Economic Feasibility of ART Center in Cocoon Hospital

By

Urvashi Chaudhary

Dissertation submitted in partial fulfillment of the requirements of the degree

MBA Hospital and Health Management

Academic year, 2017-2019

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Abstract

Title: Economic Feasibility of an ART center in Cocoon Hospital

Keyword: ART, Net Present Value, Economic Feasibility, Market Feasibility

Background: In today's scenario, infertility is becoming a greater cause of concern. As per the study conducted by Inito, 10-14 percent of Indian couples suffer from infertility which accounts to around 27.5 million. Worldwide more than 80 million of population suffers from infertility. Cocoon is a maternity hospital; a healthcare unit of RJ Corp was established in 2012. Taking into consideration its vision and mission and the aim to expand and excel in its services, the management team is planning to set up ART Center in its premises. Feasibility study is conducted to know about the practicality of a proposed project.

Objective: To assess the market feasibility through Porter's Five sources and SWOT

To assess the economic feasibility through NPV.

Methodology: The study design used was descriptive study design. The proposed feasibility study will be exploratory in nature. Combinations of qualitative and quantitative methods were used to map the viability for ART Center. Study Duration: 2 months (March 1, 2019- May 1, 2019). Study Tool: Structured questionnaire used for taking details from various IVF Centers in Jaipur. Sample size: 20 percent of IVF centers in Jaipur Primary research: The data on IVF was obtained from the IVF centers functional in Jaipur to determine the demand trend of the patients suffering from infertility and opted for ART. Secondary research: For obtaining the list of equipments required along with their approximate price, legal requirements to set up IVF Center. Sampling method: Convenience Sampling. Study analysis plan: The study aimed to determine the market feasibility by conducting a primary research on visited IVF centers present in Jaipur and demand estimation by calculating the average number of procedures held in the visited IVF centers in the month of January. Economic feasibility was determined by calculating the Net Present Value of cash flows for 4 years.

Results: Maximum number of IVF cycles is performed in the southern and the western region i.e. 37% and 35% respectively and 48 patients in total were there among whom some were referred from Cocoon hospital for IVF and rest asked about the IVF facility in the hospital. For the economic feasibility the value of NPV was Rs. 64, 82,673.

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Conclusion: From the study it was concluded that setting up an ART Center in Cocoon Hospital will be profitable as the NPV was Positive and also As can be seen that the in depth market analysis regarding the competitors and the overall target market tells us about the present day need of having an IVF center which will not only be beneficial for the society based on the increasing demands but will also be running successfully in our hospital

Declaration

I do hereby declare that, I am a student of 2nd year MBA Hospital and Health Management in IIHMR University, Jaipur, Rajasthan (2017-19).

I would like to state that I have done my dissertation from 1st Feb 2019 to 4th May 2019 from Cocoon Hospital. I have done dissertation on the topic "Factors for non – retention of patients for recommended surgical treatment" under the guidance of Dr. Priyanka Maan. I have completed my project for the completion of my degree.

This project has done by myself and not be submitted to other institute and University or the purpose of Award and Reward.

Urvashi Chaudhary

IIHMR University,

Jaipur

Acknowledgement

It is my extreme pleasure to present the dissertation report on “Feasibility Study of setting an IVF center at Cocoon Hospital” in the organization. I would like to extend my sincere thanks to all staffs that helped me out with project.

I express my deep gratitude to our project guide Dr. Priyanaka Maan for her guidance and constant supervision, and for providing support in completing the project.

I would also like to express my gratitude towards DR. SANDESH KUMAR for his kind co-operation and encouragement at each step of project.

Contents

List of Figures

List of Abbreviations

1) IVF – In Vitro Fertilization
2) ICSI – Intracytoplasmic Sperm Injection
3) IUI – Intra Uterine Injection
4) NPV – Net Present Value
5) ART – Assisted Reproductive Technology

Introduction:

Reproductive health is a state of complete physical, mental, and social well-being in all aspects relating to the reproductive system and to its functions and processes. It is very important for every person to have access to right healthcare treatment.

In today's scenario, infertility is becoming a greater cause of concern. As per the study conducted by Inito, 10-14 percent of Indian couples suffer from infertility which accounts to around 27.5 million. Worldwide more than 80 million of population suffers from infertility. As per the WHO, infertility is defined as a disease of reproductive system defined by the failure to achieve a clinical pregnancy after 12 months or more of regular unprotected sexual intercourse.

Cocoon is a maternity hospital; a healthcare unit of RJ Corp was established in 2012. Taking into consideration its vision and mission and the aim to expand and excel in its services, the management team is planning to set up IVF Center in its premises. Feasibility study is conducted to know about the practicality of a proposed project.

Feasibility study aims at rationally uncovering the strengths and weaknesses of an existing business or proposed venture, opportunities and threats present in the natural environment, the resources required to carry through, and ultimately the prospects for success. The current study includes Technical, legal and financial feasibility.

Literature Review

Arushi Vij ,2015 As per the feasibility study on IVF center conducted in 2015, IVF success rates are more in case of women who are below the age of 35 years of age. The Gynecology department witnessed a footfall of nearly 16423 patients in the past four months of which the

Paridhi Mehra, 2011 According to the feasibility study conducted on providing home healthcare solutions to patients undergoing IVF treatment, launching the new product for IVF patients will be highly beneficial to the organization and will have a probability of success. With the launch of this product, the company will not only have the first mover advantage but will also be able to capitalize on the growing trend of infertility clinics across the country.

R.K. Adageba, E.T. Maya,2012 According to the study conducted on 'Setting up and running successful IVF program in Africa, it is difficult in a region because of serious infrastructural challenges coupled with low levels of income is a daunting task.

Quaid –E-Azam, Ali Jinnah, 1944 As per the feasibility report of the day care center following were taken into consideration: Competitor analysis, marketing plan, financial statements and their analysis. The conclusion came out that the project would enhance the participation of women in reaming the economic activities and would also give boost to the emerging demand of industrialization.

Juneau, Anchoage, 1999, The KANA group conducted a preliminary assessment of the feasibility of constructing, owning, and operating a child care facility in Kodiak. Methodology used: The study team gathered information from a variety of sources through interviews and secondary research. A three-part model was developed to assess the feasibility of a KANA child care center. First, a demand estimate on current unmet demand and the potential to capture additional market share. Second, estimates were created utilizing different ratios of full-time and part-time child care, various age mixes of children, and the associated revenue and staffing requirements. Third, operating expenses were estimated for two different sized facilities (40 children and 80 children).

Fox, Steven M., Capt, USAF, MSC, This study examined the feasibility and potential benefits of implementing a blood management program at the Mike O'Callaghan Federal Hospital (MOFH). The study evaluated two major courses of action for potential implementation of blood

utilization practices. Analyses indicated that implementation of a full-scale program in the surgical setting would not significantly impact the MOFH from a strict cost-benefit standpoint.

Jacobs, Mercer: As per the study conducted on Feasibility of Hospital based blood banking the findings were that the cost per suitable blood unit produced was US$12.4; at an HIV test sensitivity of 93.5% during the study period, discounted financial benefits of the interventions exceeded costs by a factor of between 17.2

Research Question

What is the market and economic feasibility of setting an IVF Center in Cocoon hospital, Jaipur?

Objectives

- To assess the market feasibility thorough Porter's five forces and SWOT analysis
- To assess the economic feasibility through NPV

Methodology

- Study Design: Descriptive Study
  The proposed feasibility study will be exploratory in nature. Combinations of qualitative and quantitative methods were used to map the viability of ART center.
- Study Duration: 2 months (March 1,2019- May 1, 2019)
- Study Tool: Structured questionnaire used for taking details from various IVF Centers in Jaipur.
- Sample size: 20 percent of IVF centers in Jaipur

Primary research: The data on IVF was obtained from the IVF centers functional in Jaipur to determine the demand trend of the patients suffering from infertility and opted for ART

Secondary research: For obtaining the list of equipments required along with their approximate price, legal requirements to set up IVF Center.

- Sampling method: Convenience Sampling
- Study analysis plan: The study aimed to determine the market feasibility by conducting a primary research on visited IVF centers present in Jaipur and demand estimation by

calculating the average number of procedures held in the visited IVF centers in the month of January.

Economic feasibility was determined by calculating the Net Present Value of cash flows for 4 years.

Phases of the Study:

The study was carried out in different phases. In a hospital which is well known for its Obstetrics and Gynecological services, having an IVF treatment facility is supposed to be beneficial in long run. Taking into consideration the patient foot-fall in especially gynecology department the feasibility study was conducted for opening an IVF center at Cocoon Hospital.

Phase 1: Market research involving the internal and external market scanning.

Phase 2: Assessment of technical requirements in terms of equipment's and manpower and location feasibility

Phase3: Calculating the Economic feasibility of the project.

Phase1: Market Research Feasibility

When beginning with the market feasibility following parameters were included

2.1 Need Analysis
2.2 Competitor Analysis

2.1 Need Analysis

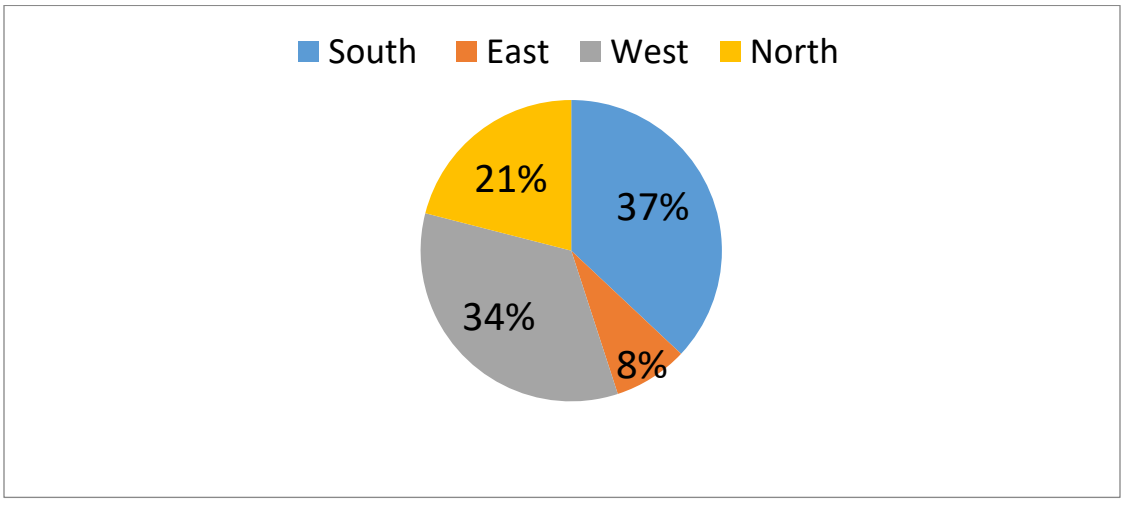
The India IVF services market is developing steadily and is projected to grow at a high rate, owing to increase in awareness among the populace with respect to infertility and programs that are projected to develop patient confidence. High success rates of conception associated with IVF also accelerates the market growth. Furthermore, high prevalence of infertility among population, change in lifestyle, growth in acceptance of ART and IVF, increase in awareness about IVF among the non-metro regions have driven the adoption of IVF services in India.

As per the study conducted by E&Y in 2015, states that there are 27.5 million couples at their reproductive stage suffering from infertility. Out of which 270,000 (1percent of infertile couples) couples come forward for evaluation and among them 65000 couples prescribe and avail the IVF treatment.

Indian Demographic Data

Population	1,281,935,911 (July 2017 est.)
Age Structure	0-14 years: 27.34% (male 186,087,665, female 164,398,204) 15-24 years: 17.9% (male 121,879,786, female 107,583,437) 25-54 years: 41.08% (male 271,744,709, female 254,834,569) 55-64 years: 7.45% (male 47,846,122, female 47,632,532) 65 years and over: 6.24% (male 37,837,801, female 42,091,086) (2017 est.)
Birth Rate	19 births/ 1000 population

Chart1: Geographical Distribution of IVF Cycles performed in India



Source: https://www.ey.com/Publication/vwLUAssets/EY-call-for-action-expanding-ivf-treatment-in-india/$FILE/EY-call-for-action-expanding-ivf-treatment-in-india.pdf

Explanation: The above pie diagram depicts that maximum number of IVF cycles takes place in the Southern region of India that is 37%. Whereas it is 21%, 34% and 8% in North, West, and East respectively. As it can be seen that after South it is west wherein 34 percent of IVF cycles takes place thus clearly shows that there is an increased demand for IVF treatment in North which is an advantage for the hospital.

Table2: Infertility Prevalence among Currently Married Women(20-49yrs) Women with Marital Duration of ≥ 2 yrs. in the Indian States and Selected High Prevalence Districts,2015-16

States/Districts	Ever experienced infertility (%)			Currently infertile (%)	Women (n)
	Total	Primary	Secondary		
States	8.8	6.7	2.1	4.6	532100
Jammu & Kashmir	9.0	7.1	1.9	3.5	13564
Himachal Pradesh	5.2	3.8	1.3	3.5	8917
Punjab	9.5	7.5	2.0	3.6	18375
Uttarakhand	5.4	3.8	1.5	3.7	11166
Haryana	12.0	9.2	2.8	3.6	18304
Rajasthan	5.2	3.8	1.4	6.0	35701
Uttar Pradesh	10.8	8.5	2.2	4.6	74327
Bihar	13.3	11.3	2.0	4.6	39157
Sikkim	8.0	5.8	2.1	2.4	3781
Arunachal Pradesh	3.1	2.1	1.1	5.8	12666
Manipur	7.4	3.3	4.1	3.1	7922
Mizoram	5.0	2.4	2.7	2.8	6281
Tripura	6.7	4.3	2.4	3.1	3467
Meghalaya	2.6	1.4	1.0	2.5	5546
Assam	5.0	2.8	2.1	3.6	25508
West Bengal	14.8	12.1	2.6	3.5	18250
Jharkhand	9.8	7.1	2.8	6.0	23341
Orissa	7.9	6.4	1.5	5.7	24144
Chhattisgarh	11.9	9.5	2.4	5.8	15513
Madhya Pradesh	7.3	5.3	2.0	4.8	40662
Gujarat	6.7	4.4	2.3	5.2	21252
Maharashtra	8.5	6.4	2.1	4.4	28869

As per 2015-16 data, the above table shows that there were 6 percent infertile women in Rajasthan which is more than most of the states in India. Hence generating a need to have ART facilities in Rajasthan to provide solution by increasing the pregnancy rate in the state.

2.2 Competitor Analysis

According to the study and literature review the analysis approach was to do the Porter's Five Forces and SWOT analysis of the proposed IVF center based on the extensive market research and in depth analysis of the services we shall be providing.

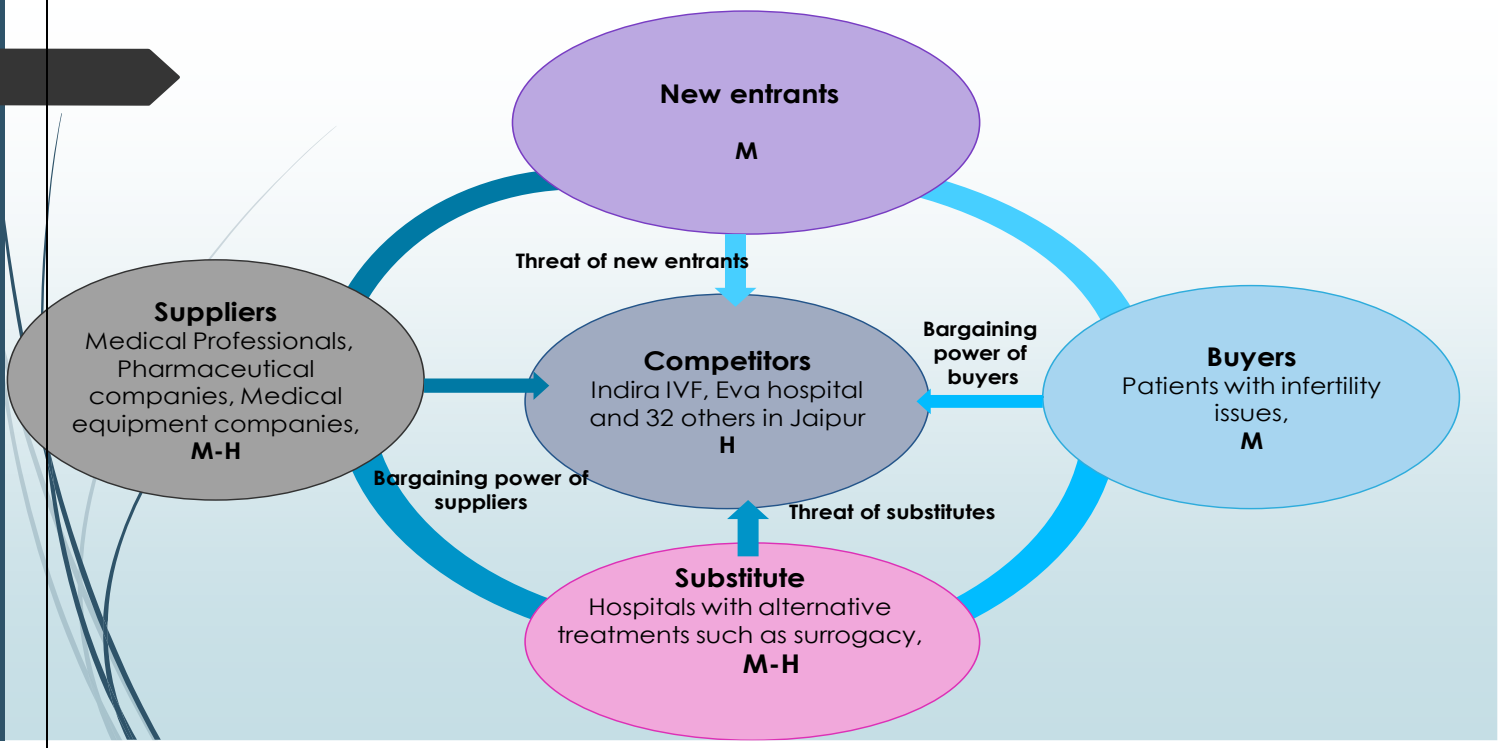
Stakeholders:

- Internal Stakeholders-
  - Gynecologists
  - Embryologists
  - Urologists
  - Andrologist
  - Pharmacists
  - Nurses
  - Nursing Assistants
  - Administrative Staff
  - Catering Staff
  - Dieticians
  - Electro Biomedical Engineer
  - Paramedics
- External Stakeholders –
  - Medical Equipment devices Companies
  - Pharmaceutical Companies
  - Hospital IVF center planning consultancy
  - Insurance company for the insurance of equipments
  - Referral Hospitals
  - Referral Clinics
  - Departments of Regulation and Licensing - ICMR
  - Caregivers and family members

- Media
- Health Educators
- Competitors

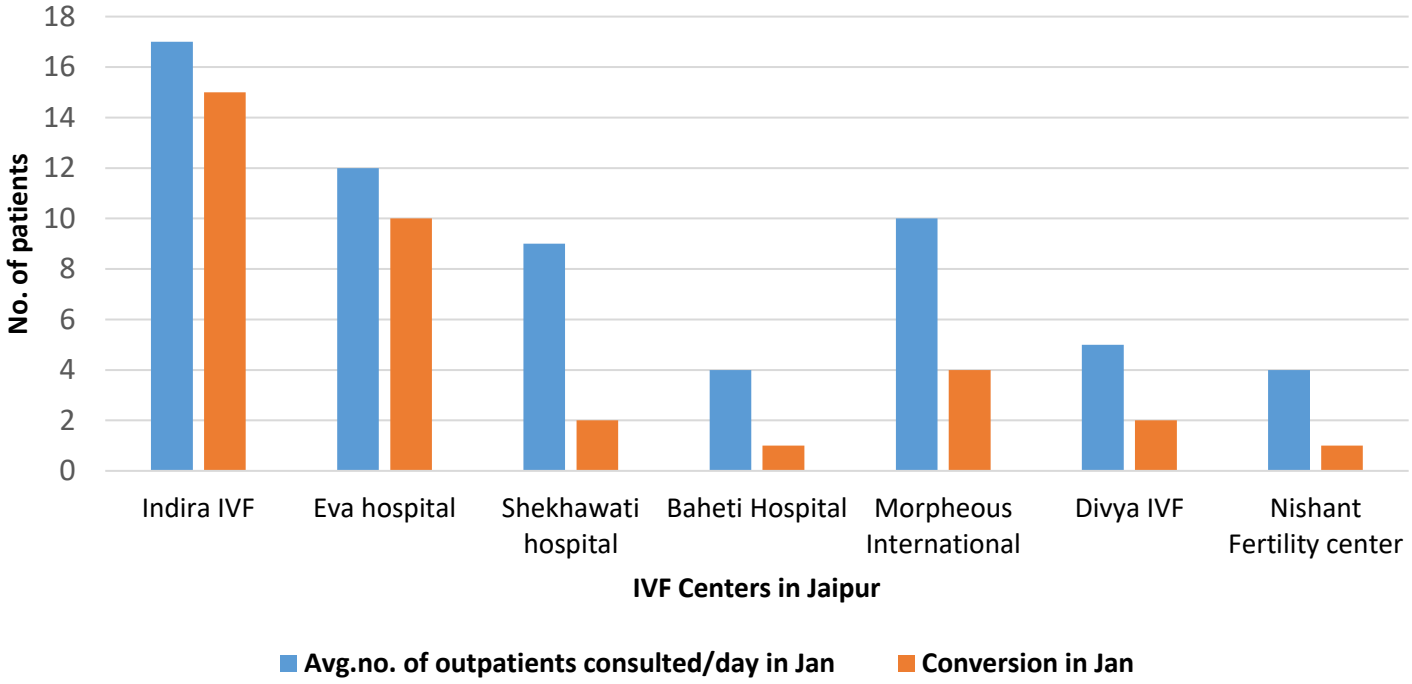
- Interface Stakeholders-
  - CEO of RJ Corp and the Top Managers

Porter's Five Forces



Description: As per the Porter's five forces analysis, the Bargaining Power of Suppliers is Medium to High where the Suppliers will be Medical Professionals, Pharmaceutical Companies and Medical Equipment Companies. Our Competitors are the IVF centers currently functional in Jaipur and nearby areas such as Indira IVF, Eva Hospital etc. The bargaining power of buyers will Medium and the target customers will be the male and female suffering from reproductive problems and facing infertility issues. The substitutes to the IVF centers are the Hospitals with alternative treatments like surrogacy will be having the bargaining power from Medium to High.

Chart 1.2: No. of Patients Consulted and conversions done for IVF treatment in the month of January, 2019



Interpretation: As per the Chart 2, Maximum number of consultations and conversions in January were held at Indira IVF Center that is 17 and 15 respectively. Whereas Baheti hospital and Nishant Fertility center experienced the least no. of consultations and conversions that is 4 and 1 of both theses hospitals respectively.

Table 1.3: Query for IVF coming to Cocoon Hospital:

Months	No. Of Patients
February,2019	11
March, 2019	9
April,2019	13

Table 1.4: Patients referred for IVF treatment from Cocoon Hospital

Months	No. Of Patients
February,2019	5
March, 2019	3
April,2019	7

Phase 3: Assessment of technical feasibility in terms equipments and manpower needed

Table 2.1: Manpower needed as per three shifts

Manpower	**Shifts**			**Leave Reserves**	**Total Staff**
	Morning	Evening	Night		
Embryologist	1	-	-	1	2
Jr. Embryologist	1	-	-	1	2
Urologist	1	-	-	1	2
Sonologist	1	-	-	1	2
Andrologist	1	-	-	1	2
Anesthetist	1	-	-	1	2
Gynecologist	1	1		1	3
OT Technician	2	2	2	1	7
Paramedical Staff	6	-	-	1	7
Nurse	3	-	-	1	4
Lab Technicians	5	-	-	1	6

Table 2.2: Equipment List of IVF

S.no.	Name of the Equipment	Quantity	Departments
1	Digiblock Test Tube Warmer	3	OT, Urology and Andrology lab
2	Microscope Magnus MLX Plus	1	Andrology lab
3	Nikon SM2	1	Urology
4	Narishge Micro manipulator	1	
5	Crash cart trolley full SS	1	
6	Lab Workstation	1	Urology lab
7	Nikon E200 – Bino	1	Urology lab
8	Nikon E200 – Trino	1	Urology lab
9	OT Light	1	
10	Centrifuge remi r4c	1	Andrology lab
11	USG	1	
12	Anaesthesia Trolley Equipped	1	
13	Multi Para monitor	1	
14	Labour Obstetrics table complete S.S with Mattress	1	
15	Instrument Trolley	3	OT, Urology and Andrology
16	Desktops	3	Pharmacy, reception, doctors chamber
17	General semi fowler bed	10	
18	Bed side locker	10	
19	Over bed table	10	
20	Scrub station and hygiene equipment		
21	Craft Suction Unit		OT
22	Hera cell CO2 Incubator	3	
23	Examination Table		

Phase 4: Economic Feasibility of the Project

Economic feasibility of a new or extended project can be determined by calculating the Net Present Value of the project. If the calculated NPV of the project is positive then it is profitable to go ahead with the project and if the NPV is negative then it is not profitable hence should not proceed for the project. To determine the economic feasibility of the project the following steps were taken into consideration:

Step1: Determining the cost of equipment and manpower

Step2: Setting the prices of the procedures

Step3: Calculating the cash flows for four years

Step4: Calculating the Net Present Value

Step 1: **Determining the cost of equipment and manpower**

S.no.	**Name of the Equipment**	**Quantity**	**Price per qty**	**Total Cost**
1	Digiblock Test Tube Warmer	3	30000	90000
2	Microscope Magnus MLX Plus	1	35000	35000
3	Nikon SM2	1	170000	170000
4	Narishge Micro manipulator	1	2200000	2200000

5	Crash cart trolley full SS	1	15000	15000
6	Lab Workstation	1	30000	30000
7	Nikon E200 - Bino	1	140000	140000
8	Nikon E200 - Trino	1	140000	140000
9	OT Light	1	35000	35000
10	Centrifuge remi r4c	1	18000	18000
11	USG	1	500000	500000
12	Anaesthesia Trolley Equipped	1	120000	120000
13	Multi Para monitor	1	35000	35000
14	Labour Obstetrics table complete S.S with Mattress	1	40000	40000
15	Instrument Trolley	3	40000	120000
16	Desktops	3	50000	150000
17	General semi fowler bed	10	8000	80000
18	Bed side locker	10	3000	30000
19	Over bed table	10	3500	35000

20	Scrub station and hygiene equipment	1	45000	45000
21	Craft Suction Unit	1	120000	120000
22	Hera cell CO2 Incubator	1	275000	275000
23	Examination Table	2	25000	50000
24	Suction Unit	1	16000	16000
25	Endoflator	1	65000	65000
26	Monitor	1	30,000	30000
27	UPS with generator backup	2	6,000	12000
29	ECG Monitor	1	42,000	42000
30	Oocyte Aspiration Pump	2	120000	240000
31	Refrigerator	2	50,000	100000
32	Laminar Hood with CO2 incubator	1	112,000	112000
33	Laminar Hood	1	35,500	35500

Manpower Costing Table:

Manpower	**Quantity**	**Assumed Fixed cost per month in (Rs)**
Physicians on call plus routine OPD @25000	1 * 12	70000/-
Nurses @15000	3 * 12	45000/-
Lab Technicians @ 20000	5	100000/-

Sonographers@ 80000	1 * 12	960000/-
OT technicians @ 30000	4 *12	1440000/-
Embryologists @ 10,000 per day	15 days – 6 months(180 days)	1,50,000 /-
Andrologist @ 60000	1 *12	7,20,000/-
Housekeeping Staff@ 5000	3*12	1,80,000/-
office site area @ Rs.263/sq. ft.	10000 Sq. ft.	26,30,000/-
Lab equipments	32	5125500/-
Depreciation@ 10%		512550/-
Maintenance @ 4%		205020/-
Construction Cost		5,00,000/-
Marketing expenses		2,00,000/-
Hospital Consultancy Charges		4,00,000/-
Total Cost		69,43,070/- (Excluding Electricity charges)

Step2: Setting the prices of the procedures

The prices of the procedures were set for four years keeping in mind the competitors pricing. For the first two years, the prices of the procedures were fixed at price lower than the competitors'

price in order to increase market share and for the next two years prices were fixed higher than the competitors' pricing.

Table 4: Per Procedure Pricing

Time Period	IVF (Rs)	IUI (Rs)	ICSI (Rs)
Yr1	150000	4000	300000
Yr2	150000	8000	300000
Yr3	200000	10000	350000
Yr4	200000	12000	400000

Table 5: Number of Procedures per year

PROCEDURE	IVF	IUI	ICSI
Yr 1	6	36	12
Yr 2	9	54	18
Yr 3	12	72	24
Yr 4	15	90	30

The number of procedures in year 1 is the average of the number of procedures conducted in the month of January in seven IVF centers that are Indira IVF, Shekhawati hospital, Divya Fertility center, Nishant Fertility, Morpheous International, Eva Hospital, and Baheti hospital.

Step3: Calculating the Cash Flows for Four Years

Table5: Projected Cash Flow Statement for Four Years

		Year 1	Year 2	Year 3	Year 4
	Particulars	**Amt.(Rs.)**	**Amt.(Rs.)**	**Amt.(Rs.)**	**Amt.(Rs.)**
	Cash flow from operating activities				
	Cash receipts from customers	4644000	7182000	11520000	16080000
	Cash paid to suppliers and employees	-60400000	-6100000	-6110000	-6200000
	Cash generated from operations	-496000	2432000	7810000	12880000
	Net cash flow from operating activities	**-496000**	**2432000**	**7810000**	**12880000**

	Cash flow from investing activities				
	Additions to equipment	-5125500	-	-	-
	Construction cost	-500000	-	-	-
	Office site area	-2630000	-	-	-
	Net cash flow from investing activities	-8255500	-	-	-
	Cash flow from Financing activities				
	Cash proceeds from long term borrowings	6191625	-	-	-
	Interest on loans @ 10% compounded annually		-2489744	-2489744	-2489744
	Net cash flow from financing activities	**6191625**	**-2489744**	**-2489744**	**-2489744**
	NET INCREASE/DECREASE IN CASH				
	Cash at the beginning of the period		-2559875	-2617619	2702637
	Cash at the end of the period	**-2559875**	**-2617619**	**2702637**	**13092893**

Step4: Calculating the NPV

Net Present Value is calculated by taking the inputs from four years cash flow statement. Discount Rate is 10% which is the interest rate on long term borrowings. Formula of calculating NPV is

$$\frac{R_t}{(1 - i)^t}$$

Where, R_t = The net cash flow i.e. Cash Inflow – Cash Outflow, at time t

t = Time of the cash flow

i = The discount rate i.e. the return that could be earned per unit of time on an investment with similar risk.

In this project NPV is calculated on Excel

Discount Rate		10%				
Time Periods		1		2	3	4
Cash Flows		-2559875		-2617619	2702637	13092893
NPV	**6482672.69**					

Interpretation: As per the data shown in the table, the NPV of the project is positive that is Rs.6482672.69

This clearly infers that since NPV is positive so it will be profitable to set up and operationalize IVF center at Cocoon hospital.

Suggestions

1. Based on the Study results which show the positive NPV of cash flows for four years, it would be feasible and profitable for the organization to come up with the IVF Center and make it operationalize.
2. External Marketing team of Cocoon to hold more health and awareness camps discussing the infertility issues.
3. This facility will also help in increasing the market share as it will be providing all the services related to obstetrics and Gynecology under one roof hence meeting the demands of the customers (patients).
4. ART will be an extension of the operation theatre so every effort must be taken to maintain the sterility in the lab. Strict discipline must be exercised with regards to hand washing and maintaining the parameters in the laboratory.

Conclusion

The ART laboratory plays a crucial role in the treatment of infertile couples and setting up a state of the art laboratory is no easy task. To setup a quality ART laboratory, the combination of three key areas will provide the main framework. The main goal of laboratory should be to provide a safe and secure environment while maintaining optimal parameters for embryonic development.

The feasibility of having an IVF center is quite high based on the extensive research and findings. As can be seen that the in depth market analysis regarding the competitors and the overall target market tells us about the present day need of having an IVF center which will not only be beneficial for the society based on the increasing demands but will also be running successfully in our hospital.

The facility is already a flourishing mother and child hospital and keeping in mind the number of diagnosed cases of infertility prevailing in the country it can be said that the center will function well once started. The high costs involved in offering such services are the consequences of expensive infrastructure, drugs required for inducing multiple ovulations and maintenance expenses.

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