

Physicians and Strategic Decision Making Processes in Hospitals

THESIS

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**Under the Supervision of
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CERTIFICATE

This is to certify that the thesis entitled **Physicians and Strategic Decision Making Processes in Hospitals** and submitted by **Dr. A. LINGAIAH, ID No. 2006PHXF006** for the award of Ph.D. degree of the institute embodies the original work done by him under my supervision.

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ABSTRACT

This research is in the area of physician leadership and management. In most organizations, leaders and managers are seen as having different roles—leaders focus on skills that help develop people’s abilities, while managers are more concerned with keeping the organization running as efficiently as possible. In the ever-changing world of healthcare today, most Physicians will need to possess both leadership and management skills. Physicians who are at the-coal face in the management of the ward and constitute the largest number of operational managers in hospitals. As organizations restructure for cost efficiency, Physicians are asked to take on more responsibilities to meet the priorities of the organization. The Physicians role links management and employees, facilitates and ensures the provision of quality of care and is pivotal in the meeting of organizational goals and objectives. Many researchers are also state that substantial changes in the healthcare system have evolved the role from being just an experienced member of hospital with excellent clinical skills to one that involves dealing with the complexities of being an effective leader and manager.

The main focus of this research focused on broad range of issues with collection and analysis of diversity of information in the field of strategic decision making processes in Indian hospitals. The work concentrated to study the intensity of participation of physicians in strategic decision making processes and explores the functions of these decision contents and their execution. It shall also involve development of efficient methods and their implementation aspects as explained in the objectives section. The specific objectives of this research was to investigate and identify various constituents of external and internal environments which impart the formulation and adoption of strategy for hospital services, to examine the intensity of participation of physicians in strategic decisions, to explore the functions of strategic decision contents and the extent of their execution.

In keeping with the brief literature review and identified research gaps in the early stage of work, this research work carried out an extensive literature review on strategic decision making, organizational and marketing strategy issues, marketing mix in hospital setting,

measures and approaches involving physicians in hospital decision making, effect of their involvement on strategies, decision outcomes, patient care and satisfaction. The exploratory and descriptive research design was adopted due to the nature of the research problem. The sample was drawn from various private hospitals. Based on the literature review and perceptions on research problem the questionnaire was designed and a pilot survey was conducted. Before the actual survey for the study was carried out, the questionnaire was pre-tested on 40 physicians and 20 executives working in various private hospitals in Hyderabad, Telengana State. These selected candidates have diversified characteristics in using strategies and participated in hospital activities. Physicians and executives were also asked to identify and rate the organizational and marketing strategy factors and also the personal strategy and patient satisfaction factors which they perceive were important during the making and execution of the decisions and based on their perception. Based on the findings of this pilot study, the survey instrument was improved and administered to get 221 samples. Appropriate measures and statistical test were performed on the data and the results were presented in three parts relate to the research questions that guided the study. The independent variables represented by marketing mix strategy components, namely health service, pricing, distribution, promotion, physical evidence, process, and personal strategies and dependent variable which represented by patient satisfaction were analyzed. The study also focused on examining the relationship between marketing strategy and organizational strategy in the context of private hospitals. The results showed that an influential relationship between these strategies does exist; that this influence derives from several concepts related to both strategy types, and that the interactions among these concepts are both complex and diverse. An exploration of a strategic orientation continuum and its application in health care was conducted during the course of this research. Findings indicated that when marketing strategy and organizational strategy are related to the strategic orientation continuum, the strategic decision makers showed uncertainty and indecisiveness about various organizational characteristics. Using Data Envelopment frontiers the physician's efficiency, the technical and scale efficiency in decision making was evaluated.

This research study is based on the analysis of various factors with large sample information. This makes it extensive study leading to a robust model. The pilot study, reliability analysis, ICC analysis, Pearson Correlations, Multiple Regression, t tests and Data Envelopment

Analysis with four models were conducted. The multiple tests performed ensured the instrument presented in this research has high external and internal validity for hospital sector. Analysis of strategies reveals that it is significant that a middle of perspective, in both organizational strategy and marketing strategy, was uncovered through the quantitative analysis. This perspective indicates uncertainty and indecision in both forms of strategy in private hospitals, and is an important finding from this research. The further empirical analysis elucidates the effect of physicians' involvement in strategic decision-making process on hospital decision outcomes, stresses the higher number of physicians in decision making improves the decision quality, commitment and understanding of the rationale of the decisions. The DEA model, measuring overall technical and scale efficiency partitioned by specialty and relative weight has identified the inefficient physicians. Physicians should use this information to adjust their 'style of practice' to get real productivity improvements. Another contribution is that the size of the estimated coefficients implies that the more important factors associated with efficient care were the physician practice characteristics, rather than the patient illness characteristics. This finding has important implications because physicians tend to believe that the most clinical inefficiency arises from differences in output mix-a variable that is beyond their control. That was not the case. The study found that on average, one high severity case 'could be traded' for five low severity cases. It offers physicians, managers and policy makers a new way of thinking about severity and prevention-one that considers the effect of severity on the marginal productivity of hospital resources. The research suggests that involvement of physicians in decision making process would enhance the understanding of intricacies and relevance of the various aspects of decision making to have successful decision outcomes, patient satisfaction and better hospital performance.

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Acronyms

ANOVA	Analysis of Variance
BCC	Banker, Chang, Cooper Model
CCR MODEL	Charnes, Cooper, and Rhodes Model
CEO	Chief Executive Officer
CFA	Confirmatory Factor Analysis
DMU	Decision Making Unit
DRG	Diagnostic Related Groups
ICC	Intra Correlation Coefficients
MD	Managing Director
RTS	Returns to Scale
RWT	Relative Weight
SDM	Strategic Decision Making Unit
SE	Scale Efficiency
TE	Technical Efficiency

CHAPTER 1

INTRODUCTION

1.1 Introduction

Health care is universally confronted with a growing demand for medical treatments and services, due to factors such as a 'greying' population, and raised standards for the quality of life (Fellegi, I. P., 1988; Goldstein S. M. and Naor M 2005). Health care has been an issue of growing importance for national or provincial governments (Miller, R. H. 1994). Many national and regional health care plans were made in the past to standardize the cost, quality, and availability of health care for all. Outlay specifications usually create a complex environment for local health care institutions. An interesting questions are, how the organizational, managerial and IT executions are conducted in hospitals, and how they influence each other, in terms of impact, alignment, and reinforcement. For instance, hospital management may focus on centralized financial control, decentralization of budgets, coordination of primary medical processes, or networking with other hospitals providing health care. The latter often occurs in combination with a focus on control of the total costs of medical and health care for specific groups of patient, often indicated as clients. In addition, a number of failures of the health care organizations, mergers, alliances and cooperatives were also reported (Ginter, P. M. Swayne, L. E. and Duncan, W. J, 2002). So more and more hospitals are attempting to improve the organizations and quality, customer satisfaction, and clinical outcomes or reduce costs through participation strategies. The key to the success of these strategies is the effectiveness with which the participants solve pressing strategic problems.

The hospital, in which physicians practice their craft, is being forced to consider more complex organizational arrangements than in past. Tomorrow's decisions about competitive advantage are increasingly influenced by today's changing medical practice and health care environment (Goldstein S. M., 2003: the traditional dual hierarchy or autonomous professional organization where administrators managed health care support systems and physicians practiced medicine is no longer able to meet the needs of the fast-evolving health

care market. Dramatically increasing health care costs coupled with public dissatisfaction with the delivery of health care indicate a need for increased attention to strategic decision making processes in hospitals, because a hospital's strategic decisions determine how the organization will align itself with the environment (Jemison, D., 1981, Files, L., 1988) .

The health care industry presents a dynamic, unexpected, ambiguous and uncertain environment. Continuous changes in technological, social, political, regulatory and economic aspects of health care delivery have made management of these issues much more crucial. The complex health care environment creates and subsequently demands intricate information processing requirements for hospitals. Hospitals need to consider organizational structures and processes that enable the critical information need for strategic decisions to interact, interpret, and select courses of action. As the physicians are a source of critical strategic information, they "are increasingly involved in administrative and management responsibilities within medical care organizations" (Guthrie M 2005). The issue of their involvement in hospital strategic decision making is an important topic in the health care literature (Guthrie M 2005, McDaniel, R. R. and Ashmos, D. P., 1986,, Shortell, S. Morrissey M. and Conrad, D. 1985, Morlock, L. Alexander, J. and Hunter, H. 1985, Kovner, A. and Chin, M. 1985). Most researchers see a changing role for physicians in the process of making important organizational decisions for the comparatively unstable health care environment (Goodall AH, 2011, Shortell, S. et.al. 1985, Freidson, E., 1985, Greer, A. L. 1984.)

Since physicians control resources the execution of strategic plans (Greer, A. L., 1985) their role in a hospital's strategic decision processes gather importance. Physicians generate around eighty percent of medical care expenditures. Thus, it is unlikely that major hospital decisions are made without some physician input, although we know very little empirically about how this takes place. Greer (1985) examined the influence of physicians in technology decisions that affected the hospitals' missions and found that, physicians play only a minor role. Shortell et. al. (1985) observed that the participation of physicians on governing boards is related to hospital case mix and membership in a multiunit system.

1.2 The Physicians' Role in Decision-Making

This research is in the area of physician leadership and management. In most organizations, leaders and managers are seen as having different roles—leaders focus on skills that help develop people's abilities, while managers are more concerned with keeping the organization running as efficiently as possible (Daly, Speedy & Jackson, 2004). In the ever-changing world of healthcare today, most Physicians will need to possess both leadership and management skills.

The study focuses on Physicians who are at the-coal face in the management of the ward and constitute the largest number of operational managers in hospitals. As organizations restructure for cost efficiency, Physicians are asked to take on more responsibilities to meet the priorities of the organization (Effken, Verran, Logue & Hsu, 2010). The Physicians role links management and employees, facilitates and ensures the provision of quality of care and is pivotal in the meeting of organizational goals and objectives (Oroviogicoechea, 2006). Duffield et al. (2001) state that substantial changes in the healthcare system have evolved the role from being just an experienced member of staff with excellent clinical skills to one that involves dealing with the complexities of being an effective leader and manager.

Physicians are the first-line managers in the hospitals and have an important role in the healthcare environment. They now have enormous responsibility to sustain quality, safety, innovation, efficiency and financial performance at the unit level and to ensure that staff are prepared and capable of delivering the complex patient care that is required (O'Brien-Pallas, Duffield & Hayes, 2006). The constant demand involved in executing this broad scope of responsibility takes its toll on Physicians.

The flattening of organizational structures has decreased the number of middle managers (Duffield, 2005). Consequently, physicians now have a broader role and greater responsibilities than before (Paliadelis et al., 2007). Moreover, as Carroll (2008) states, 'all leaders must make decisions and the most effective leaders have a strategic plan for gathering information, evaluating the information and deciding a course of action based on critical

thinking'. An understanding of the various leadership styles characteristic of the Physicians group and the effectiveness of those styles in terms of implementing decisions was thus warranted.

1.3 Significance of the Study

This study has academic and professional significance in that despite the widely recognized relevance of understanding the concept of Physicians' decision making, the study of this nature has focused mainly on upper management levels. Very little has been researched about decision-making by the physicians apart from the emphasis on its relevance in coordinating and managing employees.

The researcher's experience, skilled in articulating their thinking processes associated with decision-making. On some occasions, the researcher has noted that physicians can experience resistance from their employees if they are not informed appropriately or involved in the decision-making process. This study analyses the decision-making process, from the physician identifying a decision through to the implementation of the decision in hospitals. There has been considerable research on the decision-making process and the conceptual models to support the way hospital managers of organizations make decisions (Gokenbach, 1995; Goodwin & Wright, 2004). A quantitative approach was considered appropriate for this study, as there is little research relating to physicians involvement in hospital decision making and the effect of those decisions in the hospital setting. Results from this study undertaken may be easily transferable and could be used to inform administrators of other similar hospitals in the management of the workplace.

1.4 Scope of the Research

The main focus of this research would be an exploratory and quantitative study, and would cover a broad range of issues with collection and analysis of diversity of information in the field of strategic decision making processes in Indian hospitals. The work shall concentrate to study the intensity of participation of physicians in strategic decision making processes and explores the functions of these decision contents and their execution. It shall also involve

development of efficient methods and their implementation aspects as explained in the objectives section.

1.5 Purpose and objective of the Study

The aim of this study was to use the quantitative and explanatory approach to develop a substantive theory that explained the decision-making process of physicians through the data collection methods of in-depth interviews and field survey of questionnaires. The parameters for this study are:

- the Physicians role in the hospital decision-making process,
- measures and methods used by the physicians in implementing decisions.

Studies on management and leadership have extensively documented that when staff are disinterested and resistant to change, there is a decrease in compliance and commitment to the job (Bartram, Joiner & Stanton, 2004; Berggren, Bégat & Severinsson, 2002; Cummings et al., 2008; Lautizi, Laschinger & Ravazzolo, 2009). Terzioglu (2006) states that in this context of a complex healthcare system, it is necessary for healthcare managers to have high-level problem-solving skills. With quality administrative planning, it is possible for them to meet the ever-changing demands of healthcare services, as well as the needs of patients and society, in a flexible and creative manner, and to achieve effective medical and nursing services (Becker & Fendler, 1990).

The objectives of the proposed research are:

- i. To investigate and identify various constituents of external and internal environments which impart the formulation and adoption of strategy for hospital services
- ii. To examine the intensity of participation of physicians in strategic decisions
- iii. To explore the functions of strategic decision contents and the extent of their execution and to help to develop a conceptual model for strategic decision making process.

1.6 Structure of the Thesis

This thesis comprises five chapters.

While the current chapter (**Chapter 1**) presents an introduction to the research area and provides overview of the physicians role in decision making, significance of the study, scope of research, purpose and objectives of the study, brief description about the rest of the chapters is as follows.

Chapter 2: Literature Survey and Analysis of Problem Domain

This chapter consists of extensive literature review. The review include the literature in strategic management and physician decision making, marketing strategy on patient satisfaction, the marketing mix strategy components, Aaker and Mills strategic orientation continuum, comparison of theoretical models in marketing strategy and organizational strategy. Finally, research gaps are identified from the literature review in the area of role of physicians in strategic decision making.

Chapter 3: Research Design and Methodology

This chapter outlines the methodology of the study in detail, including the research hypotheses, sample size and sampling procedure, details of pilot study, the research instrument, details of data analysis measures, Pearson correlations, Intra correlation coefficients, Data Envelopment Analysis.

Chapter 4: Research Analysis and Discussion

This chapter presents the analysis of research findings of the study in three parts. Part-I presents the analysis on marketing mix strategy on hospital performance measured by patient satisfaction. Further it also discusses the analysis on organizational strategy and marketing strategy continuum issues in hospitals. The hypothesis1 was tested and its results were discussed. The second part, Part-II of the analysis describes the outcomes of decisions when

physicians were involved in strategic decision-making process in hospitals. The hypotheses 2, hypotheses 3 and hypotheses 4 were tested and results were presented. The results of the third part, the efficiency of physicians in the hospitals through DEA was also presented.

Chapter 5: Conclusions

This chapter presents the conclusions drawn on the empirical results obtained from the analysis of data and also summarizes both, the specific contributions of the work done as well as its limitations. Planned future work has also been briefly presented in the end of the chapter.

Bibliography was presented at the end.

CHAPTER 2

LITERATURE SURVEY AND ANALYSIS OF PROBLEM DOMAIN

2.1 Introduction

In hospital settings, strategic management refers to the activities that position a hospital in its environment and organize internal resources to achieve long term objectives. Strategic change involves significant alterations in this strategic orientation (Kimberly, J. and Zajac, E., 1985; Guo K.L., 2002), including changes in strategy per se (Zajac, E. J. and Shortell, S. M., 2003; Goes, J. B. and Meyer, A. D., 1991) and structural and organizational changes necessary to support that strategy or better align the hospital with its environment (Meyer, A. D. Brooks, G. R. and Goes, J. B., 1990) (Greiner, L. E. and Bhambri, A., 1989). So far, little is known about the internal dynamics of strategic change or the impacts of these changes on short-term performance. As Porter (Porter, M. E., 1991) argued, knowledge concerning strategic change is at a formative stage because most popular definitions of strategic change ignore time and process. For example, health care research focus changes in strategy built on Medicare/Medicaid and prospective payment legislation (Zajac, E. J. and Shortell, S. M., 2003) (Goodstein, J. and Boeker, W., 1991) and on the survival rates of hospitals associated with these regulatory discontinuities (Arnould, R. J. and DeBrock, L. M., 1986). The population ecology perspective and the doctor-patient interface usually ignore internal organizational changes suggesting any variation that might be selected by the environment as essentially random (Aldrich, H. E., 2004)]. Similarly, strategic change research that focuses changes in strategy per se typically ignores the organizational design accompanying such changes (Lant, T. K. Milliken, F.J. and Batra, B, 1992). As a result, the in-firm dynamics of strategic change are often glossed over and underappreciated.

Strategic decisions in hospitals require considerable strength to process non-routine information, and physicians represent a major source of this capacity. Processing non-routine information, characterized by complexity and analytical difficulty, requires values, interpretation, and discussion. A hospital's capacity to process non-routine information is partly a function of identifying and choosing participants in the decision making process as

decision makers vary in access to information, value of information, and abilities to interpret and analyze. Physicians, captive on their training and socialization, are an important source of health care information and beliefs [Robert A. McGowan., 2003]. It is often through a physician's expertise that strategic information is interpreted and analyzed.

Two complementary theories from the organization and strategy literatures may be used to predict physician participation in hospital strategic decision making. One theory is that participation in strategic decision making is fluid –that "participants come and go" (Cohen, M. March, J. and Olsen, J., 1972) as a function of the specific issue and the potential participants' interests and resources. The other theory is that the participants in strategic decision making are a stable group in which membership is secured by either access to resources or formal position in the organization. The fluid participation view suggests that physician participation in hospital strategic decision making varies according to the content or "attributes of the choice situation" (Cohen, M. March, J. and Olsen, J., 1972). As suggested by Pinfield (1986), "participants and choice opportunities do not occur as streams but are connected by the content of issues to be explored in each choice opportunity." Strategic decisions also differ in the amount and kinds of uncertainty they represent. Of course, the nature of the information-processing task required for making choices differs across different decisions encountered.

The fluid participation of strategic decision making process is based on two notions: (1) organizations are information-processing systems (Thompson, J. D., 2003; Galbraith, J., 2002) whose critical function is decision making [Huber, G. and McDaniel, R., 1986], and (2) decision makers alter their information search processes as a function of the task (Payne, J., 1976). At the strategic levels of the hospital, the information search may be change by altering the makeup of the strategic decision-making group according to the divergence in decision task. Pinfield (1986) in a case study of decision process found that "participants were important as carriers of problems and solutions and the presence of participants was important for decision outcomes". Further, he also observed participation to be fluid across the phases of the decision process.

Another explanation for physician participation in hospital strategic decision making is based on the information processing role of strategic decision making. However, this consistent-participation suggests that (1) the hospital's information-processing requirements differ as a function of hospital's strategy type rather as a function of differences in decisions, and (2) the primary information processing for strategic decision making is done by a relatively small group at the top hierarchy. This "upper echelon" (Hambrick, D. and Mason, P, 1984; Norburn, D. and Birley, S, 1988) is often viewed as a team with fairly stable membership, whose makeup is a function of the hospital's strategy type. A strategy represents the hospital's world view and its interpretation of the environment and the "values and cognitive bases of powerful actors in the organization". Strategic orientations will differ in their perception of the criticality of what information for competitive advantage, and the kinds of solutions attached to the same problems.

According to the consistent-participation view, the participants in strategic decisions in this hospital will be those who best process hospital-specific information. On the other hand, if a hospital believes that the best way of gaining a competitive advantage is to focus unique product characteristics and to gain new markets, it is likely to give importance to market-specific information. The participants in strategic decisions will invariably be those who process this information. In either case, the participant group will be stable as the organization's beliefs are stable. Fredrickson and Mitchell (Fredrickson, J. and Mitchell, T., 1984) stated that characteristics of an organization's strategic process tend to be consistent across decisions that are perceived as clearly strategic. The approach used by them has influenced subsequent research. Investigating physician participation in hospital strategic decision making requires consideration of both of these theories.

Question raised whether the physicians participate in hospital strategic decision making as a function of the content of the strategic decision, as suggested by a fluid-participation view, or do they participate as a function of the hospital's generic strategy. The implication of the fluid-process view is that when hospitals identify a specific strategic issue that needs to be addressed, they are deciding, perhaps unknowingly, who participates in that decision. The implication of the consistent-process view, on the other hand, is that when executives decide

the hospital's generic strategy type, they decide who will participate in subsequent decisions. The difference in these two views of physician participation relates to the choices the hospitals make about the category of information making those critical. Prioritization of information according to its generic strategy, or according to the decision at hand accord the choice of information to attend a function the organization interprets to its environment. It is this interpretation that guides organizational action.

Strategic decision making requires information that enables the hospital to manage its relationship with task environment, that is, those elements of the environment that influence the hospital's ability to accomplish its core task. In hospitals the core task is uncertain, and the technology for performing it is largely imbedded in people - that is, physicians and nurses deliver medical and nursing care primarily through the exercise of their professional judgment, although they are aided by machines that may redefine professionals' roles. As hospitals alter their ways of achieving competitive advantage, they are frequently altering their core task. Strategic decisions that result in changes to the hospital's core task require many kinds of information. Unlike financial or marketing information, much of the information about patients, medical equipment, medical services, and licensing requirements is imbedded in physicians rather than in management reports or administrative information systems. A hospital considering the expansion or elimination of an existing medical service, would need information on quality and complexity of the service, the effect on the medical community etc. This important information is mostly accessible to the hospital through physicians whose medical expertise and values provide unique information-processing capabilities (Robert A. McGowan., 2003).

Physicians are the clinical leaders of hospital operations. As noted, non-physician managers have often supplanted physician leadership in non-clinical functions and in overall direction of the hospital. This movement toward professional management yields many benefits but, also has the potential to engender a greater degree of bureaucracy and rivalries between clinical operations and other functions (Succi, M. J. and Alexander, J. A., 1999). The involvement of physicians in strategic decision making is one of the critical links between strategic planning and the clinical function. Physicians play a prominent role in functioning

of their organizations than in some other business functions as evidenced by their growing involvement in operations decisions (Ashmos, D. P. and McDaniel, R. R., 1991). Physicians are the primary users or prescribers of technology, determining for each patient which technologies and equipment will be used to deliver services, and seek to have their preferences met through planning at the strategic level. Physician's involvement in strategic decision making means that the involvement provides them a strong voice in critical decisions that are made by hospital management. One of the ways physicians elevate their role in strategic decision making is by serving on their hospitals' governing boards along with non-physician professional managers (Succi, M. J. and Alexander, J. A., 1999). Physician involvement on boards may be beneficial to hospitals. Molinari et al. (Molinari, C. Alexander, J. A. Morlock, L. and Lyles, C. A, 1995) reported that, operating margins are significantly higher in hospitals with physicians on their governing boards. As hospitals have shifted from physician- managed to professional managed, hospital administrators have stated to several allied pursue relationships with physicians, in an effort to maintain patient-referral basis via their advice. The relationships include joint ventures and management service organizations, in which hospitals provide administrative services for physician practices. However, this tactic results in benefits beyond patient referrals. Kocher et. al. report [Kocher, C. Kumar, K. and Subramanian, R, 1998] that hospitals with more physician-hospital contractual arrangements also generate greater physician involvement in capital-budgeting decisions. Involvement of operational practitioners in strategic decision making is the evidence of operations pro-activeness in hospitals. Research on the balance of power between physicians and hospital administrators shows that physicians have more trust in hospital administrators when physicians are involved in strategic and partnership decisions (Succi, M. J. and Alexander, J. A., 1999). This trust may result in improved performance as physicians and managers bridge the gap of their diverse cultures and interests to create strategies with input from both sides (Molinari, C. Alexander, J. A. Morlock, L. and Lyles, C. A., 1995; Goldstein S.M. and Ward P.T., 2004). Physicians are defined as the principal service providers for hospitals. Although many hospitals have shifted toward a paradigm in which professional management controls strategic processes, evidence in the literature suggests that involving physicians in strategic decision-making processes may result in beneficial outcomes for hospitals.

2.2. Marketing Strategy on Patient Satisfaction

A number of researchers (Ziethaml, 2000; Lovelock, 2001, Ahmad, 2007; Kotler, 2011) have previously argued that the traditional 4Ps of the marketing mix model are inadequate for either the marketing of goods or for services marketing. Services are different from products, because of their characteristics; intangibility, inseparability, heterogeneity, and perishability. The unique characteristics of services create unique marketing problems and challenges, which need special marketing strategies to deal with them. Consequently, the marketing strategy in the services should include the 7Ps of the services marketing mix and framework, which may have a crucial effect on hospital performance (Lovelock, 2001).

The purpose of the next discussion is to explore existing literature relating to services marketing mix strategy components and hospital performance measured by patient satisfaction included in the research, which represent the first part of the research framework. This objective was achieved through reviewing relevant literature in both services and health services context for research purposes.

2.3 The Marketing Mix Strategy Components

The marketing mix strategy is considered one of the core concepts of marketing theory (Ziethaml and Bitner, 2000). Booms and Bitner (1981) extend marketing mix for services from 4Ps to 7Ps adding three elements to the traditional model: participants, physical evidence and processes. By adding personal, physical assets, and procedures to the marketing mix (forming the 7Ps) services marketing theorists ventured out into a new field of management theory and practice separate from the marketing of tangible goods (Lovelock, 2001).

In health care, more than in other services, the product is the person. When the patient thinks of medical care he or she thinks of the physician (Ahmad, 2007).

The patient envisions medical care in terms of the people who deliver it. Thus the fifth P of marketing is the organization's people (Kotler, 2011).

2.3.1 The Service Strategy

The service concept is the core element of a service, and it must be derived from the needs and wants of a specified target group of customers. The service product is the central component of any marketing mix strategy (Ennew, 1998).

Grönroos (2000) defines a service as an activity or series of activities of a more or less intangible nature that normally, but not necessarily, occur in the interactions between the customer and the service employees and / or physical resources or goods and / or systems of the service provider that are provided as solutions to customers' problems.

Product strategy is McCarthy's first element of the marketing mix components. It can be summarized as the ultimate result involving benefits being enjoyed by a client at the time of a purchase/ receipt of service from an organization (Kotler, 2011).

Medical service can be defined as a health care service intended to influence a person's health, directly or indirectly, through procedures executed by medically educated personnel. It is difficult to distinguish clearly between diverse activities within medical services (Oravo & Tuominen, 2002).

The unique characteristics of services that determine what constitute components of the service product are generally a difficult task. Lovelock (2001) argues that the key aspect of the service product strategy in health service organizations is to meet the problems, which are created by these characteristics. Therefore, when these organizations move through these levels they are trying to differentiate themselves (Lovelock, 2001). This can be achieved by having a range of high quality services, means of branding, new service development, and customer service (Baker, 2000).

Health service organizations usually offer a wide range of health service products to a number of customer and patient groups in order to satisfy a variety of customer and patient needs and wants (Kotler, 2011).

Many service industries such as health services are facing increasing competition. Strong brands are established not only in the market, but also in the mind of the customer. Services can be classified into two categories. Firstly there are services which are small or unlinked to goods; and secondly services that are connected with the products (Keller, 2003).

2.3.2 Pricing Strategy

Customer satisfaction in addition to profitability and long term survival (Avlonitis and Indounas, 2005) is a marketing concern of service organizations. Nagle and Holden (1995) point out that if effective product development, distribution and promotion sow the seeds of organization success; efficient pricing strategy is the harvest. While effective pricing strategy can never compensate for poor execution of the first three elements, ineffective pricing can surely avoid those efforts from resulting in financial success. The price strategy should be integrated and consistent with the other marketing mix strategies in the organization to achieve the organization objectives (Palmer, 2001). Price is one of the fundamental elements of the services marketing mix (Lovelock, 2001). Some researchers (Lovelock, 2001, Keller, 2003) have suggested that pricing is the only factor of the marketing mix strategy that produces revenues for the organization, whereas all the others are related to expenses. The degree of complexity of pricing strategy amongst the service sector is comparatively significant due to the high degree of homogeneity between most service groups and shared service delivery and operating systems (Kotler, 2011). However, the most important concern in this research is investigating the Jeddah hospital managers' perceptions of different pricing strategies that are being used when they formulate their strategies.

Costs play a significant part in the pricing of health services. Managers must consider corporate objectives as well as costs when setting hospital prices. Purely covering costs is unsatisfactory in view of the fact that the hospital needs to meet its monetary objectives and

generate a profit. In addition to cost consideration, hospital pricing strategy is usually influenced by consumer price elasticity. Price elasticity of demand measures the responsiveness of the quantity demanded of a service to any change in price. Segmentation approach supports the notion that disparate groups of consumers will place dissimilar values on a service, and therefore require different pricing strategies, (Booms & Bittner, 1981).

2.3.3 Distribution Strategy / Access Strategy

Distribution deals with the availability and accessibility of products and services. Carter et al (1989) established that the importance of distribution channels vary depending on different types of institutions. Several life insurance companies relied heavily upon a sales force while others relied exclusively on brokers and other independent intermediaries (Carter et al, 1989).

Health service organizations need to develop successful sales force teams, which have the basic and necessary skills, knowledge, and motivation related to delivery of health services (Jones, 2003).

Health care organizations, whose products are primarily services, must consider three distribution decisions: physical access, time access, and informational and promotional access (Jones, 2003). (Jones, 2003) presented a comprehensive case for health service access. They stated that dental offices in shopping malls operate in locations (physical access) that are more convenient for the consumer. They are also open at weekends and in the evening, providing better time access. And they rely on the traffic within the shopping mall (promotional access) rather than word of mouth or physician recommendation (referral) to generate demand (Jones, 2003).

Accessibility implies the customer's/ patient's ability to easily arrive at and depart from the service location or to experience the service without great difficulty due to effective spatial orientation and layout (Carter et al, 1989).

Renner and Palmer (1999) studied customer perceptions of service quality at sporting events and found that facility access and convenience exerted a significant influence on the quality perceptions of certain groups of sports fans. Thus, these researchers provide a basis for including accessibility as a structural descriptor of service process since it emanates from managerial design choices. Time access deals with three distinct issues: the opening hours, the length of waiting time (in the service providing waiting area) and the time between calling and having an appointment (Renner & Palmer, 1999).

2.3.4 Promotion Strategy

Promotion and communication strategy is one of the key components of the services marketing mix strategy by which hospitals can communicate their health services to customers (Lovelock, 2001). The hospital's managers must first examine the needs of customers in the environment it serves and choose the communication tools that suit the environment, based on profit and growth potential given hospital resources and objectives. Promotion can provide an opportunity to organizations to differentiate themselves at corporate and brand levels.

A service promotion strategy has a number of components that are known as the "promotional mix" (Harrison, 2000). There is no one promotional tool that is able to achieve promotion strategy objectives which, in turn, means that most service organizations use more than one promotional tool in order to avoid the disadvantages of each tool. This implies that each promotional tool has different advantages and disadvantages so most service organizations try to use more than one promotional tool in order to maximize the advantages and minimize the disadvantages of each (Harrison, 2000).

Advertising is expected to play a more prominent role in a hospital's quest for market share and profits. Several specific reasons account for this contention. First, it is apparent already that competitive pressures have increased for hospitals. Many administrators seem to have increased their marketing efforts to respond to competition. Advertising is a critical component of these efforts (Andaleeb, 1994).

Andaleeb (1994) discussed advertising as being an important tool for hospitals for two reasons. First, advertising is a competitive tool for hospitals. Its effective use should assist hospitals to attract and retain clients in a rapidly changing environment where the clients are increasingly involved in selecting the right hospital. Second, a nationwide survey showed that 50 percent of consumers remembered seeing or hearing a hospital advertisement.

Word of mouth can operate through both channels. Informational influence occurs when information is accepted as evidence of reality (Lovelock, 2001). In contrast, normative influence operates through compliance, which means that the individual conforms to the verbalized expectations of referent others (Wangenheim & Bay`on, 2004).

2.3.5 Physical Evidence Strategy

The appearance of a work area is similar to physical appearance, identified previously as a structural descriptor (Jones, 2003). Work area appearance relates only to the non-design aspects of the service environment, which are inherently variable in nature. These aspects include such things as cleanliness and tidiness or the general appearance of the service location on a day-to-day basis. For example, the work area at which a service encounter occurs could be dusty or cluttered with a variety of items that might distract from the customer's satisfaction with the service encounter. Although items such as furniture, wall coverings, or pictures might be designed into the service environment, their appearance could have variable aspects quite apart from the original design intent if they were dirty, torn, broken, improperly hung, or otherwise in a state of disrepair (Carter et al, 1989). Health services have a number of unique characteristics, which have crucial implications for marketing strategy. Physical evidence aids health services to tangibles the high degree of intangibility (Wangenheim and Bay`on, 2004).

Other services marketing researchers (Lovelock, 2001; Palmer, 2001) have pointed out the vital importance of physical evidence in service businesses in order to send a consistent message and retain a coherent image about the organization. Palmer (2001) has focused on

the vital role of providing tangibles as a significant component of the company service offer. Lovelock (2001) has argued that physical evidence is one of the vital components of the 8Ps of the services management paradigm by which the company can provide tangible objects to customers during the service delivery process and tangible metaphors used in such communications as advertising, symbols, and trademarks (Lovelock, 2001).

2.3.6 Service Delivery/ Process Strategy

Process is one of the crucial elements of the expanded marketing mix components in services that should be a distinct strategic element. This is because process may influence the initial customer decision to purchase a service and affect the level of customer satisfaction (Collier, 1991).

Zeithaml and Bitner (2000) discovered that the top management challenges across four service industries were maintaining quality of service, hiring employees, and employee training. Recognized that the process has three major components, which are (1) Flow of activities (standardized or customized) (2) Number of steps (simple or complex) (3) Customer involvement. The patient's opinion of a service is influenced by his or her experience of the service process. This can be divided into three phases - namely joining, intensive consumption, and detachment (Palmer, 2001). In medical services, the joining phase occurs when the patient joins in the service process in order to consume a core health service. The core surgical service is delivered in the intensive consumption phase. In surgical services the delivery and intensive consumption of services are simultaneous processes, with interactions occurring between the patient and the tangible and intangible production resources of the medical service provider (Ennew, 1998). The intensive consumption phase is followed by the detachment phase, during which the patient leaves the surgical service process. Every phase can contain various auxiliary elements, in the form of facilitating or supporting services (Grönroos, 2000)

2.3.7 Personnel Strategy

People play a crucial role in service organizations, especially during the service delivery process when the participants have interactions with customers. Service marketing has long stressed the importance of staff and particularly customer contact staff as crucial components in delivering a high quality service and contributing to overall customer satisfaction (Booms and Bitner, 1981). Currently the role of people in service delivery varies considerably across service contexts. However, the health service is one field where health staffs are considered to be of particular importance. It is widely argued that the overall quality of the delivered service for organizations such as health services is influenced, among other things, by the nature of the relationship between the customer and health providers. Storbacka et al (1994) labelled routine and critical interactions as routine and critical episodes. Customer relationships have a number of different types of episodes, and these differ with respect to content, frequency, duration, and regularity.

The doctor has significant discretion in meeting customer needs, and evaluation of the interaction is largely based on the attributes of experience and credence (Avlonitis and Indounas, 2005). Experience attributes can be evaluated only during or after the consumption of medical service. Credence attributes are hard to evaluate, even after the consumption of a medical service has occurred (Ojasalo, 1999). In health care more than in other services, the product is the person. When the patient thinks of medical care he or she thinks of the physician. The patient envisions medical care in terms of the people who deliver it. Thus the fifth P of marketing is the organization's people (Booms and Bitner, 1981).

2.4. The Marketing Mix

Borden (1984) reviewed the concept of the marketing mix and its evolution, and suggested that an organization's manage marketing mix elements, with the marketing mix being helpful in problem solving and generally an aid to thinking about marketing. Earlier, Kotler (1964) had explored ways of determining the best marketing mix for new product development

when there was only limited information, and recognized that the development of new products had to be based on profit potential. Kotler (1974) also found that the marketing mix plays a role in determining the answers as to what would keep a company afloat, through a focus on opportunities created by shortage. More recently, Gummesson (1994) examined the role of the marketing mix with a focus being given towards relationships, networks and interactions; however, Gummesson (1994) was clear in stating that the marketing mix will always be required. This paradigm shift was endorsed by Gronroos (2002) who also argued that the foundation of the marketing mix paradigm was weak, and was based on the lack of focus given to relationships. Gronroos (2002) suggested that the marketing mix does not allow any personalized relationships with producers and marketers, which does not fit with the reality of industrial marketing and the marketing of services.

From the above it is evident that the marketing mix plays an important role in the marketing of organizations, and that the balance between product, price, placement and promotion is evident in organizations. Regarding new products, the marketing mix should have a focus on their potential profitability and is important in making decisions within organizations and taking advantage of opportunities. A shift in marketing paradigms has also become evident with the focus turning towards relationship marketing.

However, the studies discussed above have not examined the marketing mix in relation to health care marketing strategies; that is, focus has been given to the overall marketing mix in organizations, while health care marketing strategy has been less investigated. Therefore, this research will explore the marketing mix in health care organizations with a view of identifying how marketing strategy influences organizational strategy.

2.4.1 Aaker and Mills Strategic Orientation Continuum

A new strategic paradigm has been suggested by Aaker and Mills (2005) in the form of the strategic orientation continuum. This continuum is suggested as being directly related to an organizations strategy flexible and enable more efficient and effective global strategy decisions as organizations tend to have different strategic orientations (Mills 2009). This

continuum, see Table 2.1 at one end illustrates strategic vision, and at the other end, strategic opportunism. Strategic vision is primarily focused on the future, is forward looking and has a long-term perspective with the horizon of planning being two, five, ten or more years into the future (Mills 2009). In contrast, the other end of the continuum depicts strategic opportunism, which is focused on strategies that make sense today; it is concerned with markets that are uncertain and very dynamic (Mills 2009). The table illustrates organizational characteristics, and shows how organizations can be placed on a continuous scale ranging from strategic vision to strategic opportunism. The organizational characteristic of perspective is observed along the continuum between (a) a forward looking perspective undertaken by strategic decision makers in the organization and (b) the decision makers being more focused on the present. Strategic uncertainties can be explored by assessing trends that affect the future or through the opportunistic end of the continuum by assessing current threats and opportunities found in the environment.

Table 2.1 The Strategic Orientation Continuum

Organizational Characteristics	Strategic Vision	Strategic Opportunism
<i>Perspective</i>	Forward looking	Present
<i>Strategic uncertainties</i>	Trends affecting the future	Current threats and opportunities
<i>Environmental sensing</i>	Future scenarios	Change sensors
<i>Information system</i>	Forward looking	Online
<i>Orientation</i>	Commitment Build assets Vertical integration	Flexibility Adaptability Fast response
<i>Leadership</i>	Charismatic Visionary	Tactical Action oriented
<i>Structure</i>	Centralized Top-down	Decentralized Fluid
<i>People</i>	Eye on the ball	Entrepreneurial
<i>Economic advantage</i>	Scale economies	Scope economies
<i>Signalling</i>	Strong signals sent to competitors	Surprise moves

Source: (Aaker & Mills 2005, p. 6)

The organizational characteristic of environmental sensing is related to the strategic vision end of the continuum, in future scenarios that may occur within the environment, while opportunism is depicted in change sensors found in the environment. Environmental sensing is related to the characteristic of information systems as these systems assist in understanding the future environment (Mills 2009).

2.4.2 A Comparison of the Underlying Theoretical Models in Marketing Strategy and Organizational Strategy

In comparing the underlying theoretical models of strategy noted in Section 2.4.1 through to Section 2.4.8 it is essential to consider the various aspects that are addressed by the different continuums illustrated in the models. Table 2.3 highlights these aspects and how each theoretical model addresses or does not address the aspects. It is clear that the different strategy models address different strategic aspects. Ansoff's growth matrix has a achievement of growth, while the BCG is focused on market growth. generic strategies addressed the need for products and services and the achievement of market growth through these products and services. The Miles and Snow typology has also focused on products and services while being concerned with the market and environment in which these products and services are distributed. The Dunphy et al. (2000) sustainability phase model focused on ecological sustainability in terms of environments, environmental sensing strategic uncertainties and markets. It also integrates human sustainability in terms of growth in competencies to deliver services to stakeholders in the market as well as leadership, people as well as structure. Mintzberg's central themes to services in accordance with the environment in which an organization operates, and the marketing mix is concerned with products and services as well as the market. Interestingly, the strategic orientation continuum that provides the basis for this study's focus is not concerned with the rather, with the external growth that an organization can achieve in the marketplace while considering the environment in which it operates.

2.5. Marketing Strategy

The following section provides an overview of marketing strategy and what this construct involves, in accordance with a discussion of marketing strategy in health care and the identification of gaps in the literature. Greenley (1993) explored the concepts of marketing strategy and strategic marketing and the differences in these concepts. It was determined by Greenley (1993) that marketing strategy could be viewed as a broad term that encompasses general marketing activity, while strategic marketing is an unfamiliar construct to most organizations and does not appear to be included in organizations' marketing strategies and operational tactics in surviving and failing organizations are that successful firms were associated with managerial expertise, grew in a focused manner, and did not react to their environment without careful consideration and focus (Colarellia O'Connor 1994). Strategic fit between marketing strategy and organizational culture has been investigated by Baker, Hunt and Hawes (1999), in accordance with examining how combining organizational culture and marketing strategy influences organizational performance. Although specific types of organizational culture and marketing strategy, if used, are significantly and positively related to organizational performance, a contingency relationship between marketing strategy and culture was, however, not established.

Marketing strategy in health care: Accountability in the marketing of health care systems has been discussed by Berkowitz (1992a) and it has been suggested that this accountability is critical in the future evolution of marketing in health care. The difference between marketing and sales in health care has also been investigated by Berkowitz (1992b) who noted that the marketing notion was largely misunderstood by health organizations and that their marketing orientation was diffused. The intersection between the use of fear appeals, marketing to the elderly and the marketing of health care services and products in relation to ethical implications has been explored by Benet, Pitts and LaTour (1993). Results from their study indicated that the elderly are not more vulnerable, that they spend a substantial amount of money on health insurance and prescription medications and that fear-based marketing appeals can be used in both a positive and humane manner. Benet and

Bloom (1998) studied senior consumers' reactions to mock advertisements relating to long-term care insurance, and recommended that marketers should provide advertising materials that are educational and informative, especially to educated groups of seniors. Porter and Olmsted Teisberg (2007) propose a strategy for health care reform that is claimed to improve health and health care value for patients. The basis of this strategy is the role physicians play in leading the medical teams that are providing the care, and thus increasing the value for patients, having an organized practice around medical conditions and care cycles and measuring results. The application of social marketing in health care has been explored by Evans and McCormack (2008), with a focus on strategies that can be applied to both health care and consumer behavior. Social marketing has the potential for expansion into health care and if done so will span a range of situations and is overall an effective behavior change approach that can be undertaken by organizations. A systematic review of public health care branding has been conducted by Evans, Blitstein, Hersey, Renaud and Yaroch (2008) indicating that past literature on health branding provided information on planning, development and evaluation of the branding, while the messages typically focused on behavior change effectiveness in relation to tobacco, nutrition and HIV/AIDS. In examining the strategic marketing planning practices of Australian private hospitals, Hopper (2004) reviewed specific marketing strategies related to growth strategies, positioning strategies, differentiation strategies, competitive strategies, service strategies, pricing strategies and advertising strategies. It was found that the strategies pursued to the greatest extent by the private hospitals — according to Ansoff (1988), Brown (1997), Johnson & Scholes (2002), Kotler et al. (1994) and Tang Chen Hsin (1997) — included pricing strategies, advertising strategies, positioning strategies, differentiation strategies, growth strategies and competitive strategies. In terms of pricing strategies, prices were set according to Private Health Fund/Government regulation requirements and were aimed at maintaining stable prices while emphasizing something other than prices. In terms of advertising strategy they recommend advertising service offerings through the local newspaper and the Yellow Pages. Regarding positioning strategy, it is recommended that the health care organizations create a positive relationship with medical practitioners and position the organization by creating an image based on the advantages that their services offer. In differentiation strategies, the authors recommend concentrating on selling services to a variety of specific groups of customers

within the total market, as well as selling services to the whole market (e.g. everyone in the region and/or city). The identification and development of a new market segment for current services is recommended for growth strategies in accordance with offering new or modified services to current market segments. In terms of competitive strategies, it is suggested that organizations should focus on a minority of market segments and not the entire market, as well as ensuring their services can be differentiated from those of their competitors.

With a focus on health care marketing strategy, it is evident that marketing strategy encompasses a wide contingent of activities, that accountability in an organization is essential and that marketing is often misunderstood and underestimated in organizations. It is also apparent that 'methods' that can be as fear applied based marketing and in social health marketing, as well as specific strategies such as pricing, advertising, positioning, differentiation, growth and competition.

While the specifics of marketing in health care organizations has been explored to some extent, the overall view of marketing strategy and its influential relationships in health care organizations have not been investigated fully. This research will, therefore, explore marketing strategy in health care organization from an overarching organizational viewpoint and determine how this will affect the organizational strategy of health care organizations.

An overview of marketing strategy has been depicted in Figure 2.3 (Aaker & Mills 2005) and endorsed by Ansoff (1988), Brown (1997), Johnson and Scholes (2002), Kotler et al. (1994) and Tang Chen Hsin (1997). It can be seen that marketing strategies may exist in the form of differentiation strategy, cost, focus, pre-emptive strategies, growth strategies, diversification strategies, strategies in declining and hostile markets, and global strategies. Marketing strategy consists of various concepts, all of which contribute to its formulation in an organization. In discussing what is involved in a marketing strategy, Aaker and Mills (2005) have focused on strategic market opportunity analysis and methods, alternative marketing strategies and implementation.

To examine marketing strategy and its use in health care, three key concepts directly related to marketing strategy require consideration. These concepts have been determined through (2005) model Aaker (see Figure and 2.3) and Mills' consist of the environment in which regional private hospitals operate, the implementation activities undertaken by regional private hospitals and the evaluation and control activities used by regional private hospitals. Literature relating to the above three components of the marketing strategy field will be reviewed in the following sections.

2.5.1 Environmental Analysis

Segev's (1979, p. 58) explanation would provide the basis for the following discussion, where the author states that of the diverse forces in the environment, the relationship among them over time, and their effects or potential effects on the study to the micro-environment (internal environment) and the macro-environment (external environment) (Aaker & Mills 2005; Bryson 1995; Hill, Jones & Galvin 2001; Kotler et al. 1994). In assessing both the micro- and macro-environments, an organisation is required to consider a variety of factors specifically related to each environmental area.

The factors described as belonging to both the micro- and macro-environments have been specifically adapted to fit within hospitals. For example, customer satisfaction in the context of this study would involve ensuring that both the doctors and patients are completely satisfied with the service they have received from a regional private hospital. Services portfolio analysis would involve the hospital management team in assessing what services they currently offer, whether these services are still viable and whether they should be adding new ones. Similarly, macro-environmental factors would involve identifying competitors and being aware of other private hospitals activities within the local region. In considering demographic factors, hospital management would be required to review the characteristics of the region in which they operate and assess whether they have the capability to meet these demographic characteristics in the services that they offer.

Miller and Friesen (1983) examined the relationship between environment and strategy-making, with a focus on dynamism, hostility and heterogeneity in relation to innovation and strategic analysis. The findings of the study determined that environmental dynamism and hostility increase an organ that stronger relationships between heterogeneity and innovation exist in successful organizations.

Ansoff and Sullivan (1993) explored the optimization of profitability in organizations that operate in turbulent environments. Strategic success was found by Ansoff and Sullivan (1993) through the profitability of an organization being optimized when the strategic behavior of the firm is aligned with its environment, with a different contingent success formula being evident for each environmental turbulence level. Wilson (1999) has explored strategy development processes in conditions of environmental volatility, based on informal and formal approaches to strategy development. The study determined that competitive marketing strategy can be viewed as an organizational response to competitive threats in the environment; that when conducting a competitive assessment and analysis, focus should be given to the perceptions and paradigms of those involved, and be conducted at various hierarchical levels in the organization; and that when facing a competitive threat, focus should be given to fresh systems and approaches.

Environment in health care has been addressed by Ashmos, Duchon and McDaniel (2000), who examined how health care organizations' respond to dynamic, complex and turbulent environments affected the financial performance of a hospital, through assessing goal complexity, strategic complexity, interaction complexity, structural complexity and financial performance. Results indicated that when operating in a complex environment, hospitals that had a greater internal complexity outperformed those with less internal complexity. The notion that the health care environment is dynamic, complex and highly uncertain is further endorsed by Begun and Kaissi (2004), who associated dynamism in the health care environment with frequency of change and the predictability of change. The health care environment complexity refers to the number of elements in the environment, their dissimilarity and the degree of interconnectivity between them. Complexity absorption and its relationship with organizational performance has been explored by Walters and Bhuian

(2004), with complexity absorption being the degree to which an organization responds to increases in environmental dynamism through complicating themselves internally. It was determined that acute care hospitals that undertook complexity absorption practices experienced a higher level of organizational performance, endorsing the previously discussed findings of Ashmos, Duchon and McDaniel (2000). The nature of the health care environment has been summarized concisely by Ozcan and Luke (1993), who examined the relationship between hospital characteristics and variations in hospital technical efficiencies. The study found that uncertainty remains over the effects of even the most commonly examined factors within the health care environment.

From the above discussion it is evident that the health care environment has been described consistently as dynamic, complex, turbulent and uncertain. Health care organizations are viewed as complex entities with a large number of elements within the health care environment. Complexity absorption is viewed as a positive practice for health care organizations, while it has been made clear that uncertainty will always remain in the health care environment. Wilson and Gilligan (2005) provide further information on the degrees of environmental complexity, expanding on the views of Ashmos, Duchon and McDaniel (2000), Begun and Kaissi (2004), Walters and Bhuian (2004) and Ozcan and Luke (1993), indicating that the health care environment has large numbers of external elements, which are dissimilar and unpredictable

The studies highlighted in the preceding discussion have explored and focused on the dynamic, complex, turbulent and uncertain nature of the health care environment. This has allowed for the overall nature of the health care environment to be investigated; however, the linkage this environment has to marketing strategy has been explored to a limited degree. This research will, therefore, explore linkages between the health care marketing environment and marketing strategy with the purpose of identifying how marketing strategy influences organizational strategy (see below). In addition to the environment, the marketing strategy component of implementation also requires investigation.

2.5.2 Marketing Strategy Implementation

Aaker and Mills (2005) concisely identify and describe four key organizational components that are essential in successful implementation of not only organizational strategy but also marketing strategy: structure, systems, people and culture (see Figure 2.4). First, structure is identified by Aaker and Mills (2005, p. 339) as defining lines of authority the mechanism and co by which organizational tasks and programmable structure can be described through a number of aspects, including centralization versus decentralization, borderless organizations, alliance networks and the virtual corporation (Aaker & Mills 2005).

The second organizational component, systems, is discussed by Aaker and Mills (2005) in terms of the use of management systems in strategy implementation. Budgeting, accounting, information, measurement and reward, and planning systems are all considered to be strategically relevant in strategy implementation. Third, the use of people in strategy implementation is discussed by Aaker and Mills (2005).

Aaker and Mills (2005) make the point that strategy is competency, which in turn is reliant on the people it has employed. In essence it is essential for an organization to consider the employees' experience of knowledge and skills within the functional areas of the organization (Aaker & Mills 2005). Fourth, the organizational culture needs to be considered when strategy is being implemented. The culture of an organization is described by Aaker and Mills (2005) as consisting of three elements: (a) shared values or dominant beliefs, (b) norms of behavior and (c) symbols and symbolic activities. All of these affect strategy implementation within an organization.

Organizational structure and process and their role in strategy implementation have been examined by Galbraith and Nathanson (1979). It was determined that organizational structure will influence strategy, and that a CEO is required to change to enable change in strategy and structure, and hence for implementation to occur successfully. Spector and Beer (1994) examined the concept of Total Quality Management (TQM) in organizations, with specific focus being given to the examination of missteps in its implementation and the link these missteps have to its long-term effectiveness. The study suggests six steps that can be

undertaken to ensure implementation success in an organization: (a) combine external competitive pressure with clearly defined direction from the CEO, (b) agree and commit to quality improvement, which is a key strategic task of the organization, (c) form ad hoc teams around processes to be improved, (d) create an oversight team which promotes learning and systemic change and assists in overcoming resistance, (e) enable teams to analyze and take action on decision-making delegation, provision of necessary team skills and the information necessary to understand, analyze and re-engineer processes. In an examination of organizations internal situations, Beer and Eisenstat (1996) uncovered barriers to strategy implementation. These barriers consisted of (a) poor coordination or teamwork, (b) unclear strategies and priorities, (c) ineffective top management teams, (d) leadership styles that are top-down, (e) inability to speak truthfully to top managers and (f) inadequate leadership skills and development at middle levels. These inhibiting implementation factors were reinforced by Beer and Eisenstat (2000), who proceeded to discuss of strategy implementation that exist within organizations.

Beer (2003) examined the longevity of TQM programmes in organizations and why they do not persist. Again, the killers' identified by (2000) Beer were examined and extensively Eisenstat in Beer (2003), with the quality of strategic direction and the quality of learning being identified as key concepts influencing effective implementation.

Implementation in health care has been addressed by Dooley, Fryxell and Judge (2000), who explored the effects that strategic decision consensus and commitment in United States hospitals have on decision implementation speed and success. It was established that the level of consensus associated with a strategic decision will increase the level of commitment to the decision in the decision team, that the level of decision-team commitment to a strategic decision will increase the likelihood of successfully implementing the decision and that the relationship between the level of consensus associated with a strategic decision and implementation speed will be mediated by the decision team's commitment. Hopper (2004) discussed the extent to which specific marketing implementation activities were carried out by Australian private hospitals (Aaker & Mills 2005; Dooley, Fryxell & Judge 2000; Ogunmokun, Hopper & McClymont 2005; Pride & Ferrell 2003; Wilson & Gilligan 2005). It was found that marketing strategy implementation in these organizations included stating the

activities to be implemented, defining the deadlines for implementing the strategies, establishing annual objectives, developing policies to guide the implementation process, allocating resources needed to implement strategies, enhancing organizational culture, managing potential conflict that may result from the implementation process, making any necessary changes, communicating to the organizational employees when and how the strategies would be carried out, providing incentives for employees to carry out the strategies effectively, consistently monitoring to ensure that all activities were coordinated and assigning people who were to be responsible for implementing the strategies.

It can be inferred from the above studies that effective strategy implementation relies on structure, teamwork, management style, information gathering and processing, and communication. Further, in relation to health care specific implementation, the speed of implementation appears to be of importance.

2.5.3 Evaluation and Control

For the purposes of this study, evaluation and control will be focused mainly on the views of Aaker and Mills (2005) who emphasized the importance of effectiveness and efficiency. These authors described strategy effectiveness as how well the strategy is and meet strategy efficiency as how well the strategy is reached shareholders' (Aaker&Mills, 2005). The need for strategy evaluation and control within an organization is also reflected in the health care related literature.

Olson (1997), highlighting the notion that control systems provide a critical linkage between strategy execution and strategy adjustment. Hopper (2004) examined the strategic marketing planning practices of private hospitals and their effect on organizational performance.

It is apparent from the literature that the internal activities of evaluation and control have been explored; however, the linkages between implementation activities and marketing strategy have been examined only to a limited degree. Consequently, this research will explore the activities of evaluation and control in marketing strategy and how these affect organisational strategy. An additional aspect of marketing strategy that requires consideration in the health care context is the communication of strategy both internally and externally to the organisation.

2.6 Organizational Strategy and Marketing Strategy

Due to the focus on marketing strategy in this the communication of marketing strategy will be the primary focus of the following discussion. It is, however, worth noting Mintzberg's thoughts on organizational the communication strategy. Mintzberg (1980) addressed both formal and informal communication between the CEO and employees in organizations through the five strategic structures encouraging constant communication about strategic change. Mintzberg (1987a) suggested that CEOs should promote the changes resulting from strategy throughout organizations and encourage employees to think strategically and communicate with each other. .

Marketing strategy communication within health care organizations can be seen in terms of relationship marketing. Paul (1988) examined relationship marketing in terms of the usefulness of health care providers targeting employers as direct purchasers of health care services, with a focus on (a) why employers' rhetoric about heal far exceeded the reality of change and (b) ways in which relationship marketing can be adopted by providers to influence the health care purchasing practices of organizational buyers. It was concluded that health care providers can achieve penetration with employers through three key methods: (a) word-of-mouth communication between employees, which is favorable, (b) leveraging employee choices in favor of designated providers and (c) encouraging more employees to purchase services directly. A form of relationship marketing has been discussed by Peltier, Boyt and Westfall (1997), who reported that health care organizations became concerned at the high rates of physician turnover, especially in rural environments (Peltier, Boyt & Westfall 1997, p. 12). The study highlighted the three levels of relationship marketing: financial bonds, social bonds and structural bonds. They concluded that structural relationship marketing bonds provided the greatest opportunity for sustaining a competitive advantage. It was found that the higher the number of competitors or occurrences of relationship marketing, the greater was the probability of contracts providing extra services over and above the basic requirement. It can be inferred that relationship marketing plays an important role in the communication of strategy in health care organizations. The construct of relationship marketing in health care is evident through the purchasers of health care being the customers, the importance being placed on the role of physicians in health care

organizations, relationship marketing improving the provision of services, community participation in rural health organizations and the different roles relationship marketing can play in a health care organization.

2.7 Performance

Performance measurement is an essential element in strategic marketing planning (Joyce & Woods 2001). This is a result of management being required to demonstrate effective performance to stakeholders (Bryson 1995) and performance reflecting how the management of the organisation view the competitive task (Urban & Star 1991). Consequently, this research will examine the different facets of the strategy and performance relationship.

Dess, Lumpkin and Covin (1997) explored the nature of entrepreneurial strategy making (ESM) and its relationship with performance. They suggested that in order to understand the relationship between ESM and performance it is essential to analyze the context in which the relationship occurs, indicating the extent to which the association between the two concepts does and does not interact. An attempt to close the gap between marketing strategy and performance was undertaken by Wong and Merrilees (2007) with a focus on brand-orientation. It was determined that marketing strategy and innovation positively influence brand performance, while brand orientation was found to be a moderating factor in the strategy–performance relationship.

The literature shows that the performance construct can be divided into individual facets that include (a) financial and non-financial performance measures, (b) a broader view of performance, or a more balanced one and (c) other performance differences and variations.

There are two key methods depicted as being essential in measuring organizational performance: financial and non-financial measures (Ballou, Heitger & Tabor 2003; Short, Palmer & Ketchen Jr 2002; Watkins 2003); and objective and subjective measures (Yavas & Romanova 2005). Objective and financial measures are closely related, as are subjective and non-financial measures (Yavas & Romanova 2005).

Watkins (2003) examined the possibility that the financial performance indicators could adequately convey information about the operational performance of health care organizations in a service-oriented economy. Watkins' results indicated that financial and non-financial measures of performance do not capture the same information, and for this reason it is imperative that both indicators be included when measuring an organization's performance, through routinely measuring certain key non-financial indicators, the financial analysis of an organization could be enhanced. Ballou, Heitger and Tabor (2003) explored the objectives relating to non-financial performance measurement in a not-for-profit community hospital. Their findings support those of Watkins (2003), by determining that by focusing on the non-financial measures, financial measures could be improved as a result, and that non-financial measures assisted in the evaluation and improvement of health care delivery, business, and support processes. An alternative perspective of health care performance measurement was taken by Short, Palmer and Ketchen (2002) by assessing resources and strategic group membership and their effect on performance. It was established that resource bundles influence performance, that strategic group membership explains performance variance and that strategic group membership moderates the influence of resources on performance.

Broader and balanced performance scope: Limitations associated with traditional financial measures of performance have been noted by Chang, Lin and Northcott (2002). Results from Chang,(2002)studyLinindicatedandthata North broader and balanced perspective of organisational performance must be taken by firms. This viewpoint is endorsed by Martin and Smith (2005) who discussed an alternative method of modelling organisational performance through placing specific emphasis on the relationships between individual performance indicators and seeking to model these indicators simultaneously within the public services context. It was determined that this balanced and broader method of performance measurement was helpful to organisations in targeting performance areas that have a priority for improvement.

Performance differences and variations: Some evidence of factors attributing to variation in health care performance measurement has been provided by Ginn and Lee (2006) in their study examining community orientation and strategic flexibility and the effect of accounting

measures of financial performance in acute care hospitals. Their findings indicated that community orientation did not contribute to short-term financial performance in highly competitive environments associated with environmental turbulence and that at least some elements of strategic flexibility were positively associated with hospital performance. In developing a model for process-based performance measurement, through an analytical hierarchy process (AHP), Hariharan et al. (2004) examined performance in health care. These authors concluded that the performance differences they found in Barbados and Indian hospitals could be attributed to technology and argued that AHP was a useful tool for process-based performance measurement. A review of public performance reports by medical providers conducted by Robinowitz and Dudley (2006) has illustrated the small (but very real) impacts on provider attempts to improve quality, as well as the impression of, and selection of, providers held by consumers. It was discovered that noise, in the form of variation due to random choice, the failure of risk adjustment to compensate for all case mix differences, gaming (overcoding patient risk factors) and accidental errors in data collection (mis-entry of patient characteristics), reflected performance differences among hospitals. Stockard and Tusler (2003) examined the long-term effects of reporting hospital publicly available data versus privately held data. Their findings indicated that the use of public data led to performance improvements and that making the performance information available to the public tended to stimulate the activities associated with quality improvement and hence explained differences and variations in hospitals' performance. More (2004) recent explored performance measures relevant to Australian health care (Ballou, Heitger & Tabor 2003; Cleverley & Harvey 1992; Eastaugh 1992; Short, Palmer & Ketchen Jr 2002; Smith, Piland & Funk 1992; Tang Chen Hsin 1997; Watkins 2003) and examined strategic marketing planning practices and their influence on organisational performance. These performance measures included market share, strategic planning effectiveness, service orientation, productivity, average occupancy, growth in the past two years, growth in revenue, profitability, return on investments and return on equity.

From the above discussion it is apparent that the strategy and performance relationship has a number of influencing concepts that require consideration. These concepts include financial and non-financial measures, a broader and balanced performance scope, and performance differences and variations. The financial and non-financial measures were found to capture

different information, with a focus on non-financial measures leading to an improvement in financial measures of performance. It can also be seen that a broader and balanced performance scope should focus on the relationships between performance indicators, with differences and variations in performance being attributed to community orientation, strategic flexibility, technology, quality improve organisations.

It is also apparent from the literature that the strategy and performance relationship has been explored with an emphasis on financial and non-financial measures, and a broader performance scope, in revealing differences and variations in performance. Specifically, the literature has not investigated the application of performance to marketing strategy. This research will therefore, seek to investigate the relationship between marketing strategy and performance and how this will affect the organizational strategy of organizations.

2.8. Gaps Identified in Existing Research

Conventional wisdom particularly highlights physician's involvement in management as the best for health service (Cobridge, C., 1996). After all, they are the principal agents who make decisions in relations to the commitment of resources in any health service. Naturally, in order to deal with problems such as inefficient allocation of resources and overspending in areas not aligned with the service's strategies, active participation by the physician in the service's management is required. Some theoretical work has explored the management-physician relationship. Some empirical research exists examines specifically the issue of physician participation in the strategic decisions. The role of physicians in managing the future of hospital, mission, and means for achieving strategic advantage is seldom clear.

Further gap identified in literature is the importance and understanding of the behavioral determinants of physician-participation in hospital administration. An information processing view of organizations suggests that participation will vary as a function of two variables: the hospital's strategy type and the content of the strategic decisions. Given the increased competition for resources, hospitals differ in their strategic approaches to organizational success (Ashmos, D., 1988; Marie-Pierre G., Emilia S. and Joan M. V., 2006). These differences in hospital strategies create a variety of information processing requirements

likely to result in differences with which the physicians participate in strategic decisions. As the content of strategic decisions differs simultaneously creating yet another kind of information-processing requirement change the nature of physician-participation considerably.

In India, a limited number of available studies focus the strategy of achieving total quality of health care. These studies focus on improving quality in certain departments, processes, operations, restructuring, customer satisfaction/relations and use of informational technology [Srinivas, T. and Prasad, G., 2002; Reddy, B. K. and Acharyulu, G. V. R. K, 2002; Verma, D. P. S. and Sobti, R., 2002; Sahni, A. 2002). In an era of continuing advancements in health care delivery, hospitals' strategies always intend to respond to competitive challenges. Strategies drive operational decisions on investments in structure, infrastructure, employee development, continuously bringing up enhanced capabilities. Overall, the literature provides some insights into service strategy in hospitals but the practical applications of physician's involvement in strategic decision making are inadequately explored. The developing countries with resources being scarce to match the demands placed on services provided by hospitals, effective hospital strategy management is the only drive to increase the system efficiency. Therefore, to fill the research gaps, this study proposes to analyze the participation of physicians in the strategic decision making and help to develop a conceptual model for hospital strategic decisions.

Greater knowledge of physicians' participation in hospital decision-making is relevant not only to understanding the many dimensions of the hospital's decision making process, but also to specific outcomes that affect the viability of hospitals as organizations.

Most of the research has focused on the structure and influence of medical staff and boards of trustees and related issues. Other studies have attempted to relate medical and administrative decision-making to quality of care in hospitals.

Analysis of hospital strategy studies reveals that very limited focus is on how marketing strategy influences organizational strategy in hospitals. This focus has been chosen as the

strategic orientation continuum has not been empirically tested thus far in the body of literature in either a quantitative or qualitative study.

2.9 Conclusion

This chapter has provided a broad review of the literature pertaining to the theoretical concepts of organizational strategy, marketing strategy, strategy communication and performance. Within the marketing strategy discussion concepts of environment, implementation, and evaluation and control have also been examined. Gaps within the current body of literature have been identified and as a result throughout the chapter research issues and research propositions have been developed. The following chapter will provide a detailed explanation of the methods that this research will use.

CHAPTER 3

RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction

This chapter details out the research methodology of the present study. In this chapter Section 3.2 presents research hypotheses tested, Section 3.3 describes the sample size and sampling procedure, Section 3.4 explains the pilot study, the research instrument used to collect the data, including methods implemented to maintain the validity and reliability of the instrument are explained Section 3.5. The data analysis methods are described in Section 3.6. The Pearson Correlation Coefficients and Intra Correlation Coefficients methods are detailed in the subsections. The data envelopment analysis is explained in Section 3.7.

3.2. Research Hypotheses

For the purpose of achieving the objectives of the study mentioned in chapter 1 the following hypotheses were presumed. These were formed on the basis of previous and current studies on the topic of physician's involvement in the decision-making process. The hypotheses are described in sets.

The first part of the research revolves around understanding and evaluating the strategies in private sector hospitals. Specially to investigate and identify various constituents of external and internal environments which impart the formulation and adoption of strategy for hospital services. This research makes a positive contribution in the direction of understanding strategy issues influencing hospital performance measured by patient satisfaction in the health services. However, this research sought to overcome the limitations it encountered with the most methodologically sound techniques and it should be followed by other efforts in the same direction. This research and similar studies will encourage other researchers to engage in more studies regarding the marketing mix strategy components in the hope that such efforts will improve the relationship between the organization, its managers and its customers with regard to greater mutual and common advantages and benefits. Based on this, to understand the broad aim of this research the following hypotheses are framed.

Hypothesis-1

There will be no significant effect of hospital strategy on hospital performance based on patient satisfaction and in providing services.

To test the above hypothesis the following sub hypotheses were framed.

- *The Health service strategy has a positive significant effect on the performance of private sector hospitals.*
- *The Pricing strategy has a positive significant effect on the performance of private sector hospitals.*
- *Distribution strategy has a positive significant effect on the performance of private sector hospitals.*
- *Promotion strategy has a positive significant effect on the performance of private sector hospitals.*
- *The Physical evidence strategy has a positive significant effect on the performance of private sector hospitals.*
- *The Process strategy has a positive significant effect on the performance of private sector hospitals.*
- *The Personal strategy has a positive significant effect on the performance of private sector hospitals.*

Research on strategic decision-making has emphasized the importance of team decision-making as it brings the benefits of synergy. The role of professional doctors in the strategic decision-making process and their impact on decision outcomes has become an important topic for research. To empirically examine the outcomes of decisions when physician executives were involved in the strategic decision-making process in hospitals, the study focuses on in determination and studying of factors affecting hospital performance. They will help the hospital administration to properly improve patient satisfaction which leads to patient retention of health services in private sector hospitals.

The second research problem moves around to examine the intensity of participation of physicians in strategic decisions. As discussed in the literature review, strategic decisions within the healthcare industry can create a dilemma within the team due to the potentially opposing perspectives of cost and quality. Executive teams with a greater presence of physicians may more fully appreciate and thus address the importance of attaining the

ultimate goal, which is providing quality of healthcare to their patients. Teams with this perspective may be more committed to a decision that would likely factor more intangibles that cannot be quantified but are essential for a quality strategic decision. Thus, with greater involvement of physician executives, it is more likely that high quality patient care will be the primary objective of strategic decisions. This focus in turn will enable strategic decision making team members to understand the rationale of decisions and will increase members' commitment to the decision throughout the implementation. Ultimately, the decision quality will be enhanced. Based on the above arguments, the following hypotheses are framed:

Hypothesis-2

The greater the presence of physician executives in strategic decision making team the greater will be the decision quality.

Hypothesis-3

The greater the presence of physician executives in strategic decision making team the greater will be the understanding of the rationale of decisions

Hypothesis-4

The greater the presence of physician executives in strategic decision making team the greater will be the commitment to decisions

3.3. Sample Size and Sampling Procedure

The exploratory and descriptive research design was adopted due to the nature of the research problem. Exploratory research provides insights into and comprehension of an issue or situation. Exploratory research is a type of research conducted because a problem has not been clearly defined. It helps to determine the best research design, data collection method and selection of subjects. While descriptive research, also known as statistical research, describes data and characteristics about the population or phenomenon being studied. On the basis of the above, the two research designs were appropriate for the present study.

A research study was planned to collect data in selected large scale hospitals in the country. As the sampling is one of the main elements of the research design and in that sample size is the number of respondents that could be included in the research study. Non-proportional

stratified random sampling was done. Determination of sample size is a very crucial decision and takes various qualitative and quantitative aspects into consideration (Malhotra, 2004). The sample size was calculated by assuming 95 percent confidence interval and margin of error 3.5 percent. At this confidence level, one would expect that if all the respondents were asked the same survey, that responses to the survey would change no more than ± 3.5 percent. Calculation of sample size determination by proportion was made as follows, using the maximum possible population variation ($\pi = 0.5$). The Precision of D in this study was 0.035 for a 95 percent confidence level. Sample size using the formula given below was calculated as under:

$$n = [\pi * (1 - \pi) * Z^2] / D^2$$

Where n = Sample size; π = Population variation; Z = Confidence interval

D = Precision Margin

The base sample size obtained is n=221. Second step is to multiply n * D (Design Effect=2; to correct for the difference in design, the sample size is multiplied by the design effect (D)). Third step is that the sample is further increased by 5% to account for contingencies such as non-response or recording error. Sample Size N becomes $(442 * 1.05) \approx 465$. Number of observations per category = $465/46 = 10$. Ten hospitals were randomly drawn from each category. The questionnaire was mailed to the senior executives such as managing director or chief executive officer or medical director of the hospitals. Since the information was supposed to be at private and confidential level, so the consent for not revealing the identity was provided to the hospital. Out of it was possible to obtain 160 filled questionnaires, out of which only 146 were analyzed because 24 were considered unsuitable for analysis as they were incomplete.

Cluster random sampling was applied to gather the sample responses from the sample respondents. The clusters were formed by dividing the target population into mutually exclusive and collectively exhaustive sub-populations or clusters. Then a random sample of these clusters was selected based on the probability sampling technique. The required information was collected from a simple random sample of the elements within each selected cluster.

The sample was drawn from various private hospitals. The type of hospitals (i.e. Private and specialty hospitals of different type) formed different sample group clusters for participant selection. A random sampling was conducted to obtain and allocate samples for each of these clusters (Neuman, 2005). Respondents from each of these schools were randomly sampled. The sampling plan was used to certify that samples were collected from different groups within the population.

3.4 Pilot Study

The pilot study formed the base for the research. A pilot survey is usually carried out among a small sample before a full-scale wider survey is implemented (Lim and Low, 1992). Walker (1997) suggested that pilot studies help to clarify research question boundaries, and make the research more focused. Before the actual survey for the study was carried out, the questionnaire was pre-tested on 40 physicians and 20 executives working in various private hospitals in Hyderabad, Telengana State. These selected candidates varied in age, gender, educational level and experience in using strategies and participated in hospital activities. They were asked to list down the various issues that they have faced while participating in the decision making process of the hospital management and providing medical services. Conducting a pilot study allowed the researcher to ask participants for suggestive feedback on the survey and also helped eliminate questionnaire framing bias. Through, the pilot survey, a list of 17 specific items were identified and used for the study. Furthermore, these physicians and executives were also asked to identify and rate the organizational and marketing strategy factors and also the personal strategy and patient satisfaction factors which they perceive were important during the making and execution of the decisions and based on their perception. A list of 12 items of the marketing mix strategy was obtained and used for the survey. Based on the findings of this pilot study, the survey instrument was improved.

3.5. The Research Instrument

The research instrument in the study consists of a structured disguised questionnaire (presented in Appendix 1) which was prepared on the basis of the literature survey and pilot study. In this study, quantitative approach was used for the purpose of gaining a comprehensive picture of the issues in question. The current research was used the questionnaire techniques to collect the primary data. The research questionnaire was designed in two parts based on previous empirical literature. This research questionnaire was used as a primary data collection method. The components health service, pricing, promotion, distribution/access, physical evidence, people, and process and hospital performance related questions will measured at 5-point Likert- scale ranging from 5 (strongly agree) to 1 (strongly disagree). The survey was distributed and collected by drop-off and pick-up and, also, on occasion, by remaining with the respondents during the answering of the questionnaire. An attempt was made to cover all the variables linked to influence the decision making and the respondents were required to indicate their level of involvement. The closed-ended questions with multiple options were used.

The survey instrument was designed to collect data from the members of decision makers in hospitals. Data was collected in two phases. During the first phase, surveys were mailed to the medical directors/CEOs requesting them to describe a strategic decision made during the last 12 months. The methodology was designed to reduce the pitfalls of retrospective reports of team members and to increase the accuracy as far as possible (Huber and Power, 1985; Golden, 1992). In addition to identifying a specific strategic decision made during the last 12 months, CEOs and Administrators were requested to identify key people who participated in the decision.

Of the 500 surveys, 160 questionnaires were returned. Of these 160 responses, 146 usable surveys were returned, as few heads replied that they were new to the hospital, and thus could not participate; few were too busy to take part in the survey; and few were declined to participate in the study. In all, 146 usable surveys were returned. The first phase of surveys thus yielded usable questionnaires from medical director/CEOs. These people identified 408

individuals who participated in the strategic decisions. The strategic decisions cited were related to new product development, improved customer service, restructuring and downsizing, and strategic alliances. The list of strategic decisions made by these hospitals is provided in the appendix. In the second phase, the survey instrument was administered to the identified strategic decision- makers to request their participation in this study. These participants were to base their responses on the strategic decision designated by the CEO. This resulted in 221 usable questionnaires from the members. The average top management team size of our sample hospitals was 4.68.

3.6 Data Analysis Measures

The details of all data analysis measures are presented in the following sections.

3.6.1. Pearson Correlation Coefficients

To analyze the effect of marketing mix strategy on hospital performance based on patient satisfaction, the independent variables represented by marketing mix strategy components, namely health service, pricing, distribution, promotion, physical evidence, process, and personal strategies and dependent variable which represented by patient satisfaction were considered. Pearson correlation coefficients between every pair of variables were constructed and the 1-tailed significance of each correlation and the number of cases contribution used. The following multiple regression model was used.

$$Y = B_0 + B_1X_1 + B_2X_2 + B_3X_3 + B_4X_4 + B_5X_5 + B_6X_6 + B_7X_7 + E$$

Where:

Y= the predicted value on the hospitals performance B_0 = the Y intercept, the value of Y when all Xs are zero X_1 = Health service strategy

X_2 =Pricing strategy X_3 =Distribution strategy X_4 =Promotion strategy X_5 =Physical evidence strategy X_6 =Process strategy X_7 =Personal strategy

B= the various coefficients assigned to the IVs during the regression

E = an error term.

3.6.2. Intra Correlation Coefficients

Our theoretical model and hypotheses examine the connection between the proportion of physicians in the strategic decision making team (the independent variable) and decision outcomes such as decision quality, understanding, and commitment (dependent variables). Researchers investigating strategic management concepts and decision making in particular are increasingly being called upon to theorize multilevel models and to utilize multilevel data analytic techniques.

In this study, the statistical procedures used in the multilevel data analyses, intraclass correlation coefficients (ICCs), $Rwg(j)$. This study involves the responses of two or more individuals that participated in a specific strategic decision, thus the data was aggregated. Aggregation was prepared by considering the mean scores. Before aggregating, it was necessary to assess the within-group agreement, therefore, inter-rater agreement will be calculated for each of the key variables before aggregating (Glick, 1985). Use of Rwg coefficient was suggested to assess the within-group agreement (James et al., 1984) which ranges between -1 and 1. A value of 1 indicates complete agreement, -1 represents a complete disagreement, and 0 represents lack of agreement (which does not equal disagreement). The general rule of thumb is that data can be aggregated when the coefficient is greater than 0.6 (Glick, 1985). The Rwg coefficients have uniform distribution suggests that there is no problems are associated with aggregating data.

We also calculate two intraclass correlation coefficients $ICC(1)$ and $ICC(2)$, and conduct an F-test for the $ICC(1)$. Specifically, $ICC(1)$ indicates the percentage of variance that resides between groups, whereas $ICC(2)$ assesses the stability of group means. $ICC(1)$ was computed by comparing the mean square between the mean square total, based on the results of one-way ANOVA. $ICC(2)$ was computed by comparing the mean square between minus the mean square within to the mean square between based on the results of ANOVA. ICCs are based on variance partitioning and therefore are subject to essentially the same assumptions as analysis of variance (ANOVA). These include homogeneity of variance (the variances within the units are statistically the same), normality (the population scores are normally

distributed), statistical independence (the observations are independent), and measures that are of equal psychological intervals.

ICCs are used “when one is interested in the relationship among variables of a common class, which means variables that share both their metric and variance” (McGraw & Wong, 1996, p. 30). The introductory piece in this issue (Bliese, Halverson, & Schriesheim) used ICC(1) and ICC(2) to draw inferences about the data. ICC(1) estimates interrater reliability (or the amount of variance in individual level responses that can be explained by group level properties), and is not influenced by group size or by the number of groups (Bliese, 2000b; Bliese & Halverson, 1998b). ICC(1) is calculated as follows (Eq. (1)):

$$ICC(1) = (ms_b - ms_w) / [ms_b + ((n_g - 1)ms_w)], \quad (1)$$

where ms_b is the between-group mean square, ms_w is the within-group mean square, and n_g is the group size (Bliese, 2000b).

ICC(2) estimates the reliability of group means and is calculated as follows (Bliese, 1998; Glick & Roberts, 1984) (Eq. (2a)):

$$ICC(2) = (ms_b - ms_w) / ms_b \quad (2a)$$

When group sizes are large, ICC(2) can also be calculated using the Spearman–Brown formula in conjunction with the ICC(1) and group size (Bliese, 1998; Shrout & Fleiss, 1979) (Eq. (2b)):

$$ICC(2) = [n_g \times ICC(1)] / [1 + (n_g - 1) \times ICC(1)] \quad (2b)$$

Since large group sizes generally result in more stable mean scores, it is possible to have high ICC(2) values and low ICC(1) values (James, 1982). Both of these equations assume equal group sizes, to calculate ICCs in samples with uneven group sizes; see Bliese and Halverson (1998b).

The $r_{wg(j)}$ index is a measure of interrater agreement, and is typically used to determine the appropriateness of aggregating data to higher levels of analysis (James et al., 1984; James, Demaree, & Wolf, 1993). Unlike the omnibus reliability indices, ICC(1) and ICC(2), the $r_{wg(j)}$ index is calculated separately for each group. The formula for calculating $r_{wg(j)}$ is (Eq. (3)):

$$r_{wg(j)} = \frac{J \left[1 - (\bar{s}x_j^2 / \sigma_E^2) \right]}{J \left[1 - (\bar{s}x_j^2 / \sigma_E^2) \right] + (\bar{s}x_j^2 / \sigma_E^2)} \quad (3)$$

where $rwg(j)$ is the within-group agreement coefficient for judges' mean scores based on J items, $\bar{s}x_j^2$ is the mean of the observed variances on the J items, and SE^2 is the expected variance of a hypothesized null distribution (James et al., 1984, p. 88). In the Bliese et al. (this issue) article, each group in the sample had three $rwg(j)$ coefficients, one for each variable. These were averaged across groups and then interpreted.

The $rwg(j)$ coefficient is a measure of interrater agreement. It was intended to be used in analyzing variables that have discrete response formats, such as a 5- or 7-point response scale. James et al. (1984) recommended that it not be used with a shorter response format (e.g., a 2-point response scale) as artificially low estimates of interrater agreement may result. Other conditions that should be met if using $rwg(j)$ include employing measures that "have acceptable psychometric properties" and approximately equal-interval measurement (James et al., 1984, p. 85), and having empirical evidence that supports the null distribution (pp. 93–94). Also, the distribution of obtained responses should not be bimodal or multimodal (James & LeBreton, 2001). Finally, the $rwg(j)$ coefficient should only be applied to measures with "essentially parallel" indicators of the same construct" (James et al., 1984, p. 88), implying that the measure should be unidimensional.

In the present study, the average inter-rater agreement was above the 0.70 benchmark proposed by James et al. (1984) for task conflict (0.85), relationship conflict (0.93), decision commitment (0.89), and decision quality (0.92). ICC(1) and ICC(2) values were 0.21 and 0.49 for task conflict ($F \frac{1}{4} 1.958, p < 0.05$); 0.23 and 0.52 for relationship conflict ($F \frac{1}{4} 2.104, p < 0.05$); 0.18 and 0.45 for team's decision rationale explored issues deeply. The mean value of inter-rater agreement (Rwg) for decision quality was 0.92 and the alpha for the aggregated measure was 0.85.

We measured decision commitment using six items adapted from Wooldridge and Floyd (1990). The respondents were asked to answer on a Likert- scale questions such as “how much were the team members willing to Understand”. Understanding was measured by asking the respondents to allocate ten points, based on relative importance, among six different areas:

- cost/efficiency,
- new product development
- coordination and control,
- human resource development,
- customer or market development, and
- other concerns (specify).

The sum of squared differences on these items was computed for each team and was then divided by the team size to produce a distance score, which represents the level of disagreement among the members over the decision rationale. This distance score, subtracted from a constant, produced a measure of how well each team’s members understood the organizational strategic priorities while making the decision. (Wooldridge and Floyd, 1990; Amason, 1996).

The control variables included in this study are organizational slack, team size, team tenure, task-based conflict, and relationship conflict. Organizational slack may affect group decision-making processes and other outcomes such as innovation (Hambrick, 1994; West and Anderson, 1996). It was therefore thought necessary to control for the “resources”. Organizational slack is measured by four items developed by Miller and Friesen (1982). In this study, the team tenure was measured as the number of years each team member had been employed by his or her current hospital. The mean value of inter-rater agreement (Rwg) for organizational slack was 0.86 with the values ranging between 0.99 and 0.41, and the alpha for slack was 0.67. Task-based conflict was measured with three items from a scale developed by Jehn (1995). The items measure the extent to which team members perceive the existence of task-based differences and disagreements. An example of an item representing cognitive conflict is “How many disagreements over different ideas about this

decision were there?”. The mean value of inter-rater agreement (Rwg) for task-based conflict was 0.85 and Cronbach’s alpha was 0.85. Relationship Conflict was measured using Jehn’s (1995) four-item summative seven-point Likert-type scale. The items measure the extent to which team members perceive the existence of person-based differences. The items were tailored to reflect the team context and were slightly modified in phrasing. For example, “How much friction is there among members in your work unit” was changed as “How much personal friction was there in the group during this decision?”. The mean value of inter-rater agreement (Rwg) for relationship conflict was 0.93 and the alpha was 0.92.

We further tested for discriminant validity by following the procedures outlined by Fornell and Larcker (1981) and Netemeyer et al. (1990), by comparing the variance extracted estimates of the measures with the square of the correlation between constructs. Variance extracted estimate is calculated by dividing the sum of squared factor loadings by the sum of the squared factor loadings plus the sum of the variance due to the random measurement error in each loading (Variance extracted). If the variance-extracted estimates of the variables are greater than the squares of the correlations between the constructs, evidence of discriminant validity is said to exist (Fornell and Larcker, 1981). In this study, the variance-extracted estimates for all the variables-exceeds the suggested level of 0.50 (Fornell and Larcker, 1981, p. 46) and also exceeds the squared correlation between the variables. These statistics, together with the CFA results, offer support for discriminant validity between decision quality, commitment, task conflict, and relationship conflict

3.7. Data Envelopment Analysis (DEA)

In hospitals, physicians play a vital role in taking strategic decisions. But all the physicians present in the hospital may not be efficient to take decisions. The efficiency of a physician may not be normally measured on the basis of his/her interest in the work, number of hours he/she works in the hospital, the number of patients he/she treats, number of years of experience he/she has, number of diagnosis tests they perform, his/her degree in medicine and likewise. Many factors together constitute the efficiency of the physician working in hospitals. The main importance to attain focus on physicians is due to following reasons.

- Due to rising of costs to crisis proportions, as physicians control 80% of resource input decisions in Health care systems.
- Resources used to care for patients with the same diagnostic condition has been found to vary anywhere from 100% to 2000% in the same hospital.

Different physicians use different levels of resource utilization due to inefficient decision making when compared with others having same caseload and mix of patients. The main policy is to improve the physician efficiency is to help the same patients who were associated with most efficient physician to inefficient patient. This helps not only the hospital, but also help the health care systems in society.

Data Envelopment Analysis (DEA) was utilized in this study. The study's preferences for data envelopment analysis is anchored on the fact that DEA is one of the important management science tool which does not require explicit specification of any functional form relating inputs to outputs. In addition, physicians decision making functions demand the use of multiple inputs and generation of multiple outputs and data envelopment analysis have proved a reliable analytical technique in handling, without complications, these multiple inputs and output situations. Above all, the objective of this study, which includes identifying the sources and magnitude of possible inefficiency in the decision making in the hospital system demands that data envelopment analysis be employed. For measuring the efficiency we take mainly two factors, namely, technical efficiency and scale efficiency. These are analyzed using DEA (Charnes, Cooper, and Rhodes, 1978; Banker, Charnes, and Cooper, 1984). Also a multi factor Tobit analysis is conducted to see which variables are associated with higher levels physician performance. And then depending on the inputs given we check how DEA with censored regression can sharpen an analysis of physician best practices and yields intuitively reasonable results in exploring factors associated with a DEA measure of clinical inefficiency. For calculating efficiency, we have a few types of efficiency like: technical efficiency, scale efficiency, allocative efficiency and overall efficiency. Here we deal with overall technical and scale efficiencies. Technical inefficiency refers to the extent to which a decision making unit (DMU) fails to produce maximum output from its chosen combination of factor inputs, and Scale inefficiency refers to suboptimal activity levels.

3.7.1. The Variables Selected for DEA

To evaluate efficiency, first we need to know best possible practices, which refer to a minimum set of inputs to produce successful results. Technical inefficiency may occur due to the following reasons: when a physician dealing with excessive resources compared to the physician with efficient resources with the same case level and mix of patients. Scale inefficiency occurs when the physicians do not even treat suboptimal level of patients. Hence physicians may be considered the most efficient with fewer days of stay and ancillary services and at an efficient scale size. Physician's decision making mainly depends on the following reasons (Billings and Eddy, 1987): Patient characteristics. Diagnostic equivocality, Uncertainty. Physician Attitude, Decision Judgment and Skill. Hospital Delay and Third Party reimbursement. In Table 3.1, the inputs to the DEA model represent the components of Physicians (X_1, X_2, X_3, X_4), and the output determinants Y_1 and Y_2 .

Table 3.1: Input and Output Measures

	Symbol	Concept	Sample
Inputs: Components	X_1	Total Length of each Patient's Stay	Number of Hospital Physicians : 221
	X_2	Total charges for ancillary Services	
	X_3	Cost of Medical Technology	
	X_4	Long-term Services	
Outputs: Determinants	Y_1	Hospital Performance	
	Y_2	Hospital Size	

In order to discriminate well between the efficient and inefficient physicians, the sample size has to be at least three times larger than the sum of the number of inputs and outputs (Avkiran, 1999). Therefore, a sample size of at least 18 hospitals in each category ((4 inputs + 2 outputs = 6) x 3 = 18) is required to analyze it separately.

3.7.2. Model Formulation

This study is based on the DEA model presented by Zhu (2004) for both the input-Oriented and output-Oriented approaches. A set of n observations will be considered on the Physicians. Each observation, Physician $_j$ ($j = 1, \dots, n$), uses m inputs x_{ij} ($i = 1, 2, \dots, m$) to produce s outputs y_{rj} ($r = 1, 2, \dots, s$). The efficiency frontier will be determined by these n observations. The mathematical formulations of the input- and output- oriented approaches are shown in Table 5. Physician $_0$ represents one of the ‘ n ’ Physicians under review and x_{i0} and y_{r0} the i th input and r th output for Physician $_0$ respectively.

Table 3.2. The DEA Model

Input-Orientated	Output-Orientated
$\min \theta - \varepsilon \left(\sum_{i=1}^m s_i^- + \sum_{r=1}^s s_r^+ \right)$ <p style="text-align: center;">Subject to</p> $\sum_{j=1}^n \lambda_j x_{ij} + s_i^- = \theta x_{i0} \quad i = 1, 2, \dots, m;$ $\sum_{j=1}^n \lambda_j y_{rj} - s_r^+ = y_{r0} \quad r = 1, 2, \dots, s;$ $\sum_{j=1}^n \lambda_j = 1$ $\lambda_j \geq 0 \quad j = 1, 2, \dots, n.$	$\max \phi - \varepsilon \left(\sum_{i=1}^m s_i^- + \sum_{r=1}^s s_r^+ \right)$ <p style="text-align: center;">Subject to</p> $\sum_{j=1}^n \lambda_j x_{ij} + s_i^- = x_{i0} \quad i = 1, 2, \dots, m;$ $\sum_{j=1}^n \lambda_j y_{rj} - s_r^+ = \phi y_{r0} \quad r = 1, 2, \dots, s;$ $\sum_{j=1}^n \lambda_j = 1$ $\lambda_j \geq 0 \quad j = 1, 2, \dots, n.$

Source: Zhu (2004)

The value of θ represents the input-Oriented efficiency score and Φ the output-Oriented efficiency score of Physician $_0$. If $\theta = 1$ or $\Phi = 1$, Physician $_0$ lies on the frontier. If $\theta < 1$ or $\Phi > 1$, Physician $_0$, is inefficient and should either decrease its input levels or increase its output levels. It is possible for the DEA to indicate an individual input reduction or output increase for a specific Physician in order to move it onto the frontier. These input reductions or output increases are called input or output slacks and are represented by s_i^- and s_r^+ respectively. The presence of ε in the input-Oriented model allows the minimization over θ to pre-empt the optimization involving the slacks, s_i^- and s_r^+ . The model is therefore calculated in a two-stage process. Firstly, maximal reduction of inputs is achieved by optimizing θ . Secondly; movement onto the frontier is achieved by optimizing the slack variables. Similarly, the output-Oriented model is also calculated in a two-stage process by firstly is calculating Φ and then optimizing the slacks by fixing Φ . Ray (2004) clarifies slacks with a simple example:

Suppose that in a particular application $\Phi^* = 1.25$ is obtained. This means that all the outputs should be increased by 25% for the company to become fully efficient. Now suppose that $s_1^+ = 10$. This implies that output1 can be further increased by 10 units. Moreover, if any one of the input slacks is strictly positive, the previous expansion of the outputs can be achieved while reducing individual inputs at the same time.

The left-hand sides of the models are called the ‘Reference Set’ and the right-hand side represents the specific Physician under evaluation. The non-zero optimal λ_j represents the benchmarks for the specific Physician under evaluation. The reference set, as shown above, provides coefficients (λ_j) to form the hypothetical efficient Physician. The reference set shows how inputs can be decreased and outputs increased to make the Physician under evaluation efficient.

3.7.3. Other Factors

Over the years, many studies have found that after controlling for case mix, specialists and sub-specialists tend to use more resources than general practitioners do. There is a strong association between a physician’s age and utilization of resources. A formulation can be given as:

Age α [1/ Number of Medical Tests] and

Medical Background α Number of Medical Tests

The conclusions from the above can be mentioned as

“Holding the effects of other factors constant, physicians without board-certified sub-specialties will utilize resources more efficiently than sub-specialists.”

“Holding the effects of other factors constant, there will be a positive association between physician age and a more efficient utilization of clinical resources.”

Physicians practice according to the specialization they are expertise in. So, every physician focuses on fewer diagnostic conditions irrespective of the severity or complexity of their

patient case mix. Moreover, studies say conclusively that there is a negative association between number of diagnostic related groups (DRC) treated and more efficient utilization of resources.

There is a myth in society that treating large number of patients makes the physician more efficient, but in practice it does not signify the same. A physician treating optimal and sub-optimal scale influences the efficiency of that physician. If a physician is caring for too many patients he will be having lots of pressure on him and thus can't be efficient. It also doesn't imply that if physician treats only a few he is efficient. So there are few difficulties in applying this concept to physicians. It also depends on length of stay and ancillary services of the patients which will be provided by a physician. Few physicians may use resources than required.

At the conclusion of different studies say that

“Holding the effects of other factors constant, there will be a positive association between the size of a physician's case load and a more efficient utilization of clinical resources.”

“Holding the effects of other factors constant, a severity mix of the output will affect the use of clinical inputs; thus there will be a negative association between the proportion of high severity cases and a more efficient utilization of clinical resources.”

There needs to be some control on the resources and the caseload of patients to be treated. Studies in this say that “Holding the effects of other factors constant, case mix variables should have little or no effect on the measure of physician efficiency; thus, there should be a weak, positive association between case mix and a more efficient utilization of clinical resources.”

When we are calculating the measure of efficiency of physicians, we need to consider the input and output variables, data on the physician resource utilization and also should consider about the factors we dealt above

3.7.4. Explanatory Variables and Control Variables

- A physician with affiliation is coded at 1 and others as 0.
- The sub-specialty variable was coded 1 if a physician was a board-certified subspecialist and 0 otherwise.
- The size of the case load was measured by counting the total volume of cases during the six month period.
- DRG Diversification was measured by counting the quantity of different diagnostic related groups (DRGs) treated over the six month period.
 - The larger the number, the more product-diversified the physician, the lower the number, the more focused or product-specialized the physician.
- Age of the physician measured by chronological years..
- The proportion of high severity cases was measured by the percent of cases in severity category
- The relative weight of case mix indicates the diagnostic complexity of the patients. The higher the weight, the more complex the case mix.
- Information about the average age of patients was collected from medical records. The average age of the case mix is the mean age of each physician's patient mix.

DEA assumes that a model is assessing the efficiency of 'comparable units', not product differences. Prior to running an efficiency analysis, if there is reason to believe that outputs are heterogeneous, it is recommended that peer groups be developed.

Two types of peer groups should be developed for this study. Both of these factors reflect differences in product and are reasons for subdividing physicians into comparable groups. In the first set of models overall technical and scale efficiency of the physicians is calculated and in model 2, only pure technical efficiency can be calculated. There is also a second set of DEA models (models 3 and 4) were run by partitioning the surgeons and internists by the relative weight of the case mix.

To find comparison groups, the complexity of each physician's case mix was measured by the average relative weight of the DRG mix. Surgeons were placed into a high versus low

case mix complexity group and interns were placed into a high versus low case mix complexity group based on the mean complexity of their case mix (i.e., average relative weight). From the above calculations we get two groups. One with the average relative weight less than a particular value and other with relative weight more than that base value. We can get number of sample tests as physicians and calculate the mean. We get significant case mix differences.

3.7.5. Strategy

The first part of analysis uses multivariate analysis of the DEA efficiency scores to explore the DEA model which yields reasonable results in explaining differences in physician efficiency. DEA score can be considered as function of patient characteristics and physician practice characteristics.

Each of the four DEA models are evaluated: Models 1 and 2 partition physicians by specialty groups and evaluate the overall technical and scale efficiency (CCR) and the pure technical efficiency (BCC). Models 3 and 4 partition by specialty and relative weight of the case mix and evaluate the overall technical and scale efficiency (CCR) and the pure technical efficiency (BCC).

The main purpose of running two sets of DEA models is to minimize or isolate the influence of case mix complexity, a variable extraneous to the purpose of the study. Even the statistical methodology used for analyzing DEA score with censored regression models. The main difficulty of using Tobit to regress efficiency scores is that DEA does not exactly fit the theory of a censored distribution.

The theory of a censored distribution argues that due to an underlying stochastic choice mechanism or due to a defect in the sample data there are values above (or below) a threshold that are not observed for some observations: As mentioned above, DEA does not produce a concentration of ones due to a defect in the sample data, rather it is embedded in the mathematical formulation of the model. A second difficulty of using Tobit is that it opens

up the possibility of rank ordering superior efficiency among physicians on the frontier – in other words 'hypothetical' scores > 1 . In production economics, the idea that some DMUs with DEA scores of 1 may possibly have scores > 1 makes no sense. It suggests that some candidates for technical efficiency (perhaps due to random shifts such as luck, or measurement error) are actually less efficient. Despite these drawbacks, blending DEA with Tobit model estimates can be informative. Although DEA does not fit the theory of a censored regression, it easily fits the Tobit model and makes use of the properties of a censored regression in practice. For example, the output can be used to adjust efficiency scores based on factors strongly associated with efficiency. Tobit may have the potential to sharpen a DEA analysis when expert information on input prices or exemplary DMUs are not available. Thus in a complex area like physician utilization behavior, Tobit could help researchers to understand the need to introduce boundary conditions for the DEA model's virtual multipliers.

By doing the above calculations inefficiency score is calculated by:

$$\text{Inefficiency Score} = [(1/\text{DEA Score}) - 1]$$

$$xB+u \quad \text{if efficiency score } > 0$$

$$\text{DEA inefficiency score} = \{$$

$$0 \text{ otherwise}$$

Once physician's DEA scores have been transformed, Tobit becomes a very convenient and easy method to use for estimating efficiency. The slope coefficients of Tobit are interpreted as if they were an ordinary least squares regression. They represent the change in the dependent variable with respect to a one unit change in the independent variable, holding all else constant. Four models were run. Each model was tested by a log-likelihood ratio test. This statistic is calculated by $-2 \log A$, where $\log A$ is the difference between the log of the maximized value of the likelihood function with all independent variables equal to zero, and the log of the maximized 14 The Tobit estimates were computed using statistical package. Values of the likelihood function with the independent variables as observed in the regression. The log-likelihood ratio test has a chi square distribution, where the degrees of

freedom are the number of explanatory variables in the regression. The statistic tests the significance of the Tobit model and is similar to an F-test in standard regression.

3.8 Conclusion

This chapter describes the research methodology, including the hypotheses, sample, data collection instruments as well as strategies used to ensure the standards, reliability and validity of the study. The methods used for the data analysis like a multiple regression model, Pearson Correlation Coefficients, Intra-Correlation Coefficients, and Data Envelopment Analysis was presented. The empirical results and analysis are presented in the next chapter.

CHAPTER 4

RESEARCH ANALYSIS AND DISCUSSION

4.1. Introduction

This chapter describes the analysis of data followed by a discussion of the research findings. The findings relate to the research questions that guided the study. The previous chapter provided a broad explanation of the research methods employed in this research. In each section the analysis of each concept is presented.

- The first part, PART-I present the analysis of various factors of external and interior business environments which impart the formulation and adoption of strategy for hospital services. From the review of the literature relating to the two key theoretical concepts, organizational strategy and marketing strategy factors were identified. The impact of these independent factors on dependent variable, patient satisfaction on hospital was investigated. Further, it also discusses the analysis of organizational strategy and marketing strategy continuum issues in hospitals. The hypothesis1 was tested and results were presented.
- The second part, PART-II of the analysis describes the outcomes of decisions when physicians were involved in the strategic decision-making process in hospitals. The hypotheses 2, hypotheses 3 and hypotheses 4 were tested and results were presented.
- The third part, PART-III presents the efficiency of physicians in the hospitals.

For understanding the involvement of physicians in the strategic decision making processes in hospitals, a survey instrument was developed and administered. This instrument has been used to address all the concepts related to the strategic decision making processes in the context of hospitals. Section 4.2 presents the analysis of factors of external and interior environments. In section 4.2.1 explanatory analysis was described. Section 4.2.2 provides marketing mix strategy components. Section 4.2.3 explains the relationship between marketing mix strategy components and hospital performance measured by patient satisfaction. Section 4.2.4 presents analysis of the organizational strategy and section 4.2.5 provides the analysis of marketing strategy. Summary of quantitative Analysis was described

in section 4.2.6. Analysis of outcomes when physicians are involved in strategic decisions was presented in section 4.3. Technical and Scale Efficiency Analysis was presented in section 4.4. Data envelopment analysis was explained in section 4.4.1 and results of DEA in section 4.4.2. Section 4.4.3 output oriented results and section 4.4.4 measures of physicians practice characteristics are provided. The chapter concludes with section 4.5.

4.2. PART– I: Analysis of Factors of External and Interior Environments

This part presents the analysis of the effect of marketing mix strategy on hospital performance based on patient satisfaction. From the literature a range of marketing and organization disciplines has guided integrating a model relating marketing mix strategy. Accordingly, the relationship between marketing mix strategy and hospital performance measured by patient satisfaction has been constructed. The study considers the independent variables represented by marketing mix strategy components, namely health service, pricing, distribution, promotion, physical evidence, process, and personal strategies and dependent variable which represented by patient satisfaction. In order to explore the relationship between independent and dependent variables the quantitative method was used to collect primary data through a survey questionnaire, which was administered in the private sector hospitals with hospital managers.

4.2.1. Explanatory Analysis

This section focuses on providing an explanatory analysis of the research data collected. The hypothesis considered for this section is “Service marketing mix strategy components have a positive and significant effect on the hospital performance measured by patient satisfaction of private sector hospitals”. Table 4.1 shows the correlation matrix, which presents the value of the Pearson correlation coefficient between every pair of variables, the 1-tailed significance of each correlation and the number of cases contribution provided in Table 4.2, to each correlation of sample.

Table 4.1. Hospital Performance and Marketing Mix Strategy

Pearson Correlation	HPMPS	Health Service Strategy	Price Strategy	Distribution Strategy	Promotion Strategy	Physical Evidence	Process Strategy	Personnel Strategy
HPMPS	1.0000	0.5326	0.0641	0.0752	0.3011	0.3694	0.3933	0.2197
Health Service Strategy	0.5326	1.0000	0.3163	0.0344	0.2865	0.4524	0.3065	0.2541
Price Strategy	0.0641	0.3163	1.0000	0.2363	0.2721	0.1836	0.3282	0.2201
Distribution Strategy	0.0752	0.0344	0.2363	1.0000	0.2354	0.1176	0.0326	0.0400
Promotion Strategy	0.3011	0.2865	0.2721	0.2354	1.0000	0.2202	0.3616	0.3132
Physical Evidence	0.3694	0.4524	0.1836	0.1176	0.2202	1.0000	0.4956	0.3384
Process Strategy	0.3933	0.3065	0.3282	0.0326	0.3616	0.4956	1.0000	0.3513
Personnel Strategy	0.2197	0.2542	0.2201	0.0400	0.3132	0.3384	0.3513	1.0000

Table 4.2. Marketing Mix Strategy and Hospital Performance Measured by Patient Satisfaction

One tail Significance	HPMPS	Health Service Strategy	Price Strategy	Distribution Strategy	Promotion Strategy	Physical Evidence	Process Strategy	Personnel Strategy
HPMPS	—	0.0000	0.1661	0.1891	0.0000	0.0001	0.0000	0.0005
Health Service Strategy	0.0000	—	0.0000	0.3545	0.0000	0.0000	0.0000	0.0012
Price Strategy	0.1611	0.0000	—	0.0023	0.0011	0.0144	0.0000	0.0004
Distribution Strategy	0.1871	0.3245	0.0021	—	0.0023	0.0823	0.3554	0.3218
Promotion Strategy	0.0000	0.0000	0.0001	0.0002	--	0.0002	0.0000	0.0001
Physical Evidence	0.0000	0.0000	0.0001	0.0082	0.0000	--	0.0003	0.0000
Process Strategy	0.0000	0.0000	0.0000	0.298	0.0000	0.0000	--	0.0000
Personnel Strategy	0.0062	0.0021	0.0038	0.3261	0.0000	0.0001	0.0000	--
Sample	221	221	221	221	221	221	221	221

However, among all the predictors, health service strategy correlates best with the hospital performance measured by patient satisfaction in that it has highest positive correlation with it, which is also significant. Therefore, it is likely that this variable will best predict and/ or explain the variance. The results of the analysis have demonstrated that the multiple regression model, Table 4.3, which consists of the marketing mix strategy components has significantly improved our ability to explain the outcome variable.

$$Y = B_0 + B_1X_1 + B_2X_2 + B_3X_3 + B_4X_4 + B_5X_5 + B_6X_6 + B_7X_7 + E$$

$$Y = 0.654 + 0.346X_1 + 0.092X_2 + 0.085X_3 + 0.172X_4 + 0.079X_5 + 0.184X_6 + 0.042X_7$$

Where:

Y= the predicted value on the hospitals performance B_0 = the Y intercept, the value of Y when all Xs are zero X_1 = Health service strategy

X_2 =Pricing strategy X_3 =Distribution strategy X_4 =Promotion strategy X_5 =Physical evidence strategy X_6 =Process strategy X_7 =Personal strategy

B= the various coefficients assigned to the IVs during the regression

E = an error term.

These coefficients as shown in the Table 4.3 are referred to as B values, which indicate the individual contribution of each predictor to the model. By replacing the B values into the above equation, the model becomes defined. In this way, the B values inform the relationship among the hospital performance measured by patient satisfaction and the influences of the marketing mix strategy. If the value is positive, this indicates a positive relationship between the predictor and the outcome, whereas a negative coefficient represents a negative relationship. Viewing the B value under the first column, the health service strategy has the highest positive relationship with the outcome variable hospital performance measured by patient satisfaction ($B=0.3346$). Non similarly, pricing strategy ($B=0.0323$), while distribution strategy has no significance ($B= 0.0453$). Whereas the other four components (promotion, physical evidence, process, and personal strategies) are significantly related to the hospital performance measured by patient satisfaction.

Table 4.3 Multiple Regression Model/Hospital Performance Measured by Patient Satisfaction

Model	Unstandardized Coefficients		Standardized Coefficients	t value	t value Critical
	Beta	Std. Error	Beta		
Constant	0.6542	0.4565	—	1.435	0.154
Health Service Strategy	0.3346	0.0775	0.3609	4.494	0.000
Price Strategy	0.0323	0.0586	0.1247	1.583	0.012
Distribution Strategy	0.0453	0.0866	0.0865	0.994	0.322
Promotion Strategy	0.1724	0.0797	0.1675	2.167	0.032
Physical Evidence	0.1798	0.0386	0.1514	2.067	0.041
Process Strategy	0.1846	0.0995	0.1583	1.867	0.042
Personnel strategy	0.1425	0.0804	0.0404	0.524	0.031
Dependent Variable: Patient Satisfaction		R² =0.731	Adjusted R² = 0.743	F=11.720	

The results of the above analysis bear a number of significant empirical conclusions for researchers and practitioners in health services marketing and in private hospitals.

4.2.2. Marketing Mix Strategy Components

It is found that there is a significant impact of a marketing mix strategy component of the hospital performance measured by patient satisfaction at all.

4.2.2.1. Health Service Strategy

It is found that the majority of private sector hospitals provides a comprehensive range of health and medical service classes to facilitate the diverse needs and wants of in their target market. Developing and introducing new health services is applied in private sector hospitals. The importance of introducing and developing new health services is twofold. First, it is a competitive tool for the hospital’s growth and continuations, and for enabling the hospital to meet the needs and wants for the largest possible market. Second, in light of the updated medical technology worldwide, it helps hospitals to gain opportunities that lead to increased market share and penetrate new markets. The research data indicate that patient services is a fundamental factor in a health service strategy and a crucial part of the marketing strategy, whereas the private sector hospitals focus on customers’ (patients) confidential cases.

4.2.2.2. Pricing Strategy

The quantitative data analysis in the private sector hospitals indicated that there are disparate pricing strategies are frequently adopted within the hospitals. These strategies involve pricing based on government regulations, and the varying costs, which the private sector hospitals incur. The pricing policy based on competition in the health market and price discrimination according to market segment was utilized by private sector hospitals.

4.2.2.3. Distribution Strategy

It is found that the majority of private sector hospitals provides an hourly service availability to match the non-programmed emergency and accident cases. The research data indicates that private sector hospitals have branches in different places and cities though it involves to a high cost of establishment. As such, most of private sector hospitals do have a mobile clinic.

4.2.2.4. Promotion Strategy

The qualitative data analysis suggests that the most prominent method of promotion is by “idle talk” communication where an existing patient recommends the hospital services to other customers in similar or different cases of illness. The idle talk communication, personal selling and customer personal contact, and public relation, and publicity for promoting health services were used by most hospitals. The rationale behind using idle talk communication in promoting health services is that the health service has unique complex characteristics especially the aspect of intangibility. Medical and administrative staff believe that the greatest means of promoting health service is by idle talking. Furthermore, promoting health services is more problematic compared with other services or products. The rationale underlying use of public relations and publicity to enhance the hospitals image in promoting their health service is that hospitals need to build trust and improve the reputation of their health services. The low use of other methods of promotion (advertising) remains a matter of debate among the health services.

4.2.2.5. Physical Evidence Strategy

The research data indicate that customer service is a fundamental objective in designing the physical evidence strategy of private sector hospitals by which it can create a customer-friendly atmosphere and comfortable access to the health services. Therefore, the customers of hospitals face an altogether different psychological situation compared to customers of other service organizations, which need additional effort to help them reduce the degree of anxiety experienced by concentrating on the physical evidence atmosphere facilities.

4.2.2.6. Health Process Strategy

The research data reveals that the health/medical services delivery process strategy is the most sensitive and critical activity that the private sector hospitals, as with any hospital around the world concentrates upon to deliver their services on time. Most medical cases do not accept any delay in treatment. Private sector hospitals also recognized satisfaction among their customers during delivering health services for two reasons: first, the social responsibilities, and second the great competition extent in the health care market.

4.2.2.7. Personal Strategy

The data indicates that private sector hospitals are generally improving their personal ability to perform their service role and to maintain a competitive level. They further concentrate on their staff's appearance because of the extreme contact occurring between staff and hospital patients. Serving customers in hospitals are critical activities that may earn customer satisfaction- or approbation, so excellent standards are essential within such an environment.

4.2.3. The Relationship between Marketing Mix Strategy Components and Hospital Performance Measured by Patient Satisfaction

The analysis and findings from the quantitative research, data analysis relating to the relationship between the marketing mix strategy and hospital performance measured by

patient satisfaction indicated that the marketing mix strategy components, namely; health service, pricing, distribution, promotion, physical evidence, process, and personal strategies are found to have varied significant and insignificant effects on hospital performance measured by patient satisfaction.

Marketing mix strategy is a necessary strategy in service organizations to ensure these organizations' success. It is vital to marketing the hospitals in the target market and acts on behalf of the whole hospital or with coordination in dealing with hospital performance measured by patient satisfaction. These are the factors that the hospital is attempting to win via the marketing strategy application and the services delivered. This study argues that such strategy does not evolve simply by chance, but through a planned effort by the hospital management. The link between these factors and the marketing mix strategy components was based on findings from the literature, pilot interviews. The framework suggests that marketing mix strategy as a core construct in this research receives its vital role through the effect of marketing mix strategy on hospital performance measured by patient satisfaction. As a result, the argument of this study is that the marketing mix strategy is a mediating factor that relies on hospital performance measured by patient satisfaction. Furthermore, the marketing mix strategy itself leads to some impact on the hospital, including hospital performance measured by patient satisfaction.

The services are considered as the context for this work because, given the characteristics of services it is evident that most of the diagnostic and therapeutic health services in the hospital are delivered by direct contact between service provider and patients. For this reason hospital employees play a key role in the services. Hence, the customer might not observe more valuable tangibles than the health service employee who represents the service and the hospital in every service visit. Therefore, health service delivery relies on human interaction with the customers. The hospital industry is considered in this study as a major representative sector of the general service industry. It recommends that hospital managers should pay attention to the pricing strategy by studying the pricing objectives to match the patient's needs and wants. Also studying the distribution strategy by enhances the access of the health services.

This thesis contributes to the services marketing discipline in finding out the role of marketing mix strategy in delivering a better health service within the service sector. It investigates the latter so as to demonstrate the uniqueness of a service organization and the importance of the service. As such, this study attempts to contribute to the marketing knowledge and health services marketing in particular by looking at the impact of these on marketing mix strategy on hospital performance measured by patient satisfaction. It is considered as new research in the diffusion of marketing in the area of health services to gain an understanding of the relevance, effectiveness and contribution of marketing mix strategy to the private sector hospitals.

4.2.4. Analysis of the Organizational Strategy

In analyzing the quantitative data related to the organizational strategy continuum, the following question from the instrument was utilized: ‘Where would you say that your organizational strategy sits on these scales with regards to the stated organizational characteristics?’ This question used a ten-point scale in the interview instrument. However, to gain a greater depth of meaning and understanding from the interviewees ‘responses, this scale were collapsed into a three-point scale. Responses 1–3 were classified as being the visionary end of the continuum, responses 4–7 were classified as the belonging to middle of the continuum, and responses 8–10 were classified as lying at the opportunistic end of the continuum. In analyzing the data a cross-tab analysis was conducted on all responses through cross referencing the responses to question addressed against the management levels of the CEOs and responsible strategic decision making managers (SDMs). These results have been illustrated in Table 4.4 and will now be discussed.

From Table 4.4, it is apparent that the perspective characteristic for both management levels was indicated as having a strategic vision focus, illustrating that both the CEOs and the RSDMs considered their organizational strategy to have a forward looking perspective. Strategic uncertainties were depicted through a strategic vision perspective by the CEOs as leaning towards trends affecting the future, in accordance with the information systems in regional private hospitals, indicating that both management levels showed a strategic vision

perspective towards this organizational characteristic. Orientation was broken down into three aspects by Aaker and Mills (2005), with a strategic vision focus being placed on the aspect of building assets by the RSDMs. Additionally, structure was also broken down by Aaker and Mills (2005), but into two aspects. This characteristic was indicated as being more centralized, and hence visionary, by the RSDMs. Of interest, however, is the middle of the road⁴ perspective taken by both management levels on specific organizational characteristics. This middle of the road⁴ perspective is particularly relevant to (a) RSDMs in regards to strategic uncertainties, (b) CEOs in regards to structure (centralized/decentralized) and (c) both management levels for environmental sensing, orientation (commitment/flexibility and vertical integration/fast response), leadership

(charismatic/tactical and visionary/action oriented), structure, people, economic advantage and signaling. The middle of the road⁴ perspective taken by the different management levels in relation to these organizational characteristics indicates an element of uncertainty and indecision amongst management in their organizational strategy, indicating a cause for concern in the organizational strategies of regional private hospitals. From this discussion it is clear that different ends of the strategic orientation continuum can to some extent be applied to some organizational characteristics in regional private hospitals. The forward looking perspective of both management levels supports qualitative findings indicating the importance of (a) maintaining positive relationships with doctors, specialists, patients and the community into the future and (b) the length of time a strategy is forward planned. The notion of trends affecting the future has also been depicted in both the qualitative and quantitative analyses through discussion on staffing shortages and government regulations by the interviewees. Also, the visionary perspective towards building assets supports that the regional private hospitals aim to build new assets for their community.

From the above discussion, it can be seen that the quantitative analyses support and reiterate each set of findings for the organizational strategies in regional private hospitals. Interestingly, however, the quantitative findings have offered a new perspective on regional private hospitals organizational strategies, through the identification of the middle of the road perspective.

Table 4.4 Organizational Strategy

Organizational Characteristics	Management Level	Strategic Vision end of continuum (%)	Middle of continuum (%)	Strategic opportunistic end of continuum (%)
Perspective (forward-looking/present)	CEO	30	10	
	RSDM	35	20	5
Strategic uncertainties (trends affecting the future/current threats and opportunities)	CEO	20	20	
	RSDM	20	35	5
Environmental sensing (future scenarios/change sensors)	CEO	15	25	
	RSDM	10	45	5
Information system (forward looking/online)	CEO	20	15	5
	RSDM	25	35	
Orientation (commitment/flexibility)	CEO	10	20	10
	RSDM	15	40	5
Orientation (build assets/adaptability)	CEO	15	25	
	RSDM	20	35	5
Orientation (vertical integration/fast response)	CEO	-	30	10
	RSDM	15	40	5
Leadership (charismatic/tactical))	CEO		30	10
	RSDM	5	45	10
Leadership (visionary/action oriented)	CEO	5	25	10
	RSDM	10	35	15
Structure (centralized/decentralized)	CEO	15	25	
	RSDM	25	25	10
Structure (top-down/fluid)	CEO	10	30	
	RSDM	15	35	10
People (eye on the ball/entrepreneurial)	CEO	10	30	
	RSDM	5	45	10
Economic advantage (scale economies/scope economies)	CEO	6	24	12
	RSDM	12	29	18
Signalling (strong signals/surprise moves)	CEO	5	35	
	RSDM	5	50	5

4.2.5. Analysis of the Marketing Strategy

In analyzing the quantitative data related to the marketing strategy continuum, The following question of the interview instrument was utilized: ‘Where would you your marketing strategy sits on these scales with regards to the stated organizational characteristics?’. This question used ten-point scale in the instrument; however, to gain a greater depth of meaning and understanding from the interviewees responses, this scale was collapsed into a three-point scale. Responses 1–3 were classified as the visionary end of the continuum, responses 4–7 were classified as the middle of the continuum, and responses 8–10 were classified as the opportunistic end of the continuum. In analyzing the data, a cross-tab analysis was conducted on all responses through cross referencing the responses to question thirty against the management levels of CEOs and RSDMs. These results have been illustrated in Table 4.2 and will now be discussed.

For the purposes of interpreting Table 4.5 where interviewee responses indicated that specific organizational characteristics were directed towards the middle of the strategic orientation continuum, these were highlighted in green. For organizational characteristics that were spread across responses, ranging between visionary and opportunistic, these were highlighted in yellow. Where specific organizational characteristics were indicated as having a visionary perspective, these were highlighted in red. It is clear, in analyzing the results in Table 4.5, that a strategic opportunistic perspective played a strong role in red compared to the strategic visionary perspective. The strategic uncertainties characteristic in marketing strategy was indicated as having a strategic opportunistic focus by the CEOs, indicating that they were focused on current threats and opportunities in developing their marketing strategy. In orientation, both management levels indicated an opportunistic perspective leaning towards flexibility in decisions, with only the CEOs indicating a fast response in this organizational characteristic. In the characteristic of leadership, the CEOs took an opportunistic perspective and described themselves as both tactical and action-oriented. An opportunistic perspective was displayed by the RSDMs in structure as they indicated a more fluid type of structure. The structure characteristic was also described through a visionary perspective by the RSDMs as being centralized.

Similar to discussion in relation to organizational strategy, of interest here is the ‘middle of the road perspective taken by both management levels on different organizational characteristics. The middle of the road perspective was particularly relevant to RSDMs on the majority of organizational characteristics: perspective, strategic uncertainties, environmental sensing, information system, orientation (build assets/adaptability and vertical integration/fast response) and leadership (charismatic/tactical and visionary/action oriented). The CEOs held the middle of the road perspective for the characteristic of structure. Both management levels were of the middle of the road perspective in relation to people, economic advantage and signaling. This perspective taken by the different management levels in relation to these organizational characteristics indicates an element, similar to that discussed in relation to organizational strategy previously, of uncertainty and indecision amongst management in their marketing strategy, lending itself towards cause for concern in the marketing strategy of regional private hospitals.

From the above discussion on the quantitative analysis of the marketing strategies in regional private hospitals, it is clear that different ends of the continuum can be applied to some extent to some organizational characteristics in relation to the marketing strategy. The focus on current threats and opportunities in the strategic uncertainties characteristic is further highlighted in previous qualitative content analysis where it was highlighted that regional private hospitals take advantage of opportunities presented to them in introducing new services to the community. The flexibility and fast response within the orientation characteristic is also endorsed through previous qualitative findings that indicated the need to maintain and foster relationships with both doctors and the community in which the hospital operates. The leadership in regional private hospitals was described by the CEOs as tactical and action-Oriented, supporting the qualitative finding that the CEOs viewed advertising and communicating with the community as important parts of marketing strategy, portraying tactical and action-oriented leadership.

An additional perspective to marketing strategy in regional private hospitals, not previously encountered in the qualitative findings, is the middle of the road perspective. This perspective, as discussed previously, was indicated by both management levels on different

organizational characteristics when applied to marketing strategy. The middle of the road perspective does not align a continuum end with specific organizational characteristics or management level. Aspects of uncertainty and indecision are illustrated through this perspective of marketing strategy in regional private hospitals. This quantitative finding offers additional insight into the marketing strategies of regional private hospitals, not identified in the previous qualitative analysis.

The discussion above offers support on some organizational characteristics when applied to marketing strategy. However, the quantitative findings have offered a new perspective on regional private hospitals marketing strategies, through the identification of the middle of the road perspective.

Table 4.5 Marketing strategy

Organizational Characteristics	Management Level	Strategic Vision end of continuum (%)	Middle of continuum (%)	Strategic opportunistic end of continuum (%)
Perspective (forward-looking/present)	CEO	10	15	15
	RSDM	10	40	10
Strategic uncertainties (trends affecting the future/current threats and opportunities)	CEO	5	20	15
	RSDM	15	35	10
Environmental sensing (future scenarios/change sensors)	CEO	10	20	10
	RSDM	15	35	10
Information system (forward looking/online)	CEO	10	20	10
	RSDM	5	45	10
Orientation (commitment/flexibility)	CEO	10	5	25
	RSDM		35	25
Orientation (build assets/adaptability)	CEO	10	15	15
	RSDM	15	30	15
Orientation (vertical integration/fast response)	CEO	5	20	15
	RSDM	5	40	15
Leadership (charismatic/tactical)	CEO		20	20
	RSDM	15	30	15
Leadership (visionary/action oriented)	CEO		20	20
	RSDM	10	35	15
Structure (centralized/decentralized)	CEO	15	15	10
	RSDM	20	25	15
Structure (top-down/fluid)	CEO	5	25	10
	RSDM	15	25	20
People (eye on the ball/entrepreneurial)	CEO	-	40	-
	RSDM	-	35	25
Economic advantage (scale economies/scope economies)	CEO	-	25	15
	RSDM	-	40	20
Signalling (strong signals/surprise moves)	CEO	5	25	10
	RSDM	10	40	10

4.2.6. Quantitative Analysis Of Specific Marketing Strategies used by Regional Private Hospitals

Analysis of instrument questions on specific marketing strategy is shown in Table 4.6. The question related to specific marketing strategies that a regional private hospital may utilised. It asked: ‘Using the following table, please indicate the extent to which the following strategies are developed within your hospital?’. The analysis of this question consisted of recoding the scale in SPSS from a five-point scale to a three-point scale so as to give the data a greater depth of meaning.

The analysis of this question consisted of recoding the scale in SPSS from a five-point scale to a three-point scale so as to give the data a greater depth of meaning. Responses indicated as 1‘ or 2‘ were classified together as small extent. Responses indicated as 3 remained unchanged, and responses indicated as 4‘ or 5‘ were classified together as great an extent. A cross-tab analysis was conducted on all responses through cross referencing the responses to question eight against the management levels of CEO and RSDMs.

It is apparent from the highlighted strategies in Table 4.6 that the top three ranking strategies developed to a great extent in regional private hospitals are (a) positioning the organization through creating a positive relationship with medical practitioners’ (b) positioning the organization by creating an image based on the advantages that and our (c)‘ ‘offering a new or modified service to current market segments’.

A total of 95% of the decision maker’s interviews indicated that ‘positioning the organization through creating a positive relationship with medical practitioners’ as a strategy was developed to a great extent in their hospital. Under half of these interviewees were the CEOs (40%), with just over half (55%) were the RSDMs. The findings from the content analysis illustrated the importance of forming and maintaining positive relationships with doctors, specialists, patients and the community in which the hospital operates.

Regarding the strategy of positioning the organization on the advantages being developed

that in regional private service hospitals, 90% of interviewees indicated that this was done to a great extent. Of these interviewees, under one-third (30%) were the CEOs of the hospitals, with over a half (60%) being the RSDMs. Once again, this quantitative finding endorses that where services were discussed in terms of the need to monitor the competition, compare services to competitors, and market the services accordingly.

The ‘offering a new or modified service to current market segments’ was the third most developed strategy in regional private hospitals and was indicated as being so to a great extent by 80% of interviewees. Of these interviewees just over one-third (35%) were the CEOs of the regional private hospitals and just under a half (45%) were the RSDMs. This finding endorses that within the content analysis it was determined that the offering of new services was thought to play an important role in the marketing strategies of regional private hospitals.

Table 4.6 Marketing Strategies used by Private Hospitals

Strategy	Management Level	Great Extent (%)	Great Extent Total (%)
Setting prices according to Government Regulations Requirement	CEO	35	75
	RSDM	45	
Maintaining stable prices and emphasizing something other prices	CEO	30	75
	RSDM	45	
Advertise service offerings through the local newspaper/other Advertisements	CEO	26	42
	RSDM	16	
Position the organisation through creating a positive relationship with medical practitioners	CEO	17	57
	RSDM	40	
Position the organization by creating an image based on advantages that our services offer	CEO	40	95
	RSDM	55	
Selling services to more than one specific group of customers within the total market	CEO	30	90
	RSDM	60	
Selling services to the whole market (Entire region/Place etc)	CEO	35	75
	RSDM	40	
Identify and develop a new market segment for current services	CEO	30	60
	RSDM	30	
Offer a new or modified service to current market segments	CEO	35	80
	RSDM	45	
Focus efforts on a minority of market segments	CEO	10	25
	RSDM	15	
Differentiate services to those of competitors	CEO	20	65
	RSDM	45	

4.2.7. Summary of Quantitative Analysis

The preceding discussions highlight key findings from three specific questions in the interview instrument. It is significant that a middle of perspective, in both organizational strategy and marketing strategy, was uncovered through the quantitative analysis. This perspective indicates uncertainty and indecision in both forms of strategy in regional private hospitals, and is an important finding from this research. Additionally, as has been highlighted in the above analysis, there are three key marketing strategies presently being developed in private hospitals, all of which have been discussed in depth.

4.3. PART-II: Analysis of Outcomes when Physicians are involved in Strategic Decisions

Studies on strategic decision-making in hospitals have emphasized the importance of team decision making as it brings the benefits of synergy. In this analysis the empirical examination of the outcomes of decisions when physician executives were involved in the strategic decision-making process in hospitals are presented.

The results of confirmatory factor analysis and measurement properties are presented in Table 4.7. The discriminant validity between decision quality, commitment, task conflict, and relationship conflict was tested by comparing the variance extracted estimates of the measures with the square of the correlation between constructs. Variance extracted estimate is calculated by dividing the sum or squared factor loadings by the sum of the squared factor loadings plus the sum of the variance due to the random measurement error in each loading.

The means, standard deviations, and correlations among study variables are reported in Table 4.8. The prelude analysis of correlation reveals significant positive correlations between the predictor variable and the dependent variables. Ratio of physicians is positively correlated with decision understanding, commitment, and quality.

Table 4.7. Results of CFA and Measurement Properties

Variable	Rwg	Cronbach Alpha	Variance extracted estimate
Task-based conflict	0.7885	0.8532	0.6528
Relationship conflict	0.9326	0.9218	0.7428
Decision quality	0.9128	0.8554	0.5468
Decision commitment	0.8923	0.8858	0.5578

Table 4.8. Descriptive Statistics and Correlations between Variables

Variable	Mean	SD	1	2	3	4	5	6	7	8
Organizational slack	4.4129	0.4987								
Team size	4.5668	4.4551	0.0133							
Team tenure	9.6702	6.3241	0.0813	0.1432						
Task-based conflict	2.3425	0.5625	0.0941	0.2112	0.1434					
Relationship conflict	2.0041	0.5932	0.0421	0.2321	0.1145	0.4030				
Physicians ratio	0.3324	0.1781	0.0923	0.2353	0.2176	0.3443	0.1502			
Decision quality	3.2231	0.5743	0.0132	0.1843	0.1578	0.5864	0.1534	0.5943		
Understanding	7.6974	1.2852	0.1126	0.0325	0.1889	0.4187	0.1943	0.2954	0.4433	
Commitment	5.6998	0.6899	0.0259	0.1002	0.1290	0.6800	0.1234	0.4354	0.6432	0.3121

Table 4.9 presents the results of the hierarchical regression analysis. The regression was performed with organizational slack, team size, team tenure, task-based conflict, and relationship conflict – into the regression equation. Column 1 represents the direct effects model of the effect of these control variables on dependent variable decision quality. The direct effect model suggests that task-based conflict is a significant predictor of decision quality. The Hypothesis 2 is related to the positive relationship between the physician ratio and decision quality. In Column 2, physician ratio is entered into the regression equation. The results of hierarchical regression show significant beta coefficients for task-based conflict 0.4821 and physicians ratio 0.4545. In addition, the model was significant explaining 53 per cent of variance in decision quality. In Column 2 inclusion of the physician ratio accounted for an additional 17 percent of the variance in decision quality. These results suggest that the physician ratio has a positive effect on decision quality, thus supporting Hypothesis 2 that the greater the number of physician executives involved in the strategic decision-making process, the greater will be the decision quality. The Hypothesis 3 was concerned with the effect of the physician's ratio on understanding the rationale of decisions. The direct effects model, Column 3 suggests that task conflict is significantly related to understanding and the beta coefficient is 0.4223. Inclusion of the physician ratio Column 4, into the regression equation increased explained variance by 2 percent and was moderately significant. The beta coefficient for the physician ratio was 0.1645 and was moderately significant, suggesting that Hypothesis 2 has received modest support. The full model, however, was significant. The direct effects model, Column 5 of the relationship between physician ratio and decision commitment suggests that both task-based conflict 0.7634 and relationship conflict 0.1832, were significant predictors of decision commitment. Inclusion of the physician ratio into the regression equation, Column 6 increased explained variance by 4 per cent, and the regression coefficient for the physician ratio, 0.2368, was significant. In addition to the physician ratio, task based conflict and relationship conflict explained more than fifty per cent of variance in decision commitment and are significant.. These results support Hypothesis 4.

Table 4.9. Regression Coefficients of Physician Ratio of Decision Quality, Understanding, and Commitment

Variables	Decision Quality		Understanding		Decision Commitment	
	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
Organizational slack	0.049	0.013	0.1512	0.1325	0.0821	0.0634
Team size	0.061	-0.015	-0.1659	-0.1821	-0.0352	-0.0634
Team tenure	0.062	-0.037	0.1224	0.1013	0.0345	0.0123
Task-based conflict	0.623	0.4821	0.4223	0.365	0.7634	0.6967
Relationship conflict	-0.123	-0.1125	0.0534	0.0669	0.1832	0.1758
Physicians ratio		0.4545		0.1645		0.2368

In addition to the hypothesized model that the physician ratio has an effect on decision quality, commitment, and understanding, we conducted a post-hoc analysis of an alternative model whereby physicians ratio influences understanding, which in turn leads to commitment. Decision quality is enhanced when members are committed to the implementation of the decision. We tested these two models using structural equation modeling technique, and the path coefficients are presented. The structural equation modeling results parallel and supports the regression results. The path coefficient of physicians ratio to understanding in the regression was 0.16, whereas the path coefficient in the hypothesized model was 0.22. The path coefficient of physician ratio to decision quality in the regression was 0.45, whereas the path coefficient in the hypothesized model was 0.48, and significant. When we compared the hypothesized model with the alternative model, the alternative model demonstrated that commitment also leads to decision quality, as the path coefficient from commitment to decision quality was 0.07 and significant. Comparison of the “goodness of fit” statistics between these two models suggests that the alternative model is superior to the hypothesized model. Future research may dwell on the antecedents to decision quality as suggested by our post-hoc analysis.

Using regression, we also conducted a post-hoc analysis of three alternative models.

- Alternative model 1 represents the inclusion of understanding and physicians ratio in the model of decision commitment;

- Alternative model 2 has understanding, commitment, and physicians ratio included in the model of decision quality; and
- Alternative model 3 has physicians ratio, understanding, and decision quality included in the model of commitment.

We examined empirically the involvement of physicians executives in the strategic decision-making process and their effect on decision outcomes. Since physicians executives are more directly concerned with patient care and would contribute to the decisions that result in higher levels of patient care, the decision outcomes have direct relevance to the ultimate objective of the healthcare organization: i.e. patient care. The results of our study suggest that the number of physicians does make a difference in decision outcomes, and that the higher the ratio of physicians executives in the strategic decision-making process, the greater the decision quality, commitment and understanding of the rationale of the decisions.

4.4. PART – III : Technical and Scale Efficiency Analysis

Using Data Envelopment frontiers the physicians' efficiency, the technical and scale efficiency in decision making was evaluated and presented below.

4.4.1. Data Envelopment Analysis

The numerical values were assigned to the 4 inputs and 2 outputs. For length of stay and quantity of low and high severity cases, the natural physicians units were used (days, and number of cases). For ancillary services, there was no relative weighting system available other than aggregating these services into a 'total amount of rupees charged' factor. The four-input, two-output model was tested for isotonicity. A regression and correlation analysis confirmed that a positive association existed between the inputs and outputs and a moderate interrelation between the four input variables and a very weak interrelation between the two output variables. Table 4.10 and Table 4.11 show the descriptive statistics for the components (inputs) and the determinants (outputs), respectively. Table 4.12 presents the summary of physician factors.

Table 4.10. Descriptive Statistics for Physicians Components

Components	X₁	X₂	X₃	X₄
	(Rs)	(Rs)	(Rs)	(Rs)
Mean (Average)	3,503,827	633,207	3,098,542	3,466,495
Median	2,650,000	356,563	1,663,000	0
Standard Deviation	3,870,023	1,292,309	4,595,824	39,314,269
Minimum	567,820	0	0	0
Maximum	44,100,687	14,734,000	27,879,360	583,020,833

Table 4.11. Descriptive Statistics for Physicians Determinants

Determinants	Hospital Performance	Hospital Size
	(Rs'000)	(Rs'000)
Mean (Average)	19.61%	41,863,062
Median	14.07%	3,817,608
Standard Deviation	32.50%	145,473,062
Minimum	0.00%	48,677
Maximum	430.18%	1,336,308,000

Table 4.12. Summary of Factors Affecting Physician Efficiency

Physician factors	Mean	Standard Deviation	Minimum	Maximum
Affiliation	0.3628	0.4928	0	1
Sub-specialty	0.3452	0.5211	0	1
Physician's age	37	8.8	32	60
Diversification	38	13	17	87
Size of caseload	68	35	35	207
Proportion of high severity cases	0.89	0.07	0.58	1
Case mix factors:				
Relative weight of cases handling	1.2426	0.2928	0.8142	1.9212
Average age of patients	62	8	45	76
Average admission severity	1.3	0.3	0.5	1.9

4.4.2. Results of DEA

After the DEA has been applied to the sample, a distinction could be made between the efficient and inefficient physicians. Table 4.13 presents the descriptive statistics for these two groups within the sample. In total, 80 of the 221 physicians included in the sample emerged as the benchmark ones and formed the efficiency frontier against which the inefficient were compared. The table points out that the average total length of each patient’s stay amount related to physicians of efficient hospitals (from here on referred to as ‘efficient Physicians’) is higher than the average amount related to physicians of inefficient hospitals (‘inefficient Physicians’). It also points out that other inputs X3 and X4 for inefficient Physicians exceed those of the efficient Physicians, while hospital performance and size are less than that of efficient Physicians. This explains why these physicians are deemed as inefficient, because their current performance and size.

Table 4.13. Descriptive Statistics for Efficient and Inefficient Physicians

	X₁	X₂	X₃	X₄		
	(Rs)	(Rs)	(Rs)	(Rs)	Hospital	Hospital
					Performance	Size
Average						
Efficient (n=80)	3,830,728	569,075	2,828,450	901,929	27.63%	58,724,823
Inefficient (n=141)	3,318,351	669,594	3,251,786	4,921,568	15.06%	32,296,106
Minimum						
Efficient	567,820	0	0	0	0.00%	48,677
Inefficient	829,665	0	0	0	0.75%	86,720
Maximum						
Efficient	44,100,687	6,105,861	27,879,360	36,720,160	430.18%	1,336,308,000
Inefficient	24,860,518	14,734,000	25,957,049	583,020,833	99.64%	828,919,309

The input-Oriented efficiency score is expressed as 1.0 (or 100%) for efficient physicians and less than 1.0 (or < 100%) for inefficient physicians. Each hospital was analyzed separately with the DEA and Table 4.14 shows how the physicians in each category are distributed between the efficient and inefficient groups for the input-Oriented approach.

Table 4.14. Input-Oriented Efficiency Score Distribution

Input-Oriented	Efficient		Inefficient		Total	Minimum	Average
	No.	%	No.	%		Efficiency Score	Efficiency Score
Hospitals (Physicians)							
Cat 1	14	33%	28	67%	42	0.259	0.709
Cat 2	13	65%	7	35%	20	0.628	0.923
Cat 3	8	24%	25	76%	33	0.389	0.757
Cat 4	13	27%	35	73%	48	0.134	0.577
Cat 5	12	57%	9	43%	21	0.222	0.730
Cat 6	20	35%	37	65%	57	0.356	0.763
Total	80		141		221		

Table 4.14 shows that the Category 2 has the highest percentage of efficient physicians followed by the Category 5, while the Category 3 has the lowest percentage of efficient physicians. It further shows that the lowest input-Oriented efficiency score of 0.134 falls within the Category 4 and that this hospital also has the lowest average input-Oriented efficiency score of 0.577. This means that, on average, physicians within this category are only 57.7% efficient and have to reduce their value by at least 42.3% in order to be fully efficient ($57.7\% + 42.3\% = 100\%$).

4.4.3. Output-Oriented Results

The output-Oriented efficiency score is also expressed as 1.0 (or 100%) for efficient physicians, but more than 1.0 (or $> 100\%$) for inefficient physicians. Table 4.15 shows how the physicians in each industry are distributed between the efficient and inefficient groups for the output-Oriented approach.

Table 4.15 Output-Oriented Efficiency Score Distribution

Output-Oriented	Efficient		Inefficient		Total	Maximum	Average
	No.	%	No.	%		Efficiency	Efficiency
						Score	Score
Cat 1	14	33%	28	67%	42	15.494	3.796
Cat 2	13	65%	7	35%	20	5.629	1.376
Cat 3	8	24%	25	76%	33	19.258	2.406
Cat 4	13	27%	35	73%	48	15.066	2.801
Cat 5	12	57%	9	43%	21	6.141	1.793
Cat 6	20	35%	37	65%	57	11.736	1.991
Total	80		141		221		

The same number of physicians are efficient under the output-Oriented approach in Table 4.15 compared to the input-Oriented approach in Table 4.14. In Table 4.15, the highest efficiency score indicates the least efficient category. The maximum output-Oriented efficiency score of 19.258 exists in the category 3, which means that the Physician of that hospital has to increase current hospital performance and size by more than 19 times in order to justify his/her current collecting charges. The benchmarking power of the DEA lies in its ability to identify efficient physicians and to suggest target levels, hospital performance and size values for the inefficient hospitals by comparing them to the efficiency frontier created by the efficient hospitals. After applying the DEA, several physicians within each sector emerged as the benchmark physicians for that particular category. The benchmark physicians are those physicians that obtained an efficiency score of 1.0 under the input-Oriented or output-Oriented approach. The DEA compares each of the inefficient physicians of the benchmark companies within its network to establish specific targets for both the inputs and outputs that the inefficient physician has to obtain in order to be efficient. Under the input-Oriented approach, the input reductions required to reach the input targets. Alternatively, under the output-Oriented approach, the output increases required to reach the output targets are an indication of how much the physician is currently underperforming.

The first set of models evaluated the overall technical and scale efficiency (model 1) and pure technical efficiency (model 2) of all the internists and all the physicians separately. This is reasonable because diagnosing a patient may require more resources than performing a procedure, hence their outputs are different. In addition to partitioning the DEA model into different comparison groups, a second set of DEA models (models 3 and 4) were run by partitioning the physicians by the relative weight of the case mix. To find comparison groups, the complexity of each physician's case mix was measured by the average relative weight of the DRG mix. Physicians were placed into a high versus low case mix complexity group and interns were placed into a high versus low case mix complexity group based on the mean complexity of their case mix (i.e., average relative weight). Among internists, two groups emerged: group 1 had an average relative weight of less than 1.03; group 2 had an average relative weight of greater than or equal to 1.03. The surgeons were also divided into two groups: group 1 had an average relative weight less than 1.5 and group 2 had an average relative weight greater than or equal to 1.5. Statistical t-tests were used to compare the means of the two surgeon groups and the two groups of interns; significant case mix differences were found. Using the output from model 3's linear programming formulations, the slack for the inefficient physicians (i.e., excess inputs and output shortfalls) was projected

4.4.4. Measures of Physician Practice Characteristics

The first set of models evaluated the overall technical and scale efficiency (model 1) and pure technical efficiency (model 2) of all the internists and all the physicians separately. This is reasonable because diagnosing a patient may require more resources than performing a procedure, hence their outputs are different. In addition to partitioning the DEA model into different comparison groups, a second set of DEA models (models 3 and 4) was run by partitioning the physicians by the relative weight of the case mix. To find comparison groups, the complexity of each physician's case mix was measured by the average relative weight of the DRG mix. Physicians were placed into a high versus low case mix complexity group and interns were placed into a high versus low case mix complexity group based on

the mean complexity of their case mix (i.e., average relative weight). Among internists, two groups emerged, group 1 had an average relative weight of less than 1.03; group 2 had an average relative weight of greater than or equal to 1.03. The physicians were also divided into two groups, one group had an average relative weight less than 1.5 and another group 2 had an average relative weight greater than or equal to 1.5. The statistical t-tests were used to compare the means of the two physicians groups and the two groups of interns; significant case mix differences were found. Using the output from model 3's linear programming formulations, the slack for the inefficient physicians was projected

TABLE 4.16. Pearson Product-Moment Correlations among Measures of Patient Characteristics and Measures of Physician Practice Characteristics

Variables	1	2	3	4	5	6	7	8
<i>Patient characteristics</i>								
Average Relative Weight RWT	-	0.5201**	-0.0821	0.15	0.0143	0.1638	0.4102*	-0.3121
Average Age of Case Mix PAGE	-	-	0.3121	0.0622	-0.09	0.0823	-0.2742	0.5523**
<i>Physician Characteristics</i>								
FAMILY CARE	-	-	-	0.3136	0.0212	0.1634	0.1624	0.1635
DOCAGE	-	-	-	-	0.0343	0.2422	-0.22	0.2243
SUB-SPEC	-	-	-	-	-	0.3743	0.0623	0.3245
DRG	-	-	-	-	-	-	0.8201**	-0.0521
Case Load CASES	-	-	-	-	-	-	-	-0.4202*
High Severity cases HPROP	-	-	-	-	-	-	-	-

The Table 4.16 shows a matrix of Pearson correlations among the explanatory and control variables. Interestingly, the correlation between the average relative weight (RWT) and the average age of the case mix (PAGE) was negative. This is not as expected, since both were hypothesized to increase the utilization of resources. Not surprisingly, the size of the caseload (CASES) was significantly correlated with both the number of different DRGs treated ($r = 0.82$) and the proportion of high severity cases (HPROP) ($r = -0.42$). Since there

is collinearity between the size of the caseload and the number of different DRGs treated, combining the two measures was considered. With the exception of belonging to the PGP family and the age of the physician ($r = 0.31$) none of the other physician characteristics were significantly inter-correlated.

The following Table 4.17 presents the empirical results for the four Tobit models run using the transformed efficiency score as the dependent variable. The results of all four regressions are significant at a 95% confidence level or higher. In considering the results in Pearson Product-Moment Correlations among Measures of Patient Characteristics and Measures of Physician Practice Characteristics, it is important to remember that inefficiency scores are regressed in the Tobit estimations. Therefore, regarding the hypotheses, the signs of all coefficients will be reversed - a positive sign means an association with inefficiency, a negative sign means an association with higher levels of efficiency.

It is noted that the results regarding the patient characteristic variables are mixed. The average relative weight variable had a strong, positive effect on inefficiency in models 1 and 2. This variable is significant and positive for model 1 supports the idea that, the models partitioned by specialty may be included unobserved output differences in the inefficiency score. Interestingly, both the pure technical efficiency models (models 2 and 4) are in agreement except for the sign of the average relative weight variable. In model 4, partitioned by average relative weight, a more complex mix of cases was associated with greater technical efficiency (-). Taken together, these results may tentatively be interpreted to indicate that physician output data should be partitioned into peer groups partitioned by case mix. The consistently positive sign of the average age of the patient variable implies that efficiency declines when physicians encounter older patients.

TABLE 4.17. Estimation Results for Tobit Models

Explanatory Variables	MODEL 1	MODEL 2	MODEL 3	MODEL 4
	Overall Technical Efficiency and Scale Efficiency	Pure Technical Efficiency	Overall Technical Efficiency and Scale Efficiency	Pure Technical Efficiency
	Coefficient	Coefficient	Coefficient	Coefficient
Constant	-1.25	-0.49	-0.98	-0.04
RWT	0.431	0.412	0.139	-0.522
HPROP	-1.321	-1.892	-1.802	-2.292
HMO	-0.381	-0.483	-0.382	-0.401
DOCAGE	-0.001	-0.012	-0.002	-0.007
SUB-SPEC	0.080	-0.032	0.891	-0.002
DRG	0.012	0.001	0.023	0.011
CASES	-0.031	-0.009	-0.008	-0.006

The size of the average patient age (PAGE) coefficient is small (0.01) in models 3 and 4. These results may be interpreted to indicate that running DEA models partitioned by specialty type and relative weight peer groups do a better job of measuring overall technical and scale efficiency - i.e., they are not muddling output differences with technical efficiency. The only variable that is clearly significant for all 4 models is affiliation variable.

This finding is interpreted to mean that inefficiency scores are significantly higher for physicians who were members of the pre-paid group practice for family care than for physicians practicing in more traditional settings. The t-statistics indicate that this variable was statistically significant at a 95% confidence level or higher. Finally, comparing models 1, 2, 3, and 4, one notes some stability in the size (and sign) of the estimated coefficients for family care affiliation, which ranged from 0.33 to 0.43. This result is interpreted to mean that inefficiency scores are significantly higher for physicians who were members of the pre-paid

group practice for family than for physicians practicing in more traditional settings. The t-statistics indicate that this variable was statistically significant at a 95% confidence level or higher. Finally, comparing models 1, 2, 3, and 4, one notes some stability in the size (and sign) of the estimated coefficients for family care affiliation, which ranged from 0.38 to 0.48. The results regarding the other physician characteristics are mixed. In all four models the parameter estimates for the effect of physician age on efficiency scores are positively associated with efficiency; however, none of the t-statistics were significant at the 5% level. The results indicate that though this appears to be the traditional sign, but, it is not clear that much confidence can be placed in this finding because age is not a good proxy for experience. It is interesting that the estimates of the effect of sub-specialty on inefficiency scores in both the pure technical efficiency models are negative, while both of the overall technical and scale models find a positive association. This finding suggests that sub-specialists may be associated with higher levels of technical efficiency, but they may not be caring for patients at the most productive scale size. As these estimates were not even marginally significant, so these variables will not be considered for any further discussion.

The results for models 1 and 3 show that the parameter estimates for the effect of the number of different DRGs treated on inefficiency scores is positive, though significant at the 5% level only in model 3. The sign of the coefficient is interpreted to mean that while holding constant the number of patients, the higher the number of different DRGs treated, i.e., the greater the product diversification, the higher the inefficiency score. Since the crude count of different DRGs is far from an ideal measure of product diversity, these results should be viewed as only indicative. The size of a physician's caseload had a negative effect on inefficiency scores, and is significant only in model 3. Thus, physicians who cared for fewer patients, irrespective of mix, were more likely to be inefficient. Finally, in all four models, though significant only for model 3, the proportion of very high severity cases had a negative effect on inefficiency scores. Since the parameter estimates were significant for model 3 and not model 4, it suggests that under differing severity conditions a more optimal caseload can be achieved that can lead to improved efficiencies through a reduced utilization of resources.

The results presented above suggests that models 3 and 4 should receive more attention in this analysis for several reasons. The case mix variables had a much weaker effect on inefficiency scores in models 3 and 4. In addition to thus likelihood ratio test conducted on models 3 and 4 to determine the effect of heteroscedascity on the estimates could not reject a hypothesis of homoscedascity. In order to explore some of these findings further, model 3, referred to as CCR was used to estimate most productive scale size possibilities, and model 4, referred to as BCC was used to investigate returns to scale possibilities. to explore whether severity had an effect on a physician's clinical efficiency, the most productive output scale sizes (MPSS) were estimated. A chi square test was used to determine whether family care and fee-for-service physicians practice in regions of increasing, decreasing, or constant returns to scale (RTS). The obtained chi-square was significant at the 0.018 level. These results are interpreted to mean that the majority of the fee-for service physicians could have improved their average productivity by increasing the scale of their output.

4.5. Conclusion

This chapter has provided the empirical analysis of the research findings. The various constituents which impart the formulation of and adoption of strategy for hospital services was investigated and results presented in this chapter. Using the key questions from the survey instrument, a cross-tab analysis was performed and the results presented provided the supporting evidence for a new perspective on organizational strategy and marketing strategy. The organizational strategy, marketing strategy, and their impact on hospital performance was analyzed. Data envelopment analysis was carried out to understand the efficiency of physicians relations. The next chapter provides the summary and conclusions of the research work.

CHAPTER 5

CONCLUSIONS

5.1. Introduction

In response to demands for improved hospital performance, accountability and cost containment, there is an increasing interest for a greater engagement and positioning of physicians with systems and organizations goals and values. The significant transformational changes in progress in the current health care system will only be successful if there are effective relationships between hospitals and physicians at all levels. Coordinated co-governance between executives and doctors, specially integration and alignment between physician and hospital leaders in a broad array of issues, including expectations and values; financial and non-financial incentives; goals and their measures; shared strategic planning; and patient engagement strategies can help drive the necessary transformation. This should lead to a shared objective of creating a high-performing, integrated and sustainable health care system that delivers high-quality, effective and efficient patient care. Consequently, enhancing the relationship between hospitals and physicians will result in greater levels of satisfaction and engagement on the part of physicians working within robust and high-performing hospitals, which will improve both patient care and patient safety. This study investigates and provides an understanding of the dynamics of the physician role and the intricacies of the decision making process of the front-line leader who is responsible for the day-to-day operations of the hospital. This thesis examined the physicians and strategic decision-making processes of hospitals, in terms of these decisions that affect the performance, as well as hospital-wide directives enforced by management and administrators of the hospital.

After analyzing the findings in Chapter 4, a brief overview of the work done Vis-à-vis original research objectives have been presented and discussed in this chapter in Section 5.2, followed by the specific contribution of the work in Section 5.3, limitations in Section 5.4 and future scope of work in Section 5.5

5.2 Brief Overview of the Work Done Vis-à-vis Original Research Objectives

The objectives of this research were to investigate and identify various constituents of external and internal environments which impart the formulation and adoption of strategy for hospital services, to examine the intensity of participation of physicians in strategic decisions, to explore the functions of strategic decision contents and the extent of their execution. All of these research objectives have been met as documented in earlier chapters.

In keeping with the brief literature review and identified research gaps in the early stage of work, this research work carried out an extensive literature review on strategic decision making, organizational and marketing strategy issues, marketing mix in a hospital setting, measures and approaches involving physicians in hospital decision making, the effect of their involvement on strategies, decision outcomes, patient care and satisfaction. The exploratory and descriptive research design was adopted due to the nature of the research problem. The sample size was calculated by assuming 95 percent confidence interval and margin of error 3.5 percent. Cluster random sampling was applied to gather the sample responses from the sample respondents. The clusters were formed by dividing the target population into mutually exclusive and collectively exhaustive sub-populations or clusters. Then a random sample of these clusters was selected based on the probability sampling technique. The required information was collected from a simple random sample of the elements within each selected cluster. The sample was drawn from various private hospitals. Based on the literature review and perceptions of research problem the questionnaire was designed and pilot survey was conducted. Before the actual survey for the study was carried out, the questionnaire was pre-tested on 40 physicians and 20 executives working in various private hospitals in Hyderabad, Telengana State. These selected candidates varied in age, gender, educational level and experience in using strategies and participated in hospital activities. Physicians and executives were also asked to identify and rate the organizational and marketing strategy factors and also the personal strategy and patient satisfaction factors which they perceive were important during the making and execution of the decisions and based on their perception. Based on the findings of this pilot study, the survey instrument

was improved and administered to get 221 samples. Appropriate measures and statistical test were performed on the data and the results were presented in three parts relate to the research questions that guided the study. The independent variables represented by marketing mix strategy components, namely health service, pricing, distribution, promotion, physical evidence, process, and personal strategies and dependent variable which represented by patient satisfaction were analyzed. Using Data Envelopment Analysis (DEA) the physician's efficiency, the technical and scale efficiency in decision making was evaluated. Data Envelopment Analysis (DEA) is a decision analysis approach used to determine the efficiency of a set of similar decision making units (DMUs), which transform multiple types of input into multiple types of output. Besides determining efficiency or inefficiency of each DMU, DEA determines benchmarks for each inefficient unit which provides specific and quantified improvement targets.

5.3. Specific Contributions of the thesis Work

This study emphasizes the importance and involvement of physicians in the strategic decision making processes of hospitals. This research study is based on the analysis of various factors with 221 questionnaires, thus makes it extensive study leading to a robust analysis. The pilot study, reliability analysis, Intra Correlation Coefficients analysis, Pearson Correlations, Multiple Regression analysis and the Data Envelopment Analysis (DEA) with four models were conducted. The multiple tests performed ensure that the survey instrument presented in this research has high external and internal validity for the hospital sector. Analysis of organizational and marketing strategies on organizational continuum reveals that a middle of perspective, in both organizational strategy and marketing strategy, was uncovered through the quantitative analysis. This perspective indicates uncertainty and indecision in both forms of strategy in private hospitals, and is an important finding from this research. The further empirical analysis elucidates the effect of physician involvement in the strategic decision-making process on hospital decision outcomes, stresses the higher number of physicians in decision making improves the decision quality, commitment and understanding of the rationale of the decisions.

The physicians participated in the study revealed that the decisions they have to make on the management of their ward are caught up by various constraints that they face in their hospital setting, the lack of medical and human resources, the cost factor, the governance, a culture of resistance within the hospital and what they described as internal and external environment factors. Internal factors pertain to the physician' feelings of inadequacy and uncertainty in their ability to undertake their role at times, whereas the external ones relate to the constraints that exist within their hospitals, such as the lack of input in decisions and implementing decisions which are thrown on them. As a result of these factors, the physicians felt that it was difficult for them to make decisions at ground level that would result in a satisfactory outcome. Therefore, their main important concern was found to be their attempt to satisfy the top management, patients and staff when executing decisions. The physician participants strongly feel that they should become part of the strategic decision making process of the hospitals. Their early engagement in decisions in hospitals would assist in gaining their ownership in the short-term and in increasing their commitment in the long-term, achieving therefore both margin and mission.

This study also focused on the strategic orientation continuum based on health care context and carried the investigation on how marketing strategy influences organizational strategy especially in hospital settings. This focus has been chosen as the strategic orientation continuum has not been empirically tested thus far in the body of literature in either a quantitative or qualitative study. This continuum approach is also of interest and relevance due to the variety of organizational characteristics that are addressed through the continuum and then linked to either end of the continuum through visionary or opportunistic aspects. Through applying this continuum approach to health care, insight into marketing strategy and organizational strategy is achieved and the influence of marketing strategy on organizational strategy in hospitals was determined.

The efficiency of physicians was evaluated using Data Envelopment Analysis (DEA). The DEA models, measuring overall technical and scale efficiency partitioned by specialty and relative weight have identified the inefficient physicians. Physicians should use this information to adjust their nature and practice behavior to get real productivity improvements

at work. Another contribution is that the size of the estimated coefficients implies that the most important factors associated with efficient care were, the physician practice characteristics, rather than the patient illness characteristics. This finding has important implications because physicians tend to believe that the most clinical inefficiency arises from differences in output mix-a variable that is beyond their control. That was not the case. The research study also offers the physicians, managers and policy makers a new way of thinking about the severity and prevention-one that considers the effect of severity on the marginal productivity of hospital resources.

The work adds to the healthcare management literature, especially in the Indian context wherein there is a paucity of research. The study provides researchers and practitioners with objective information in the field of strategic management literature. It suggests that involvement of physicians in the decision making process would enhance the understanding of the intricacies and the relevance of the various aspects of decision making to have successful decision outcomes, patient satisfaction and better hospital performance.

5.4. Limitations of the Work

- This study covered only private sector hospitals in India. Hospitals considered for analysis are mostly large and profit centered hospitals. To test the wider validity of the instrument, similar studies may be undertaken across a larger number of other industries. Further, to test its robustness, studies may also be carried out in different countries. The generalisability of the study results is limited as it is limited to health care services in private hospitals.
- The research study focuses only on the understanding and commitment of the physician executives included in the strategic decision making process in the private sector hospitals. It doesn't consider their role in the implementation of strategic decisions.

- Another limitation of this study is the subjective nature of some data present in the data analysis; in particular items were measured by respondents' involvement strategic decision making, organizational and marketing strategy. That is the important issue in the development of the decision analysis factors. These constructs were developed based upon information from the respondents. The items in the questionnaire are subjective in nature. Respondents were asked to rate items based on their perception, as to the extent to which the items were applicable in their respective areas. Hence, the lack of objective measures might introduce a certain amount of bias into the data collected. Utilizing objective data combined with subjective data may provide a better understanding of the relationships among antecedent metrics and the ultimate dependent variable.
- The survey instrument used in the study to understand the strategic decision making and physicians involvement in decision making assigned equal weight to each of the factors, it may be a good idea to investigate whether assigning different weights to different factors would improve the quality of assessment of the decisions. It is plausible that certain factors may have a larger impact on the decision than others. The measures used to analyze the data like CFA, Intra Correlation Coefficients and Data Envelopment Analysis have their own limitations

5.5. Future Scope of Work

Future work for this study might involve different aspects, Individual's competence-based confidence in other team members and decision effectiveness; Studies on public sector hospitals decision making and physician involvement; Comparative study on the health service sector and manufacturing sector to understand the differences and effects on strategic decision making process and marketing mix strategies. Because our data are cross-sectional, we cannot conclusively establish causality between the independent and dependent variables analyzed in the study. Longitudinal studies in the future could perhaps add insights to the issue of causality.

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APPENDIX -I

Questionnaire

Dear Sri/Dr.....,

This PhD research focuses “**Physicians and Strategic Decision Making Processes in Hospitals**” is aimed at to understand and evaluating the role of physicians in strategic decision making process in a hospital setting. We solicit your participation in this research study because of your recognized expertise in the field of health and health service management.

Therefore, we deeply value and seek your opinion on the issues raised in this questionnaire. This research result will be reported in the form of a thesis towards a PhD degree; however, there will be no details included in the project or presentation which could identify you. We will appreciate if you could answer these questions the way things are and not the way it ought to be

Thanks for your anticipated cooperation and response

Dr. A Lingaiah

QUESTIONNAIRE

1. Your position..... 2. Organization Name.....

3. When you think of efficiency (hospital efficiency) what comes to your mind.....
.....

4. Evaluate the performance of hospital managers/CMD at the hospital level in the state in terms of:
 - (a) Resource usage.....
 - (b) Health management experience.....
 - (c) Relationship/communication with other management bodies of health
 -

5. Describe the existence (and extent) or otherwise of pressure from other sources in the administration of health in respect of:
 - (a) Staffing process of the hospitals.....
 - (b) Location/siting of hospitals.....
 - (c) Development of existing hospitals.....
 - (d) Funding of the hospitals/health facilities.....

6. Describe the extent to which the hospital managers/CMDs at hospital levels have autonomy on:
 - (a) Personnel employment process.....
 - (b) Health service planning.....
 - (c) Financial delegation.....
 - (d) Personnel transfer.....

7. In your opinion ,what are the main factors affecting the performance of the hospitals (either inside the hospitals, inside and outside the health system)
-

8. Do you think the following variables reasonably reflect the key resources used and activities in the hospitals existing in the state: Doctors, Beds, Nurses, Admin staff; Outpatient, Inpatient, Deliveries, Surgical intervention, and health education.....
.....

9. How do the factors identified in question 7 above affect the performances of Hospitals
-
-

10. Rate each of the factors below on the extent to which you considered them as affecting the performance of private hospitals. **1= least important, 7 most important for performance**

A. Security situations	1	2	3	4	5	6	7
B. Behaviours of medical personnel	1	2	3	4	5	6	7
C. Non- functional equipment and theatre	1	2	3	4	5	6	7
D. Hospital ownership	1	2	3	4	5	6	7
E. Number/ concentration of hospitals in the area	1	2	3	4	5	6	7
F. Dual practice	1	2	3	4	5	6	7
G. Public source of electricity	1	2	3	4	5	6	7
H. Poor Connectivity to Hospital	1	2	3	4	5	6	7

11. How do you think the factors above can affect hospital performance?

.....

12. How will you evaluate the location of the hospitals in the country bearing in mind the health needs of the People.....?

.....

14. What suggestions do you have for improving the performance of hospital/facilities.....?

.....

PHYSICIANS INVOLVEMENT IN THE STRATEGIC DECISION-MAKING

Please, indicate to what extent you believe that the Physicians of the hospital has been involved in the formation and evaluation of the strategic decisions.

Formation of New Strategic Decisions

The Physicians are usually not involved with the formation of strategic decisions	
The Physicians are consulted usually and after that top management ratifies strategic proposals that are formed	
The top management usually asks physicians probing questions and then ratifies Strategic proposals that are formed	
The top management usually asks physicians probing questions which lead to revisions of strategic proposals that are formed	
The top management usually helps to form strategic decisions with physicians in the meetings	
The board usually helps to form strategic decisions with physicians within and between meetings	
The top management usually forms strategic decisions separate from physicians	

Evaluation of Prior Strategic Decisions

The physician is usually not involved with monitoring the progress of strategic decisions	
The top management usually accepts the evaluation given to it by the physician without asking probing questions	
The top management usually accepts the evaluation given to it by the physician after asking probing questions	
The top management usually determines the timing and criteria of evaluation, but that information is supplied by the physician and it is rarely challenged by the top management	
The top management usually determines the timing and criteria of evaluation, but that information and it often requests additional information after receiving the progress report from the physicians	
The top management determines the timing and criteria of evaluation and it is often requested additional information after receiving the progress report from the physician	
The top management usually collects its own information about the progress of the strategic decision in addition to the physician reports	

Strategic Decision - Making Process

<p>In your Hospital, the responsibility of determining the cause of a problem would be assigned to</p> <p>A. No specific individual/ Physician or group</p> <p>B. One specific individual/ Physician</p> <p>C. Two people jointly (One Physician specially)</p> <p>D. Tow People (No physician)</p> <p>E. An existing committee of three or more employees</p> <p>F. A specially formed group of three or more employees</p>	
--	--

<p>In attempting to determine the cause of a problem, your Hospital would</p> <ol style="list-style-type: none"> Not be willing to rely on Physicians for any assistance Be willing to rely on one or two physicians to provide limited assistance Be willing to rely on one or two physicians for moderate assistance Be willing to rely on physicians for significant assistance Rely entirely on outsiders if necessary 	
<p>In your Hospital, possible problem causes would be identified primarily through</p> <ol style="list-style-type: none"> The ideas of a single individual / physician Informal discussions among managers / physicians Scheduled meetings among managers / physicians Scheduled meetings and some analysis Scheduled meetings and extensive analysis 	
<p>To develop an effective <i>health service strategy</i> our hospital:</p>	
<ul style="list-style-type: none"> • Has a distinguished hospital brand name • Introduces new health services • Understands customer needs in order to develop new health services • Offers a considerable (comprehensive) range of health care types (classes) • Has a good reputation for services and this becomes very important in our hospital success • Has medical staff who play a crucial role in building our brand reputation • Uses a formal plan for new health services types or programmers development • Uses customer (patient) service as a central element in our service offering strategy • Uses customer (patient) feedback to improve the quality and efficiency of our health service • Has a good capacity to hold huge numbers during disastrous time • Has structured and formalized procedures for new health programmer development process • Understands our customers (patients) needs thoroughly 	
<p>When we <i>price our health services</i> we price them based on:</p>	
<ul style="list-style-type: none"> • Price discrimination according to market segments which we serve • The private hospital association and physicians association requirements • Pricing strategy according to demand • The different kinds of costs which our hospital incurs • A predetermined rate of return that our hospital is looking for • What customers (patients) are willing to pay • The services which we introduce to our customers (patients) • Pricing strategy according to competition • The ministry of health regulations 	
<p>In developing our <i>distribution (access) strategy</i> our hospital uses:</p>	
<ul style="list-style-type: none"> • Telemedicine to deliver our health consultation • Electronic distribution channels such as e-health to distribute our health education to our society • Mobile clinics to access our health services to rural areas • Our branches to access our services to different geographical areas • Flowcharts or diagrams which describe the steps and activities required to deliver our health services to customers • A distinctive distribution capabilities e.g. the ability to open new branch of the 	

hospital <ul style="list-style-type: none"> • Convenient opening hours in our outpatient clinics at the hospital • Hourly service availability 	
--	--

To develop an effective <i>promotion strategy</i> our hospital:	
<ul style="list-style-type: none"> • Advertises in media such as television, newspapers, magazines...etc • Encourages our customer/ patient to use word of mouth communication to recommended our hospital to other patients • Publicity and public relation to enhance our image • Promotes sales such as , gifts, discounts, free medical days...etc • Uses direct marketing methods such as e-health , direct mail ,the internet • Sponsors special events such as sports charities, seminars...etc 	
To develop an effective <i>physical evidence strategy</i>, our hospital uses:	
<ul style="list-style-type: none"> • Comfortable environment with good directional signs • The décor and atmosphere of our hospital • Comfortable physical environnement furnishing, colours, elevators, guides etc. • Enough parking for our patients and visitors • Designed facilities to achieve specific marketing image objectives • Up-to-date and well-maintained facilities and equipment • The cleanliness and appearance of our hospital facilities • Accessibility in terms of location 	
To develop an effective <i>process strategy</i> our hospital uses:	
<ul style="list-style-type: none"> • No delays in providing our health services and simple procedures • Updated medical equipments • Customer (patient) feedback to improve health services • Confidentiality and privacy about our patient cases • Privacy during treatment • Services that are provided at the appointed time • A short waiting time of not more than one hour • Dignity and respect when treating our patients • Thorough explanation of medical conditions to patients • Technology in delivery service process 	
To develop an effective <i>personnel strategy</i> our hospital concentrates on Hospital Performance Measured by Patient Satisfaction:	
<ul style="list-style-type: none"> • Our patients are satisfied with our responsiveness in this service line • Our patients are satisfied with the provider of our service • Our patients are satisfied with the quality of our service • Our patients are satisfied with the price of our service • Our patients are satisfied with the promotion of our service • Our patients are satisfied with the access of our service • Our patients are satisfied with the physical evidence of our service • Our patients are satisfied with the process of our service 	

Please refer to the following criteria and scales. Where would you say that your organisational strategy sits on these scales with regards to the stated organisational characteristics?

Forward-looking perspective	1	2	3	4	5	6	7	8	9	10	Focused
Consideration given to trends affecting the future	1	2	3	4	5	6	7	8	9	10	Consideration given to current threats and opportunities
Future scenarios within the environment are given consideration	1	2	3	4	5	6	7	8	9	10	Changes sensors within the environment are considered
Forward-looking perspective regarding information about future trends for management decision making	1	2	3	4	5	6	7	8	9	10	Information regarding day-to-day activities in management decision making
Committed	1	2	3	4	5	6	7	8	9	10	Flexible
Building assets	1	2	3	4	5	6	7	8	9	10	Adaptability
Vertical integration	1	2	3	4	5	6	7	8	9	10	Fast response
Charismatic leadership	1	2	3	4	5	6	7	8	9	10	Tactical leadership
Visionary leadership	1	2	3	4	5	6	7	8	9	10	Action oriented leadership
Centralised structure	1	2	3	4	5	6	7	8	9	10	Decentralised structure
Top-down structure	1	2	3	4	5	6	7	8	9	10	Fluid structure
Employees have their eye on the ball	1	2	3	4	5	6	7	8	9	10	Employees are entrepreneurial
Scale economies	1	2	3	4	5	6	7	8	9	10	Scope economies

Marketing Strategy and Organisational Strategy

Please refer to the following criteria and scales. Where would you say that your marketing strategy sits on these scales with regards to the stated organisational characteristics?

Employees have their eye on the ball	1	2	3	4	5	6	7	8	9	10	Employees are entrepreneurial
Scale economies	1	2	3	4	5	6	7	8	9	10	Scale economies
Forward-looking perspective	1	2	3	4	5	6	7	8	9	10	Focused on the present
Consideration given to trends affecting the future	1	2	3	4	5	6	7	8	9	10	Consideration given to current threats and opportunities
Strong signals are sent to competitors	1	2	3	4	5	6	7	8	9	10	Surprise moves are made on competitors
Building assets	1	2	3	4	5	6	7	8	9	10	Adaptability
Forward-looking perspective regarding information about future trends for management decision making	1	2	3	4	5	6	7	8	9	10	Information regarding day-to-day activities in management decision making
Vertical integration	1	2	3	4	5	6	7	8	9	10	Fast response
Future scenarios within the environment are given consideration	1	2	3	4	5	6	7	8	9	10	Changes sensors within the environment are considered
Committed	1	2	3	4	5	6	7	8	9	10	Flexible
Visionary leadership	1	2	3	4	5	6	7	8	9	10	Action oriented leadership
Centralised structure	1	2	3	4	5	6	7	8	9	10	Decentralised structure
Charismatic leadership	1	2	3	4	5	6	7	8	9	10	Tactical leadership
Top-down structure	1	2	3	4	5	6	7	8	9	10	Fluid structure

THANK YOU FOR YOUR PARTICIPATION IN THIS STUDY

THANK YOU FOR YOUR TIME AND INTEREST.
(Your comments will be coded and written up anonymously)

List of Publications and Papers Presented in Conferences

Papers Published/Communicated

- Chaudhuri JR, Mridula KR, Anamika A Boddu DB, Misra PK, Lingiah A, Balaraju B, Bandaru VCS. Deficiency of 25-hydroxyvitamin D and Dyslipidemia in Indian Subjects. *J Lipids*. 2013; 623420:7.
- Chaudhuri JR, Mridula KR, Lingaiah A, Balaraju B, Bandaru VCS. Association between 25-Hydroxyvitamin D and Type 2 Diabetes: A Case Control Study. *Iranian J Diabetes and Obesity*. 2014;6:47-55.
- Lingaiah A, Venugopal P, Mridula KR, Bandaru VCS. Types of various surgeries in Day care: A study from South India. *Ambulatory Surgery*. 2015;21.1:10-13.
- Lingaiah A, Mridula RK, Bandaru VCS. Risk factors of Non-alcoholic fatty liver disease in asymptomatic subjects. (manuscript preparation)
- Lingaiah A and NVM Rao, The Strategic Process, Physician Managers Involvement and Hospital Performance, (Communicated to *New England Journal of Medicine*)
- Lingaiah A and NVM Rao, Role of Physicians in Strategic Decision Making Process in Private Hospitals at Five Metro Cities (Communicated to *Asian Journal of Economics*)
- Lingaiah A and NVM Rao, Physicians Efficiency, Patient Perception and Hospital Performance (Communicated to *Journal of Services Research*)

Biography of the Candidate

Dr. A Lingaiah is a Medical Director, Services at Yashoda Hospitals, Hyderabad, Telengana State. Since over two decades, Yashoda Group of Hospitals has been providing quality healthcare for the people in their diverse medical need. They offer sophisticated diagnostic and therapeutic care in virtually every specialty and subspecialty of medicine and surgery. Their three hospitals had a total of above 25, 00,000 patients admissions in the last five years and performed 1, 00,000 major surgeries per year, 2, 00,000 surgical procedures per year. The group operates separate Heart Institutes, Cancer Institutes and 62 Medical specialties services with 700 Specialist doctors. Dr. Lingaiah is a medical graduate (MBBS) from Kakathiya Medical College, Warangal, Osmania University. Thereafter, he completed his M.Phil. in Hospital and Health Systems from BITS Pilani, Pilani Rajasthan. He has thirty years of experience as a Physician and Corporate Administrative experience in Medical Services. He has published more than thirty research papers in journals of repute and headed many technical committees in health services area.

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Dr. N.V.M Rao is Professor in the department of Economics and Finance at Birla Institute of Technology & Science (BITS), Pilani (Rajasthan), where he has been since 1994 and he has involved in all the four fold activities of the Institute teaching, research, consultancy and institutional development. He is currently Professor and Chief of Centralized Purchases at BITS, Pilani. He also worked as Dean of Student Welfare Division and Dean of Educational Hardware Division, BITS Pilani. He taught seventeen courses and guided five Ph.D. students. At present two Ph.D. students are doing research under his supervision. His research interests are Econometric Methods, Health Economics and Policy, Microeconomic Analysis, Financial Economics, Financial Markets and Financial Engineering. He is life member of Indian Economic Association, The Indian Econometric Society, Indian Society of Labor Economics and Association of Management Scholars International. He had more than fifty five research papers published in national and international journals of repute. He had attended more than twenty five national and international conferences.