

## CHAPTER 4



### RESEARCH METHODOLOGY

The literature review as mentioned in the previous chapter provided the research a basic to develop the methodology for present study. This chapter comprises of three sections : conceptual framework, methodology, source of data, and data analysis.

#### 4.1 Conceptual Framework

Technologies for medical services are freely imported with special import tax exemption in accordance with investment promotion policy. This has resulted in a competition in purchasing and importing high -cost equipment items, and imbalance utilization of technology. As a result, the health care technology is **over supply**.

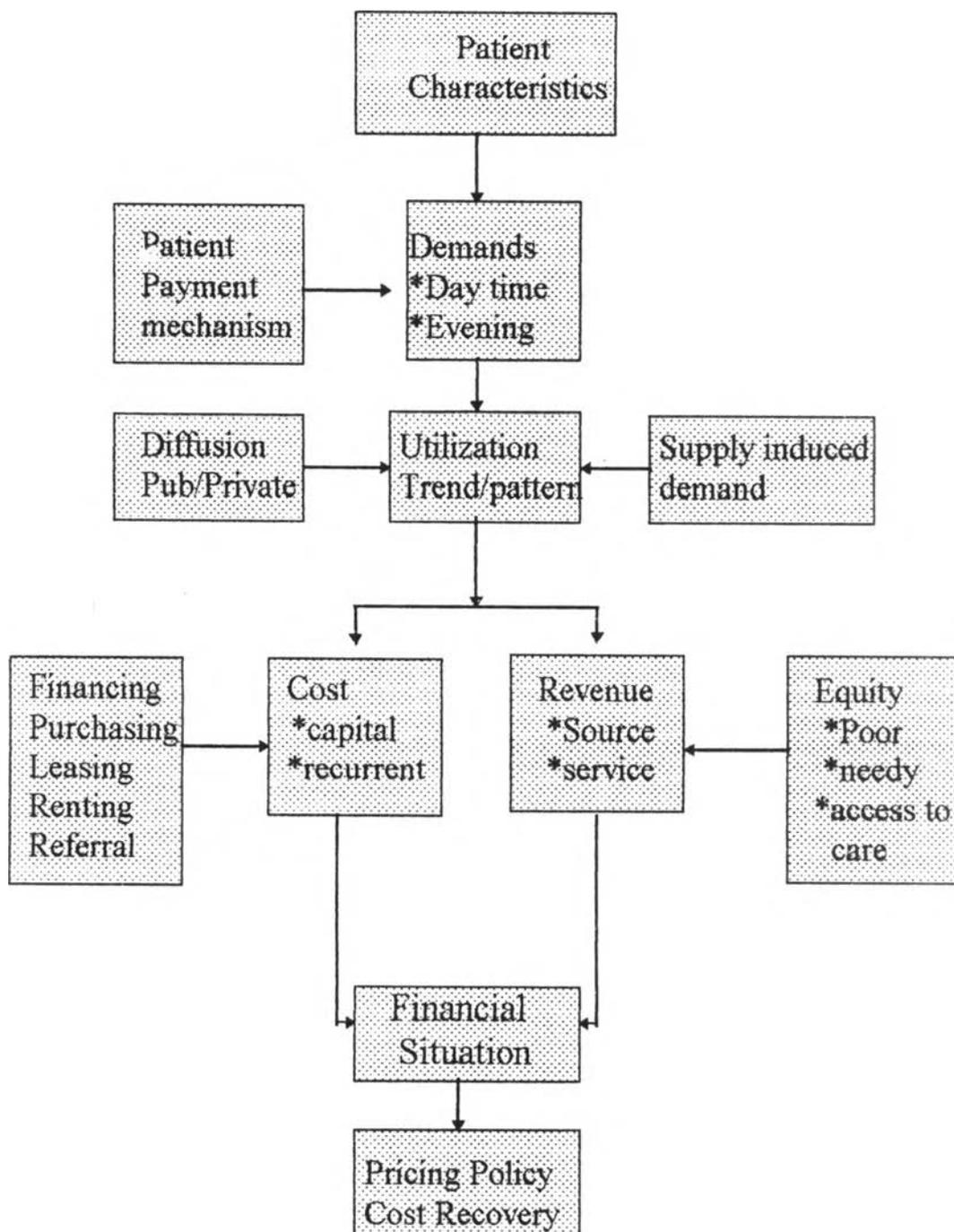
The phenomenon of the “*physician-entrepreneur*” has been described. Physicians become entrepreneur when they purchase MRI unit which they expect a profitable return on investment. New technologies imported for curative care are generally expensive as they are patented.

Besides, an investment is required for personnel development so that the new equipment will be efficiently used. Their use is normally complicated and unknown dangerous side effects have to be prevented. There are several factors must be considered when will purchasing the MRI unit is to remain variables :

1. A less expensive MRI unit can be purchased.
2. Deferred payments of creative financing can be sought in the financial market place on negotiated from the company.
3. The unit can be housed in a less expensive facility. Even though, renovations are often more expensive than new construction, locating the MRI scanner in an existing office can effect substantial saving because of the elimination of land purchase costs.
4. Additional diagnostic techniques can be added to the facility to supplement the income available and therefore, adequate third-party reimbursement is available.
5. One can pursue nonfederal third-party reimbursement (made through insurance companies, etc.)

Another factor concern is the financing to purchase the MRI unit, then the costs of land, construction, and personnel must be added to the costs of the equipment. Intelligent case load projections must be established, the operational hours of the facility set, and break-even charges calculated.

Figure 4.1 Conceptual Framework



However, some importer of this technology are tried to sell the equipment to smaller or lower capitalized hospitals by leasing or renting. Once funding assistant has been consumed, “white elephants” loom in the horizon is source from the donor country. In addition, referral from developed country hospitals who have upgraded are then purchased by developing country hospitals on a “second hand” basis.

In terms of “*supplier induced demand*” has been described. Once it has deemed feasible to generate income (either from the patient directly or from alternative sources) from MRI procedures. Patient throughput has a major impact on the economic feasibility of MRI technology.

Some may have over consume or inappropriate used technology. In other word, utilization pattern are base on population served. It can be consider by a session per week of operation. Most of MRI’s installation are aimed to generated income on services that require hospitals seeking to introduce a new service to response a demand. For example, they expanded the service hour to whole day services (or evening clinics).

Even the most efficient hospitals would be hard pressed to generate sufficient surplus operating from MRI and to cover the operating costs. In this climate may eventually lead to increasing demand. Because the evening clinics are the payer by insurance coverage or third- party payment.

It is important to describe that the payment mechanism and characteristics of patient have assess to MRI services. The people in the urban and rural areas have different opportunity in getting assess to MRI services. This clearly indicated the inequity in accessibility to health care technology.

In order to the payment status of patient using MRI services is paid from their own pockets. Such as civil servant and third-party payers who can be fully reimbursed from the Ministry of Finance. Poor people were low income card holders were deducted using sliding scale up on the social worker discretion.

It means that the poor and the low income could not assess as equal MRI services as the civil servants and their third-party payment. This clearly reflects unequal treatment for equal needs.

For the purposes of this study, most of them are concerned with financial aspects. The financial data from MRI’s provider to estimate cost of production, cost behavior, cost-recovery and break-even output. Under capital cost, I including the cost of the Magnet, unit cost of the facility, and any special heating, cooling, or radio frequency shielding.

Unit cost of some facility require expensive cost of installed site and special ferrous shielding to protect specialized equipment. On the

other hands, some sites or new constructions can be done much more economically. It regarding to types and magnetic field strength.

Due to the magnetic field is influence on space of the MRI site. It recognizes that resistive and permanent magnet installations require less space than superconducting magnet installations, additional magnetic shielding is required to protect the room from outside radio frequency interference, a special shielding room included in the purchasing price of the magnet.

Operation cost or recurrent cost can be categorized into fixed costs, variable expenses, and indirect operating expenses. Under fixed operating expenses are included expenses for maintenance, magnet utility power (electrical or cryogenic), processing power personnel and miscellaneous.

Variable expenses are consumable associated with each case. It would include the cost of film, medical supplier, paper products, magnetic disc and tapes, and patient gowns and cloth products. It seems likely that current examined into the use of contrast material may include cost for these injectible contrasts.

Indirect operating expenses, this category covers administrative costs and others. The point at which recovers the costs compared to the revenue (productivity) is determined by a break-even analysis. Graphically, it estimates the cost of the MRI operating as a function of the number of scans done per day (or per year) and from these data determines the charge per patient to recover these costs.

Further more, it seems that the optimum output depends on charges costs which different in the nature of the pathology examination. Therefore, when considered the cost and recovery of MRI services, it necessity to considerable on pricing adjustable. In order to, ability to paid or bad debt which noncollectible influence to the cost recovery.

In case of the unit cost per case is higher than net revenue in some MRI center. There is also an urgent need to improve the efficiency or subsidize from the government. Finally, this study is mainly concerned with current financial situation in Thailand in order to economic crisis and makes recommendation for further study.

## 4.2 Method of analysis

This is an analytical descriptive study which aimed to assessment of MRI utilization, financial aspects and due to their diffusion. Both public and private hospitals / centers in Thailand, which have installed MRI units, will be included in this study.

The hospital will be selected purposively from the public and private hospitals and centers for public hospital will be classified into university affiliated hospital and MOPH hospital. For private part, I separated into private hospital and private diagnostic center.

Within each group, both public and private, I selected one hospital / center which located in Bangkok and one outside Bangkok. In the medical school hospital in Bangkok will be compared due to their different in time service (evening clinic / private practice).

Therefore, two hospital / center which MRI installation will be selected for hospital level data collection. Retrospective and retrospective data collection will be control observation study is 100 consecutive patient charts will be sampled. The rest of data will be gathered by key informant interview of the administrators of the hospital and by indebt interview of physicians utilizing MRI facilities.

In conclusion, this study designed to describe the financial sustainability of MRI which emphasize more for the public side. Therefore, cost recovery and break- even analyses were used and the results of this will be taken as granted for the important implication.

### 4.3 Data

All the data used in this thesis are primary and secondary data obtained from many sources.

#### Source of data

a) Primary data / hospital level data : source from record /clinical and administrative databases.

1.Type of hospital, level, teaching status, size, ownership, location (capital / city), catchment area (by population and sqkm. if possible)

2.Type and brand of MRI, when installed, number of patient being processed per year

3.Characteristic patients by age, sex, insurance coverage (financing scheme), in /out patient, within or outside city

4.Distribution of areas imaged, by organ

5.Costs (acquisition, siting and operating), charges per procedure

b) Secondary data : the exist data source from the FDA, MoPH and Department of Radiation Protection, Medicine Science Division

1. Diffusion of MRI (year of entry, type and brand of MRI, description of the receiving institutions by type, level, size, ownership, teaching status, location)

2. Description of financial mechanism to purchased high technology equipment (including tax exemption privileges for research institutions, certificate of need and time trends in usage (productivity) of MRI.

#### Data collection

Two level of data collection will be carried out, firstly secondary data for the general status of MRI (diffusion ) study and second, hospitals / centers data for the utilization pattern study. Much of the data for the secondary data will be source from existing document, supplemented which key informant interviews, purposive sample as needed.

It is fortunately that the national data had already been surveyed by Department of Radiation Protection, Medicine Science Division. For the hospitals / centers level data collection, sampling based on access to patient records and hospital data will be done. Data were collected retrospective from the medical records of the patients scanned in March, 1998.