601,556
8	Spg. Machine C561	14	6,000	84,000	4,956,840	2,314,000	2,642,840
9	Wp. Winder J051	4	5,200	20.800	1,227,408	450,000	777,408
10	Weft Winder J192	4	5,200	20,800	1,227,408	450,000	777,408
11	Twist machine C581	2	5,000	10,000	590,100	166,000	424,100
12	Other machinery	8	4,500	36,000	2,124,360	100,000	2,024,360
Total					**16,457,889**	**6,828,000**	**9,629,889**

2.0 Software Technology

All technologies other than the hardware ones, that are needed to solve a practical task, are called software technologies. The software technologies have three components –

(a) Manpower (Humnware)

(b) Organization (Orgaware)

(c) Information (Infoware)

Manpower (Humnware) is the person-embodied component of the technology. The know-how of the human resources play a key role in accomplishing a task. Organization (Orgaware) represents the structural framework of a technological system and includes, for example, the organizations for the R&D, the production, the marketing, the corporate planning etc. It is needed to produce certain goods and services. Within the framework of the orgaware, the other three technology components work.

Information (Infoware) is usually the document-embodied form of technology. This includes, the design specifications, the material specifications (of a product), the theories, the charts. Consequently all facts and figures are needed to accomplish a task are infoware, which is thus the knowledge quantum required by the human beings or an AI (Artificial Intelligence) system.

Though it is understood that all the four components of technology play respective roles in solving a task, their relative importance varies from task to task, or with the mode of accomplishing it or the environment, in which they operate. The four component of technology are mutually dependent and play a dynamic complimentary role among themselves while solving a task.

Technological Appraisal with respect to Software Technology helps to answer following questions.

2.1 Whether the Infoware (Production Process) is appropriate or not?

2.2 Whether the Infoware (Technology) employed are appropriate from the social point of view?

2.3 Whether they follow the Infoware (Machinery) Maintenance schedule?

2.4 Whether the humnware is capable to run the process the optimally?

2.5 Whether the orgaware is capable enough to run the process optimally?

2.1 Infoware (Production Process) is appropriate or not?

The production process shown in Annexure –II is the near about production process used in all over the world and there is no problem with the production process.

2.2 Was the Infoware (technology) employed appropriate from the social point of view

Technology employed was appropriate because

(1) The technology utilizes local raw materials

(2) The technology utilizes local manpower

(3) Technology protects ecological balance

(4) Technology is harmonious with social and cultural conditions

2.3 Did they follow infoware (Machineries) preventive maintenance schedule ?

They followed breakdown maintenance schedule. They did not follow the preventive maintenance schedule which was shown in Annexure-III to run the machineries smoothly. Maintenance of Plant should be regarded as the complete upkeep of the equipment so that the working force can operate under best possible condition. The

supervisor and operators should be taught to look after their own machines. They also be on the look out and report things which might be expected to lead to major breakdown and poor performance. Maintenance must aim at avoiding emergency calls by planning in advance the care of each machine. This particular aspect is called Preventive or Pre-planned maintenance. The ideal of preventive maintenance is to remedy minor defects before they cause the need for major repairs and to make renewals before the failure of equipments.

As they followed breakdown maintenance schedule, so there was a huge unused time (about 11% of the available time)

2.4 Whether the humnaware capable to run the process optimally?

The company has the following manpower for the unit:

a)	Administrative and marketing-		15 nos
b)	Manufacturing	-	139 nos
	Total	-	154 nos

The company had 139 number of manpower directly involved in manufacturing and 15 number in Administrative and marketing to run the process optimally. The manpower did not have enough knowledge to run the project effectively to keep the machinery in running condition. The machinery was shifted from a factory of china. So the preventive maintenance schedule should be taken to run the machinery effectively. Moreover, they followed breakdown maintenance procedure. So every time there were machine breakdown problem and so the process could be run optimally all the time

2.5 Whether the Orgaware was capable enough to run the project?

Assessing the organizational capability is more difficult than estimating financing capacity. Even though it is revealed that the management did not have enough organizational capability. Organizational structure of the firm as under

Sl. No.	Name	Educational Qualification	Position	Relationship among share holders
1	Mr. Mohiuddin Ahmed	B.A.	Chairman	
2	Mr. Mizanur Rahman Khan	M. Com (Accounting)	Managing Director	Son in law of Chairman
3	A. S. M. S. Ahmed	B. A.	General Manager (Op)	Son of Chairman
4	Mrs Hasina Banu	M. Com	General Manager (Finance)	Daughter of Chairman
5	Mr Raqib Hasan	B.Sc	Factory Manager	-
6	Mr. Kazi Nurul Huda	H. Sc	Production Supervisor	-
7	Mr. Tofael Hossain	H.S.C.	In charge, Machinery	-

If the management is capable enough, then

(i) They could identify the critical management limitations. As for example, in the year 2000, 2001 and 2002 capacity utilization was 25%, 35% and 43% respectively. They did not take proper step to identify the reason behind the less utilization of capacity which causes serious loss to the project.

(ii) They could take a good decision regarding the changes in market demand, profitability and technological development

2.6 Summary of the Findings

At the time of project appraisal it is estimated that the project will run at 70% of the rated capacity. But in reality 43% of the capacity was utilized and remaining 27% of the capacity was lost in following areas:

(1) As the broad assessment of the utilities were not made at the time of appraisal,

the project faced acute power shortage. REB was supposed to supply available power for the project but REB failed to supply uninterrupted power. As such 9% of the capacity was lost due to power outage. **(Page – 19)**

(2) As they followed the Breakdown maintenance schedule, the machinery of the plant went frequent under repair. In the repairing process near about 11% of the capacity was lost. **(Page – 20)**

(3) As the hummware were not capable enough to run the project optimally, 7% of the capacity lost due poor hummware capability. **(Page- 23/24)**

Moreover pricing of technology was not done properly at the time of purchasing the machinery. About Tk. 96,29,889/- spends due to overpricing of the machinery **(Page –20/21)**. As such, cost of good sold increased and the company incurred losses.

Chapter VI

What needs to be added to the existing Project Appraisal Method?

Now it is evident that present method of Technological Appraisal is not adequate enough to analyze a project. It needs to be revised which would help control the loan default culture prevailing in our country.

The followings are need to be added in technological appraisal process:

(1) Appropriateness of Technology

To find out the appropriateness of the technology, first of all one have to answer the following questions with "Yes" or "No"

Sl. No.	Question	Yes	No
1	Will the technology fulfill the basic needs of the village and mass people?		
2	Is there enough scope of employment of large number of labor including women?		
3	Will the technology preserve the traditional job and will it create create new job?		
4	Will the technology price low and can the less skilled people handle the technology?		
5	Is the process is appropriate for small-scale production?		
6	Will the energy requirement minimum?		
7	Is there any scope of using indigenous raw material and service?		
8	Is there waste recycling process and is the waste non-polluting?		
9	Will the technology contribute in economic development in directly or indirectly?		
10	Is the technology is decentralized? Will it contribute in alleviation of income disparity?		

Sl. No.	Question	Yes	No
11	Is the technology compatible with local culture?		
12	Is the technology compatible with social condition?		
13	Will technology acceptable to the existing political system?		

If there are 13 "Yes" among the above 13 questions, the technology is said to be 'more appropriate', if there are 09 or more "Yes" the technology is said to be 'appropriate', if there are 07 or more "Yes" the technology is said to be 'about to appropriate', if there are less than 07 "Yes" the technology is said to be inappropriate.

(2) Technology Assessment

Technological assessment consists of ascertaining the trend of technological change and the resulting implications for all relevant sectors of society; systematically evaluating the consequences (direct, and indirect, intended and unintended, beneficial and adverse) of such developments in terms of their probability, severity and distribution; attempting to forecast the possible future trends and consequences; and making or recommending social decisions compatible with choosing the alternative for the future that would maximize desired benefits and minimize the negative effects according to the normative policies one wishes to effectuate

(i) Factors to be considered.

The following factors are to be considered for technology assessment:

(a) Technological factor

Reliability	Flexibility	Efficiency	Technology life

(b) **Economic factors**

Cost of the Technology	Benefit in terms of cost	Productivity	Market Demand	Market Share

(c) **Resource factor**

Availability of raw material	Availability of Energy	Availability of Skilled manpower

(d) **Environmental factors**

Environmental impact				Impact on life			
Air	Water	Land	Forest	Noise pollution	Health Hazard	Safety	Comfort

(e) Socio-Cultural factors

Impact on individual life	Impact of society	Compatible with existing culture	Political acceptibility	Compatible with existing policy

(ii) **Tools and Techniques of measuring the factor**

There is wide variety of techniques to measure the above-mentioned factors. Some of these factors can be measured in quantitative terms, while others, which defy such measurements, can only be treated in qualitative manner.

Available tools and techniques for technology assessment may be classified into following four groups:

(A) **General Intuitive Methods**

(a) **Expert Opinion/Polls and Panels**

This includes a variety of methods used either to extract information from a single individual or to accumulate input from a number of persons, often

experts in an area of interest. Surveys and panels using experts provide a better way of opinion measurement.

(b) Delphi Technique

The Delphi technique involves interactions of : experts opinion, synthesis, feedback, justification of opinions outside of the interquartile range, further feedback, counter argument and reappraisal until some kind of clear indications are reached.

(c) Cross-Impact Analysis

Application of cross impact analysis to technology assessment involves the steps like (i) selection of people who participate, (ii) definition of objectives and selections of events and developments which are expected to occur within the time span of the analysis, (iii) assignment of subjective probabilities and time priorities, (iv) assessment of interaction by the group using a cross impact matrix, (v) computer analysis and printing out of calculated probabilities, (vi) identification of key events.

(B) Important Component Methods

(a) Ad Hoc

Ad hoc methodology gives a broad qualitative information of value in comparing alternative technologies. The information is stated in simple terms readily understandable by a decision maker or member of the public, without outlining the actual impacts on the specific parameters which will be affected.

(b) Checklist

Checklists presents a specific list of technology assessment factors to be investigated. They are employed as guide for the assessor to ensure more or less exhaustive impact search.

(c) Matrices

Matrix formulations are similar to checklists, except that two or more dimensions are required for its representation. The entries in the cell of the matrix can be both qualitative (such as High, low, medium etc) or quantitative (using scaling and weighting).

(C) Structural Decomposition Methods

(a) Relevance Tree

Relevance trees graphically represent the interrelationships or linkages between various members of some set of elements. Several different trees may be utilized for impact identification. The impact tree is used to portray the causal relationships between some activity of the technological system and first order impacts, and from first to second order impacts and so on to higher order impacts

(b) Morphological Analysis

The method basically depends upon asking a series of questions about a technological development, the set of questions being exhaustive of all possible questions one could ask about the technology. One then provides a full range of possible answers to each question and then proceeds with the analysis by selecting systematically all the permeated combinations of the answers to each questions. After discarding those combinations which are incompatible or unrealizable, one reduce the problem to the analysis of the remaining alternative systems.

(c) Analytical Hierarchy

Hierarchical decomposition and recomposition of complex systems is a basic device by which human mind copes with complexity. Elements at particular level of hierarchy are kept, to the extent possible, independent of, but comparable to, the elements at the same level.

(d) Networks

Technological, social and other subsystems are generally interconnected and form webs or networks and the assessment of technological alternative often demand the identification or primary, secondary and higher order impacts.

(D) Holistic Composition Methods

(a) Cost –Benefit Analysis

Cost/benefit analysis is a way of setting out all data relevant to a given set of alternatives with the aim of maximizing the present value of all benefits less all costs, subject to specific constraints

(b) Scenario Generation

Scenario are very profound way of dealing with technology assessment issues since, if well structured, they permit one to probe consequences and at the same time allow one to use integration and imagination.

(c) Simulation Model

Simulation models portray the dynamic behaviour of a system as it changes over time. Simulation models can be either deterministic or probabilistic. Deterministic models assume that the system behaviour for a given set of circumstances is fixed. Probabilistic models assume that a number of system responses are possible and that the actual behaviour is determined from among them probabilistically.

There is no validated, universally accepted methodology in the sense of a readily replicated technique for technology assessment. The specific methodology needed for technology assessment will vary case by case in terms of objectives and focus, depending upon the stage of development of the technology and the type of technology.

(3) **Technology life cycle**

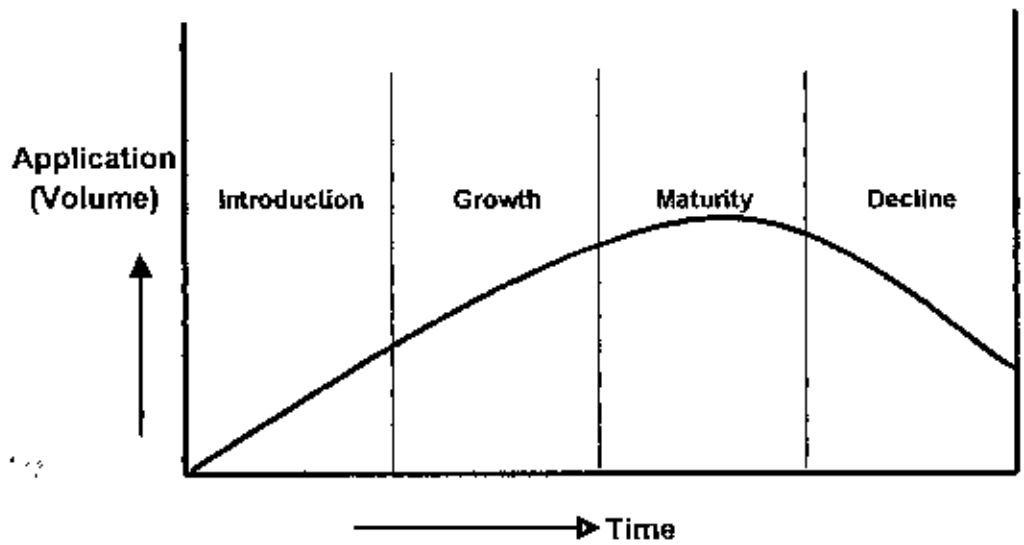

Fig : Technology Life Cycle

When a technology (for example. a product or a process) is innovated and thus introduced in the market, its volume of application normally increases with time. Its market share is expected to increase rapidly after the user identified its positive advantage (growth Phase) With the progress of time the rate of increase of its usage will decrease (i.e. the rate of its consumption will not increase as fast as during the growth phase). During this maturity stage. when it enjoys the maximum share, the pressure from other innovations will increase and technology will start loosing ground.

Technological life cycle helps Bank/Financial Institution to ascertain cost of the product/service as well as stage of the technology So Bank/Financial Institution will consider technological life cycle for taking judicious investment decision whether the technology is on the introduction or growth or maturity or decline stage and accept or reject the project proposal accordingly.

(4) **Assessment of Utilities**

(i) **Requirement of Power**

Sl	No of machine in each group	Power required for each machine (kw)	Total Power required for machinery (Kw)	Power reqd. for lighting & other purposes (Kw)	Total power requirement (Kw)
(a)	(b)	(c)	(d=b*c)	(e)	(f=d+e)

(ii) **Availability of Power**

Sl	Available power from PDB/REB (kw)	Power from own source i.e. from Standby Generator	If the standby power is 10% of the total power (f), accept the project otherwise reject the project
(g)	(h)	(i)	(j)

(5) **Choice of Technology**

Rated capacity	Actual capacity utilization			Break Even point	Reason for choosing Technology
	40%	60%	70%		

(6) Technology Evaluation and Pricing

Information of the Technology to be purchased				Parallel/upgraded Technology		Reason for choosing the machine
Name of the machinery	Manuf. company	Capacity	Price	Capacity	Price	

(7) Assessment of Humnoware

Sl. No.	Type of machinery	Skill required	Skill available of the manpower who will maintain/repair it				Decision regarding capability of Humnware
			Name	Operating skill in similar m/c	Maintenance skill in similar m/c	Professional knowledge	

Chapter – VII

CONCLUSION

If the Bank/Financial institution considers the technological aspect at the time project appraisal in line with financial and marketing aspect Bank/Financial Institution can be benefited in the following ways :

- Appropriateness of the technology will be ensured
- Right assessment of the technology will be performed.
- Appropriate of assessment of the utilities will be performed.
- Assessment of humnware, orgaware and infoware are done properly.
- Asset quality will be improved.
- Production will be increased, unit price will be reduced and loan repayment will be better
- Amount of stuck loan will be lessened.
- Loan will be more secured.
- Fund diversion will be minimized.

Thus, Technological Appraisal helps to ascertain appropriate technology, production process, raw material, humnware, orgaware and infoware. It is necessary for the Bank/Financial Institution to consider technological aspect at the time project appraisal along with financial and marketing aspect .

It is proposed that any project appraisal for the financial institution should include technological appraisal with the following components as proposed in Annexure - VI:

- Appropriateness of Technology
- Assessment of Technology
- Technology life cycle
- Availability of utilities (Electricity, power, gas, electricity etc.)
- Choice of Technology.
- Technology pricing.
- Humnware capability
- Orgaware capability.

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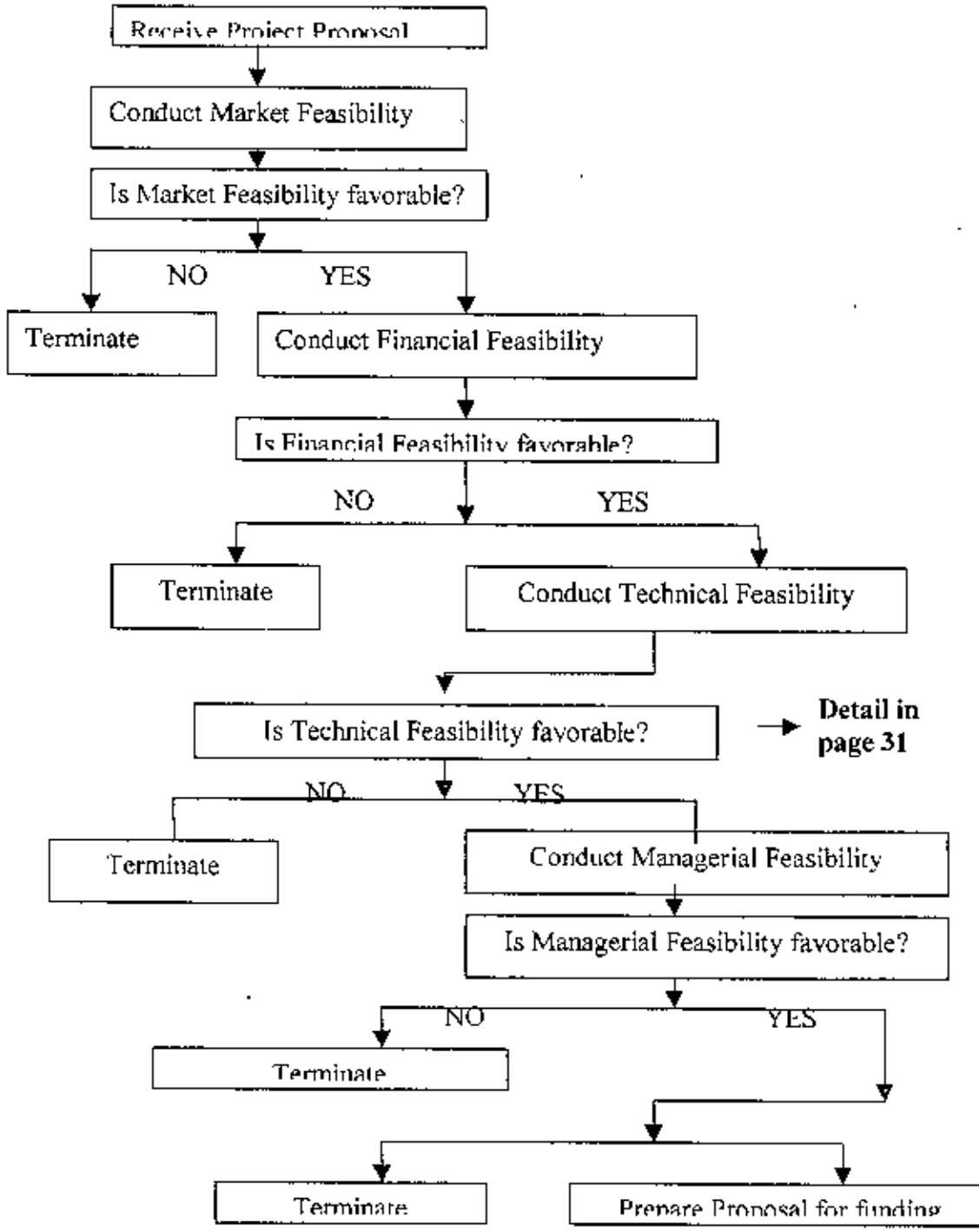
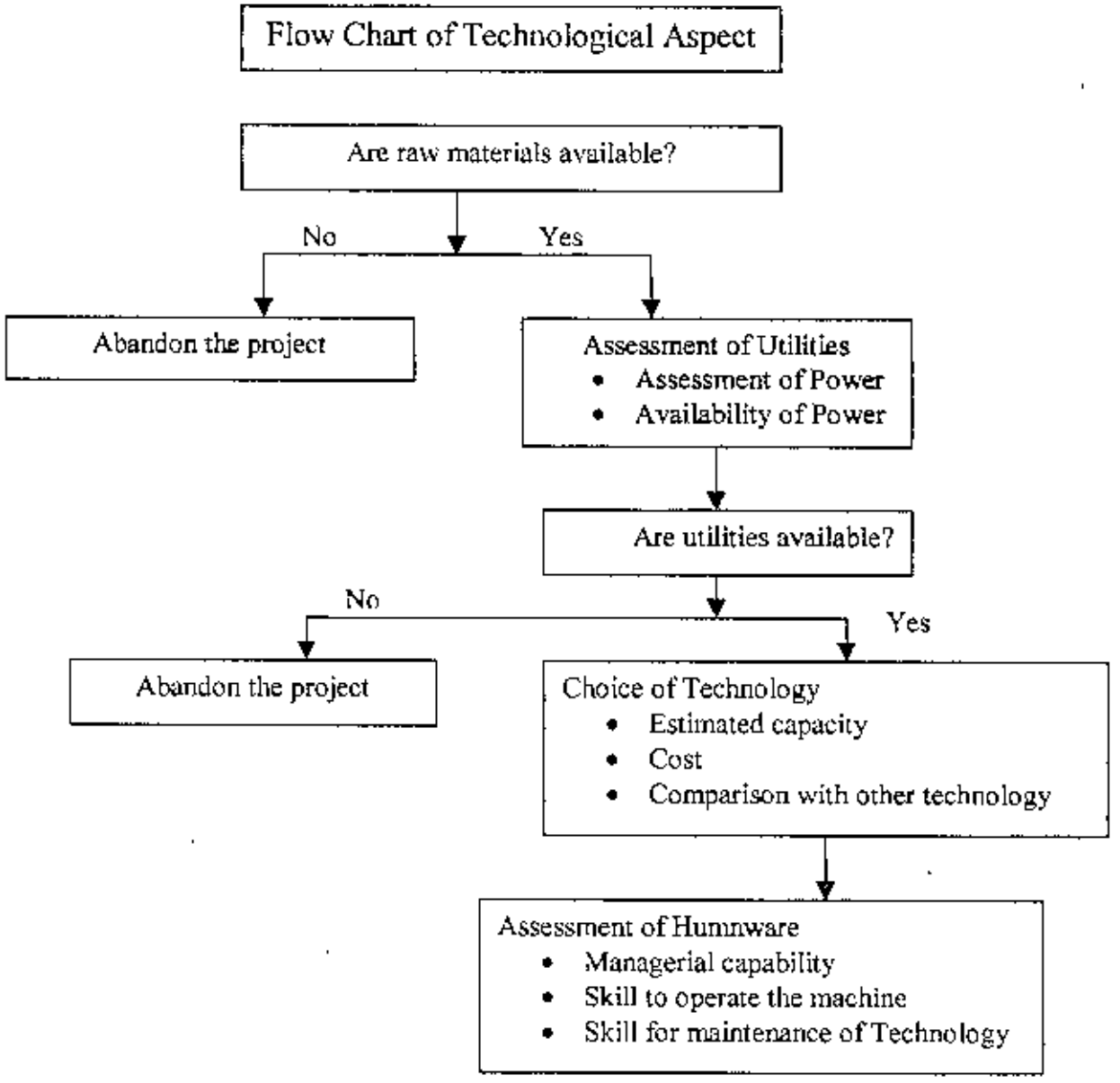
Annexure I

Project Appraisal : Flow Chart



Annexure - II


Flow Chart of Technological Aspect
Are raw materials available?
No
Yes
Abandon the project
Assessment of Utilities
• Assessment of Power
• Availability of Power
Are utilities available?
No
Yes
Abandon the project
Choice of Technology
• Estimated capacity
• Cost
• Comparison with other technology
Assessment of Humnware
• Managerial capability
• Skill to operate the machine
• Skill for maintenance of Technology

Annexure – III

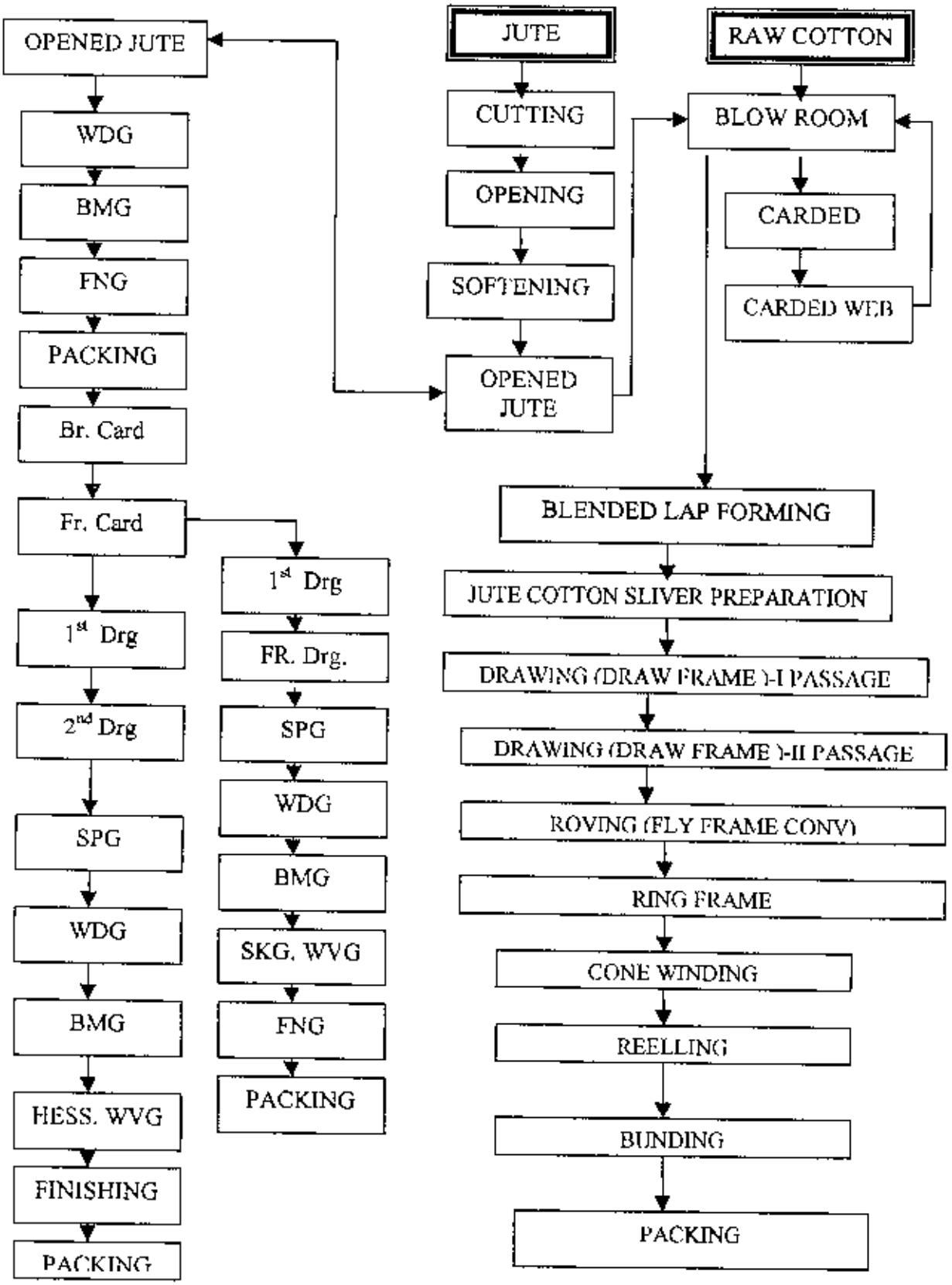
Preventive Maintenance Schedule

Task No.		Nature of Inspection/Work	Inspection/work due
Dust Shaker	1	Driv,Pulleys, Gearing, Bushes to be inspected and replaced if necessary	Once weekly
	2	Sheet metal covers, Grids, Spikes etc. to be inspected, adjusted or repaired	Once monthly
	3	All dust shaker conveyer to be checked and repaired if necessary	Once monthly
Softners	1	Inspection of safety motions, Guards etc.	Once daily
	2	Check and clean all emulsion piping, valves, nozzles and drip trays	Once weekly
	3	Inspection of Rollers, slide shafts, Bevel Gears and Bushes	Once monthly
	4	Inspection of Driving Clutch, Shaft Bushes, worm gears to be cleaned, regreased etc.	Monthly
Teasers	1	Machine to be thoroughly cleaned and lubricated, Roller staves and condition of pins to be inspected	Once weekly
	2	All gearing studs, Arbors, Bushes, Bearing along with all safety motions and guards to be inspected, repaired or replaced if necessary	Once weekly
	3	All roller settings to be ckecked and adjusted if necessary	Every three weeks
Breakers	1	Machine to be thoroughly cleaned and lubricated, staves and pins to be inspected	Once weekly
	2	All gearing, studs, arbours, bushes-bearings along with all safety motion and guards to be inspected, repaired or replaced if necessary	Once weekly
	3	All roller setting to be checked and adjusted if necessary (to be done when cylinder staving occurs)	Every 2 months
Finishers	1	Machine to be thoroughly cleaned and lubricated, staves and pin condition to be inspected	Once weekly
	2	All gearing, studs, arbour, bushes, bearings along with all safety motions and guards to be inspected, repaired or replaced if necessary (to be done when cleaning occurs)	Once weekly
	3	All roller setting to be ckecked and adjusted if necessary (to be done when cylinder staving occurs)	Every 4 months
Drawing Roll Formers	1	Machine to be thoroughly cleaned, slides polished, (to be carried out when 1st Drg. framing cleaning occurs)	Every 2 months
	2	Condition of Roll driver cork or every covering to be inspected and changed if required. Roll pressure setting to be checked and adjusted if necessary	Once weekly

Task No.		Nature of Inspection/Work	Inspection/work due
Finisher Drawing	1	All bars and Pinning to be inspected, checked and replaced if necessary	Every 2 weeks
	2	Drg. roller traverse motion, automatic stop motion, cam tramper motion, packer rod, springs, lever and cam to be inspected, repaired, replaced or adjusted if necessary	Once monthly
	3	Machine to be thoroughly cleaned and lubricated	Once monthly
	4	All gearing studs, Bushes and Bearings, Bar Carrier shafts and Pinion etc. to be inspected, repaired or replaced if necessary (to be done when cleaning occurs)	Once monthly

Annexure – IV

Production Process for spinning of Jute, Jute/Cotton blended Yarn



Annexure –V

Existing Project Appraisal Format

Project Appraisal in Practice – Company X (Appraised by financial Institution Y)

Financial Institution Y
Head Office, XXXX

Memo No : **Meeting No :**
Agenda No : **Date :**

Subject: **Proposal for Term Loan, CC (H) & L/C Limit A/C- Company X of XXXX Branch**

---

1. **Proposal** :

2. **Name of the Branch** :

3. **Name of the Project** :

4. **Main Sponsors** :

5. **Description of the project**

   5.01 Constitution :

   5.02 Location
   Factory :
   Office :

   5.03 Cost of the project and Means of finance :

6. **Financial Aspect** :

7. **Technical Aspect**

7.01 Product and capacity :

7.02 Raw material and its source:

8. **Marketing Aspect** :

9. **CIB report** :

10. **Security** :

11. **Earning forecast** :

12. **Operating results** :

13. **Recommendation of HOCC:**

14. **Decision of the Board** :

Annexure –VI

Proposed Project Appraisal Format

(Appraised by financial Institution Y)

Financial Institution Y
Head Office, XXXX

Memo No : **Meeting No :**
Agenda No : **Date :**

Subject: **Proposal for Term Loan, CC (H) & L/C Limit**
A/C- Company X of XXXX Branch

---

1. **Proposal** :
2. **Name of the Branch** :
3. **Name of the Project** :
4. **Main Sponsors** :
5. **Description of the project**

   5.01 Constitution :

   5.02 Location
   Factory :
   Office :

6. **Financial Aspect** :

   6.01 Investment outlay and cost of the project
   6.02 Means of financing
   6.03 Cost of Capital
   6.04 Projected profitability
   6.05 Break –even point
   6.06 Cash flows of the project
   6.07 Investment worthwhileness judged in terms of various criteria of merit

6.07 Projected financial position and flows

6.07 Level of Risk

7. Technological Aspect:

7.01 Appropriateness of Technology

To find out the appropriateness of the technology, first of all one have to answer the following questions with "Yes" or "No"

Sl. No.	Question	Yes	No
1	Will the technology fulfill the basic needs of the village and mass people?		
2	Is there enough scope of employment of large number of labor including women?		
3	Will the technology preserve the traditional job and will it create create new job?		
4	Will the technology price low and can the less skilled people handle the technology?		
5	Is the process is appropriate for small-scale production?		
6	Will the energy requirement minimum?		
7	Is there any scope of using indigenous raw material and service?		
8	Is there waste recycling process and is the waste non-polluting?		
9	Will the technology contribute in economic development in directly or indirectly?		
10	Is the technology is decentralized? Will it contribute in alleviation of income disparity?		
11	Is the technology compatible with local culture?		
12	Is the technology compatible with social condition?		
13	Will technology acceptable to the existing political system?		

If there are 13 "Yes" among the above 13 questions, the technology is said to be 'more appropriate', if there are 09 or more "Yes" the technology is said to be 'appropriate', if there are 07 or more "Yes" the technology is said to be 'about to appropriate', if there are less than 07 "Yes" the technology is said to be inappropriate.

7.02 Technology Assessment

Technological assessment consists of ascertaining the trend of technological change and the resulting implications for all relevant sectors of society; systematically evaluating the consequences (direct, and indirect, intended and unintended, beneficial and adverse) of such developments in terms of their probability, severity and distribution; attempting to forecast the possible future trends and consequences; and making or recommending social decisions compatible with choosing the alternative for the future that would maximize desired benefits and minimize the negative effects according to the normative policies one wishes to effectuate.

(ii) Factors to be considered.

The following factors are to be considered for technology assessment:

(b) Technological factor

Reliability	Flexibility	Efficiency	Technology life

(c) Economic factors

Cost of the Technology	Benefit in terms of cost	Productivity	Market Demand	Market Share

(c) Resource factor

Availability of raw material	Availability of Energy	Availability of Skilled manpower

(d) Environmental factors

Environmental impact				Impact on life			
Air	Water	Land	Forest	Noise pollution	Health Hazard	Safety	Comfort

(f) Socio-Cultural factors

Impact on individual life	Impact of society	Compatible with existing culture	Political acceptibility	Compatible with existing policy

(ii) Tools and Techniques of measuring the factor

There is wide variety of techniques to measure the above-mentioned factors. Some of these factors can be measured in quantitative terms, while others, which defy such measurements, can only be treated in qualitative manner.

Available tools and techniques for technology assessment may be classified into following four groups:

(A) General Intuitive Methods

(d) Expert Opinion/Polls and Panels

This includes a variety of methods used either to extract information from a single individual or to accumulate input from a number of persons, often experts in an area of interest. Surveys and panels using experts provide a better way of opinion measurement.

(e) Delphi Technique

The Delphi technique involves interactions of : experts opinion, synthesis, feedback, justification of opinions outside of the interquartile range, further

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(f) Cross-Impact Analysis

Application of cross impact analysis to technology assessment involves the steps like (i) selection of people who participate, (ii) definition of objectives and selections of events and developments which are expected to occur within the time span of the analysis, (iii) assignment of subjective probabilities and time priorities, (iv) assessment of interaction by the group using a cross impact matrix, (v) computer analysis and printing out of calculated probabilities, (vi) identification of key events

(B) Important Component Methods

(d) Ad Hoc

Ad hoc methodology gives a broad qualitative information of value in comparing alternative technologies. The information is stated in simple terms readily understandable by a decision maker or member of the public, without outlining the actual impacts on the specific parameters which will be affected.

(e) Checklist

Checklists presents a specific list of technology assessment factors to be investigated. They are employed as guide for the assessor to ensure more or less exhaustive impact search.

(f) Matrices

Matrix formulations are similar to checklists, except that two or more dimensions are required for its representation. The entries in the cell of the matrix can be both qualitative (such as High, low, medium etc) or quantitative (using scaling and weighting).

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(e) Relevance Tree

Relevance trees graphically represent the interrelationships or linkages between various members of some set of elements. Several different trees may be utilized for impact identification. The impact tree is used to portray the causal relationships between some activity of the technological system and first order impacts, and from first to second order impacts and so on to higher order impacts.

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(D) Holistic Composition Methods

(d) Cost –Benefit Analysis

Cost/benefit analysis is a way of setting out all data relevant to a given set of alternatives with the aim of maximizing the present value of all benefits less all costs, subject to specific constraints.

(e) Scenario Generation

Scenario are very profound way of dealing with technology assessment issues since, if well structured, they permit one to probe consequences and at the same time allow one to use integration and imagination.

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Simulation models portray the dynamic behaviour of a system as it changes over time. Simulation models can be either deterministic or probabilistic. Deterministic models assume that the system behaviour for a given set of circumstances is fixed Probabilistic models assume that a number of system responses are possible and that the actual behaviour is determined from among them probabilistically

There is no validated, universally accepted methodology in the sense of a readily replicated technique for technology assessment. The specific methodology needed for technology assessment will vary case by case in terms of objectives and focus, depending upon the stage of development of the technology and the type of technology.

7.03 Technology life cycle

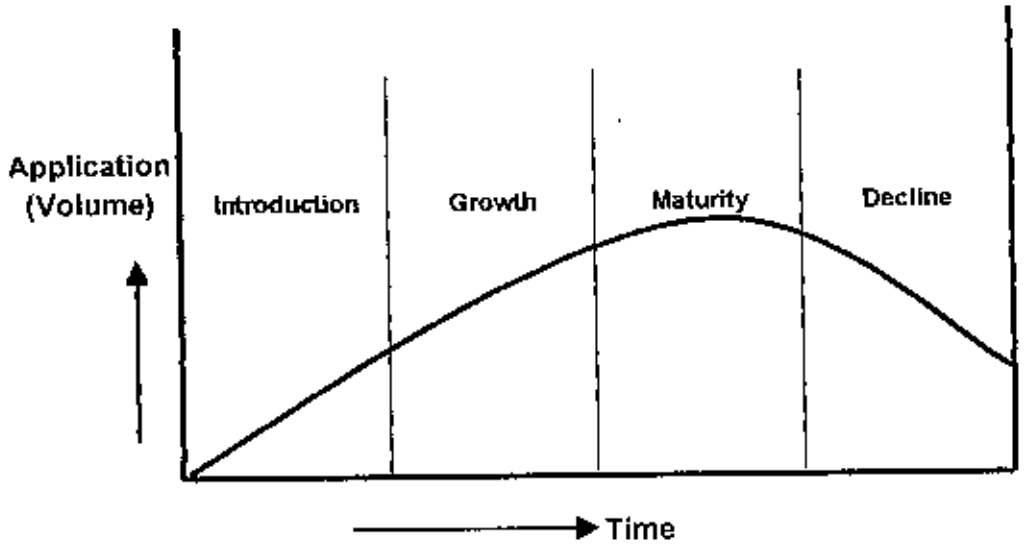

Fig : Technology Life Cycle

When a technology (for example, a product or a process) is innovated and thus introduced in the market, its volume of application normally increases with time. Its market share is expected to increase rapidly after the user identified its positive advantage (growth Phase). With the progress of time the rate of increase of its usage will decrease (i.e. the rate of its consumption will not increase as fast as during the growth phase). During this maturity stage, when it enjoys the maximum share, the pressure from other innovations will increase and technology will start loosing ground

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7.04 Assessment of Utilities

(iii) Requirement of Power

Sl	No of machine in each group	Power required for each machine (kw)	Total Power required for machinery (Kw)	Power reqd. for lighting & other purposes (Kw)	Total power requirement (Kw)
(a)	(b)	(c)	(d=b*c)	(e)	(f=d+e)

(iv) Availability of Power

Sl	Available power from PDB/REB (kw)	Power from own source i.e. from Standby Generator	If the standby power is 10% of the total power (f), accept the project otherwise reject the project
(g)	(h)	(i)	(j)

7.05 Choice of Technology

Rated capacity	Actual capacity utilization			Break Even point	Reason for choosing Technology
	40%	60%	70%		

7.06 Technology Evaluation and Pricing

Information of the Technology to be purchased				Parallel/upgraded Technology		Reason for choosing the machine
Name of the machinery	Manuf. company	Capacity	Price	Capacity	Price	

7.07 Assessment of Humnware

Sl. No.	Type of machinery	Skill required	Skill available of the manpower who will maintain/repair it				Decision regarding capability of Humnware
			Name	Operating skill in similar m/c	Maintenance skill in similar m/c	Professional knowledge