Comparing the efficiency of competition strategy to coopetition strategy in managed care in South Africa

Stefan Roux
27526594

A research project submitted to the Gordon Institute of Business Science, University of Pretoria, in partial fulfilment of the requirements for the degree of Master of Business Administration

13 November 2008

ABSTRACT

The aim of this research is to measure the difference in efficiency between a coopetition strategy and a competition strategy pursued in a managed care organisation in order to guide South African managed care organisations (MCO's) in their endeavours to ensure sustainable provision of affordable, quality, accessible healthcare. Medical doctors are not convinced of the efficiency of managed care strategies and are suspicious of managed care initiatives. Competitive managed care strategy is perceived by medical doctors as high handed and as the cause of adversarial relationships between doctors and MCO's.

Competitive strategy is contrasted to a coopetitive managed care strategy departing from the premise that doctors would improve their efficiency if they are incentivised to do so in a transparent, objective manner. The research compared the efficiency means (μPI) of two groups of doctors engaging the MCO with either competitive or coopetitive strategies.

Insufficient statistical evidence was found to confirm that the coopetitive strategy was significantly more efficient than the competitive strategy. Even though the research cannot confirm that the coopetitive strategy is significantly more efficient (α 0.1) there is enough evidence to indicate that the coopetitive strategy is more efficient than the competitive strategy, given a slightly higher alpha value (α) of 0.2. The research also illustrates that the efficiency of coopetitive strategy depends on effective implementation and not on the choice of strategy only.

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

DECLARATION

I declare that this research project is my own work. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration at the Gordon Institute of Business Science, University of Pretoria. It has not been submitted before for any degree or examination in any other University. I further declare that I have obtained the necessary authorisation and consent to carry out this research.

_____ Date: 13 November 2008

Stefanus Johannes Roux

ACKNOWLEDGEMENTS

This research would not be possible without the contributions of the following people:

Dr. Raj Raina, my supervisor, for his guidance and critical review.

Prime Cure Health for affording me time to attend the MBA course.

Monica Sonqishe from GIBS Information Centre who assisted with the search for references.

Clinical Partners Ltd. and Netcare Medical Scheme for allowing access to data.

VanZyl Kruger who performed the statistical analysis.

Orna Roux, my dear wife, for her unwavering support and patience while keeping family and friends together.

Danco and Danielle, my children, for time sacrificed and their consideration.

Letti Roux, my mother, for her support and encouragement.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

1. CHAPTER 1: INTRODUCTION TO RESEARCH PROBLEM

1.1. PROBLEM DEFENITION

Introduction

Managed Care Organisations (MCO's) and doctors compete (beat the competition) with each other on resource allocation. The critical constraint in the system is the doctor because he controls resource use and throughput which in turn determine cost efficiency. To relieve the constraint MCO's have to consider strategies that create partial congruency between MCO goals and that of doctors. Coopetition strategy may create this goal congruency. This research aims to compare the efficiency of coopetition strategy with the efficiency of competition strategy to guide future strategic decision making.

Context of the research

Health care is on a collision course with patient needs and economic reality. Without significant changes the scale of the problem will only get worse. Rising costs, mounting evidence of quality problems, and increasing numbers of Americans without health insurance are unacceptable, and unsustainable (Porter and Teisberg, 2006). This holds true for South Africa where healthcare groups in the private sector have been frustrated by the slow uptake of health insurance by low income earners. Employers find the subsidies required to assist employees more than they can afford (Porter and Teisberg, 2004).

Clinicians have no incentive to explore alternative ways to reduce costs or improve efficiency. Hospital group's return on capital invested does not compete well with alternative investment opportunities for investor capital as reflected in their share prices.

Adversarial relationships (Ullman, 2003) between stakeholders due to their conflicting strategies are not conducive towards greater efficiency and are actually contributing towards the escalating cost of health care insurance (Porter and Teisberg, 2004). This holds true for the high income segment as well as the low income or emerging market segment. The net effect is low income earners do not have sufficient access to private health care and will remain reliant on the public sector for health care services if no alternative strategy realising improved efficiency (improved quality, reduced cost and increased access) is implemented by MCO's in the private sector.

The efficiency of competition and coopetition strategies applied by MCO's will be measured to guide MCO's in the choice of a strategy.

Relevance

The private healthcare sector in South Africa is challenged by government for their lacking ability to attract and service the employed low income segment of the population. This population segment is currently partially reliant on public healthcare services and is diluting the health-rand-tax spend available to the unemployed indigent poor.

The growing employed but uninsured population segment presents business opportunities to health insurers (Medical Aid Schemes) and MCO's that can successfully capture this market segment. There is also an element of social responsibility and prestige for the company able to extend private health services to the low end of the market.

The first healthcare insurer to succeed with a more efficient alternative strategy will enjoy considerable first mover advantage and may be well positioned to exploit other opportunities in Private Public Partnerships (PPP's) with the government.

Purpose

Healthcare in the USA has been plagued by ever increasing cost without a concurrent increase in quality of care, hence the need for a more efficient strategy. (Porter and Teisberg, 2004) This also applies to South Africa where there is a need to reduce the cost of healthcare.

1.2. OBJECTIVE OF THE STUDY

Although coopetition strategy is applied by MCO's in SA the predominant strategy applied is competition strategy. The objective is to determine the more efficient strategy of the two. The alternative coopetition strategy will be contrasted against the current competitive strategy and its inherent problems and inefficiencies (Porter and Teisberg, 2004).

The alternative coopetition strategy will be quantitatively tested against a competitive strategy to prove or disprove its success towards improved efficiency in managed health care delivery.

For the purpose of this study the terms Medical Aid Scheme (MA) and Managed Care Organisation (MCO) may be used interchangeably because the managed care function may be performed in-house by a MA or outsourced to an independent MCO.

Evidence of the difference in efficiency (cost and quality) of current predominant strategy (Competition framework) and the alternative strategy (Coopetition framework) in managed healthcare will be used to guide future MCO strategic decision making.

Theory scope of the research defined

The study will draw lessons from strategy theory investigating competition and cooperation in the linear value chain contrasted against coopetition in the creation of value in a non-linear value network as applied in the motor and other industries. Theory relevant to competition and coopetition strategies will be researched in so far as is relevant to the healthcare industry but is by no means exhaustive on the topic. The discussion of efficiency and value networks are discussed to the extent the entities are relevant to competition and coopetition and is not intended to be exhaustive.

The theory on each strategy will be discussed followed by two different MCO strategies contrasted under the headings:

- Competition strategy (Current/predominant) of MCO/Medical Aid Scheme and
- Coopetition strategy (Alternative) of MCO/Medical Aid Scheme.

The intent of the section will be to investigate the relationships of the two stakeholder's (MCO and doctor) characteristics in relation to the theory of competition and coopetition.

The study will measure the efficiency in value creation of the coopetition value network strategy as apposed to competition strategy in order to validate its higher efficiency.

Motivation for the choice of topic

The aim of the research is to identify the more efficient strategy to be pursued by a managed care organisation (MCO) to breach the boundaries of the current impasse between the stake holders in healthcare that is frustrating growth in membership (Porter and Teisberg, 2004). The theory base of the strategy will be researched and the efficiencies of the two strategies will then be compared to determine the most efficient strategy.

Should coopetition strategy be proven more efficient it could provide an alternative to the current predominant competition strategy theory applied in managed healthcare in South Africa. If more efficient, coopetition strategy application could be applied more extensively to increase access and sector growth (value creation).

The relationship – aligned or misaligned - existing between a MCO and it's doctors discussed here impact on other relationships in the healthcare sector towards the goal of delivering superior patient value. Porter and Teisberg (2004) advocate the transformation of health plans from a culture of denial (cost cutting and competition) to a culture of value-based competition encompassing the characteristics of coopetition.

2. CHAPTER 2: LITERATURE REVIEW

2.1. INTRODUCTION

According to Eiser and Eiser (1996) resistance to change by physicians in managed care may occur due to a formal power shift away from physician autonomy due to potential incongruence between work and human elements (i.e. clinical & computer skills) and between work and organisational elements (i.e. task flow changes) caused by MCO management strategies.

Doctors are pressed to reduce resource consumption of services (a reversal of the practice model under the fee-for-service arrangement) while maximising critical measurable outputs like clinical outcomes, patient satisfaction, cost efficiency and market share. The incongruence may affect doctor motivation and organisational effectiveness. The adversarial relationship between managed care organisations (MCO's) and physicians is an expression of resistance to change (Eiser & Eiser, 1996). Research on the strategies that influence the relationship between the MCO and physician doctors may

provide guidance to MCO management to increase congruence in order to reduce adversity and increase efficiency.

This research will measure the difference in the efficiency of two such strategies applied by MCO's in interaction with medical doctors. A competitive management strategy (where little congruence exists between MCO goals and doctor goals) will be compared with a coopetition management strategy (where partial congruence exists between MCO and doctor goals).

2.2. ELEMENTS APPLICABLE TO THE RESEARCH

2.2.1. VALUE NETWORK

Definition

According to Allee V. (2002, p. 6) "a value network is any web of relationships that generates tangible and intangible value through complex dynamic exchanges between two or more individuals, groups, or organisations". The value may be a traditional tangible exchange (Goods, service or revenue) or it may be intangible exchange (Knowledge in the form of news and feedback, or benefits like customer loyalty).

Three types of value network interdependence :

- Pooled dependence where multiple of components have to be at the same locus at the appropriate time for production of goods, i.e. the automobile industry production line or a mass transport station where people have to be at a set time to function.

- Sequential dependence i.e. a production line where components are required in a particular order to produce goods.
- Reciprocal dependence i.e. the medical environment where a therapy is added and a response is awaited, reassessment takes place and the next appropriate therapy or investigation is performed.

The health system is a reciprocal interdependent value network existing out of different stake holders i.e. government, department of health, public health service, private health service, funders, managed care organisations, service providers and patients or subscribers and their employers as well as investors and technology providers. The stakeholders can interact in a zero-sum game of competition strategy or in a positive-sum game of coopetition strategy delivering care more efficiently (Porter, 2006).

The managed care organisation (MCO) role is to manage the quality and cost of care purchased. The quality is a service to the subscriber while the cost is service to the funder or payer. The MCO manages the relationship between the funder and the doctor.

Doctors are interdependent in delivering the different service components of the service purchased by the MCO (Health Insurer or Medical Aid) or member (subscriber) and should thus be regarded as multiple service providers in a value network and as complementors to each other's services.

Key requirements for successful Value networks:

- Value ad by converting what they know into tangible and intangible value (Allee, 2002).
- Allee (2002, p. 20) states that “successful value networks require:
- Trusting relationships and a
- High level of integrity and
- High level of transparency on the part of participants”

2.2.2. MANAGED CARE

Managed Care is defined by Chetty (2000) as bringing the disciplines of analysis, efficiency, and accountability to bear on health care systems and delivery or as the practice of evidence based medicine and is an approach to managing both the quality and the cost of medical care.

The elements common to managed care systems are authorisation systems and some level of restriction on members’ choice of doctor. The tools employed are utilisation review, cost management, doctor contracting and information technology (Chetty, (2000).

The objective of MCO’s is to purchase and deliver the highest quality appropriate health care at the lowest cost (most efficient health care) (Ullman, 2003). The highest quality care ensures the best service towards improvement of the health status of members and the lowest cost ensures the affordability to members or employers, expressed as the most value to the payers of the premium.

Low cost and good quality service (production) ensures the sustainability of the organisation (profitability in a for-profit organisation or reserves if not-for-profit organisation i.e. a medical scheme) and growth in membership (lower premium attract more subscribers/members according to the laws of demand and supply) (Ullman, 2003).

It is thus a drive towards the best value proposition for the organisation and the member or health system in an attempt to balance access, cost and quality (Chetty, 2000).

Process

A MCO interact with doctors as a network in an attempt to improve the efficiencies of health care delivery (Chetty, 2000) by ensuring the care delivered is the best quality at the appropriate level to create the most value for the funding provided.

The process may involve some or all of several interventions like DUR (Drug Utilisation Review), HUM (Hospital Utilisation Management by Pre-authorisation and Case Management) and doctor profiling (Information sharing), doctor accreditation, coupled with Pay for Performance incentives (P4P) as alternative reimbursement mechanism (Ullman, 2003).

Doctors sometimes experience these interventions as intrusions on their professionalism and the patient doctor relationship that leads to adversity between them and the MCO which in turn is perceived by MCO's as unwillingness to cooperate (Ullman, 2003).

The strategy should be to align the interests of the different stake holders to focus on common interests to collaborate to achieve the efficiency strived for (Inamdar, Kaplan, Jones and Menitoff, 2000). Coopetition strategy may provide the goal congruence to achieve the alignment required.

2.2.3. ORGANISATION

Definition

According to Chester I. Barnard (1938) a formal organisation is “a system of consciously coordinated activities or forces of two or more persons.” Such a cooperative system is a complex of physical, biological, personal, and social components which are in a specific systematic relationship by reason of the cooperation of two or more persons for at least one definite end.” The system embraces other systems and is itself also a subordinate part of larger systems. The interactions of such system components are based upon relationships. The elements of an organisation are communication, willingness to serve and common purpose.

Viewed from the above perspective the health system is a system of organisations functioning in relationships to produce health goods. Communication and willingness to serve with a common purpose act as three levers determining the efficiency of health goods production.

- To affect the efficiency of the production of health goods thus requires:
- communication to create a congruent purpose (goal) and

- communication of incentives to create
- willingness to serve (cooperate or collaborate).

2.2.4. GAME THEORY

Business should be seen as a game with players representing the customers, suppliers and competitors. According to Kippenberger (1998) complementors should be added as counterpart to competitors to form a framework called a value net. A player is a complementor if it is more attractive for a supplier to provide resources to you when it's also supplying the other player than when it is supplying you alone. An example is airlines that compete with each other but act as complementors to each other by leading to more economic aircraft manufacture by their aggregate demand. This can be applied to the health industry where funders, MCO's, doctors and hospitals act as complementors that create demand for each others services.

According to Kippenberger (1998) the concept of Game theory is applied more and more in strategic thinking. The traditional competition thinking on strategy does not explain the complex business world adequately. He explains that companies choosing competition alone as strategy and fight to the death destroy the pie and leave little value to capture (lose-lose game).

Kippenberger (1998, p. 26) contends that "business is co-operation when it comes to creating a pie and competition when it comes to dividing it up". This could make business relationships feel paradoxical and that learning to be comfortable with the duality is the key to success. He stresses the importance

to think outwardly to understand the positions and interdependencies of other players and their likely responses to your own strategy.

This view is applicable to the complex health environment where competition has not delivered the desired outcomes and stakeholders have to consider coopetition as alternative to improve efficiency that will lower cost and include the lower income groups to grow the pie. By analysing relationships in less adversarial light stakeholders can change their view of strategy (Kippenberger, 1998).

The South African health industry may be regarded as an oligopoly because it contains only a few competing firms and each firm has enough power to prevent it from being a price taker, but with enough interfirm rivalry to prevent it from dominating the market and it is subject to a measure of administered prices. There is a relative scarcity in specialists and medical scheme beneficiaries and each respond to a move the other makes. (Lipsey and Chrystal, 2004). MCO's and doctors have a choice to compete or cooperate or to do both namely coopete (coopetition). This is a situation where they choose to cooperate on delivering cost efficient health care to patients (create pie) but compete for revenue (share of pie). The efficiency of the coopetition strategy followed depends heavily on the communication and accountability to share information to develop trust in a mutually beneficial relationship supported by the leadership. Examples would be the "Battle of the sexes" (Lipsey and Chrystal, 2004, p. 206) game in which both loose if they compete but both are winners if the cooperate.

2.2.5. GAIN SHARE INCENTIVE

The sharing of costs via coopetition strategy of value creation may improve efficiency to such an extent that economic value is achieved that allows for profit (saving) and fund sharing arrangements according to Dagnino and Padula (2002). This is the motive for a medical aid scheme or MCO to go into a gain share agreement with doctors to incentivise them for efficiency by sharing the saving with them following benchmarking, individual profiling and information sharing. Robins and Judge (2007) name achievement, recognition and responsibility as incentives that can be used to motivate stakeholders – in this case doctors – towards increased efficiency. All three may be achieved by practice profiling doctor efficiency against a benchmark in combination with the gain share principle in a coopetition strategy.

2.2.6. EFFICIENCY

Meaning of efficiency in healthcare

Efficiency in healthcare is a factor of cost and quality (Porter & Teisberg 2004). The objective in the past has been reduction of cost (Cost management) measured as the cost per case expressed as Rand per case (Rand/unit). The goal should rather be to improve value (quality of health outcomes per rand expended) (Porter and Teisberg, 2004).

Quality in healthcare can be expressed in different ways. For the purpose of this study the number of complications or redo procedures following hospital admission or surgery will be included as quality indicator. These will not be

measured separately but included into the cost per event since the cost will increase should the quality be inadequate to the extent that it ends in a complication or returns within a set time period i.e. 12 months for a redo procedure. The quality objective is thus to get it right the first time.

Quality is included in the measurement by calculating case mix and cost efficiency indices using internationally recognised methodologies. The cost (value) per event (procedures or service codes grouped into clinical cluster groups called episode treatment groupers or ETG's) is a factor of the sum of the costs of all treatments (cost) that includes any occurrence of other related treatments preceding or following a treatment event i.e. complications or redo procedures (quality) including ambulatory and in-hospital care.

According to Chin, Chan and Lam (2008) effectiveness and efficiency can be increased by coopetition due to a reduction in up-front costs and learning costs.

Measurement of efficiency

The highest value proposition or the most value created i.e. the highest quality care at the most affordable total cost should be considered the most efficient (Porter and Teisberg, 2004).

The following factors are drivers of efficiency (Quality & Cost):

- Doctor proficiency/experience
- Doctor incentive (Pay for Performance or P4P) (Barnard, 1938)

- "Share the benefits" incentive/P4P (Ullman, 2003, p.2)
- Doctor compliance
- Aligning of objectives
- Technology use (new and old) (Porter, 2004; Wicks, 2007)
- Value chain integration (Keating, Quazi and Coltman, 2008)
- Value network principles (Friedman, 2005)
- Objective measurement/profiling and Information sharing (Weber, 2001)
- Trust
- Competition (Porter and Teisberg, 2004)
- Cooperation
- Coopetition
- Innovation (Porter and Teisberg, 2004)
- Quality (Ullman, 2003)
- Long term contracting (Ullman, 2003) contracting by the scheme on long term basis.
- Intent

2.2.7. COMPETITION (PORTER THINKING 1980)

Definition

Competition is defined by Ma (2004) as action and response, or pre-emption, attack and retaliation in competitive engagement among rivals.

Competition is about jockeying for position, pre-empting rival action or gaining valuable resources or access to it. The competitive advantage could be through ownership or access.

Table 1.
Comparing the Paradigm of Competition, Cooperation and Coopetition
(Dagnino & Padula, 2002)

	Competition strategy (Competition) PORTER school **Dominated 1980**	**Cooperation strategy (Collaboration) BARNARD school** **Dominated 1938**	**Coopetition strategy (Coopetition) BRANDENBURGER & NALEBUFF school** **Dominated 1996**
Paradigm	Assumes Firm interdependence based on Smithsonian individual interest search ("island in the sea of market relations" Dominant paradigm in strategic management during the 1980's Entirely diverging interest structures	Development of a collaborative advantage through a network of strategic interdependence pursuing convergent interests & deriving mutual benefits Up surged in the marketing management field (1976) and developed in strategic management on the turn of the decade 80's to 90's. Entirely converging interest structures	Within interfirm interdependence both processes of value creation and value sharing take place Coopetitive system of value creation At the beginning of it's life cycle since 1996. Partially convergent interest & goal structure.
	Transactional marketing paradigm	Transition from transactional to relational marketing paradigm	

In the traditional health care system applying a competitive strategy, participants divide value in stead of increasing it in what Porter and Teisberg (2004) name Zero-sum competition by cost shifting rather than fundamental cost reduction, and pursuit of bigger bargaining power. It also entails restricting choice of members and physicians, and settlement of disputes in court.

Dagnino and Padula (2002) contend that a zero-sum game reigns in the competitive perspective and that value appropriation by one party means the defeat of another.

2.2.8. COOPERATION (COLLABORATION, BARNARD THINKING 1938)

Definition

Cooperation is defined as the initiation and participation in collaborative arrangements with other players in a firm's environment" (Ma, 2004, p. 7) aiming for "relational rent" to get access to customers, resources or capabilities, knowledge or scale and scope of economies. The arrangement could entail pooling of resources or forming alliances.

Cooperation strategy framework

Dagnino (2002) contends that in a cooperative framework a positive sum game is effected with joint value creation and with mutual dependence and a strong incentive toward collaborative orientation.

Table 2.

Comparing the Drivers and Aims of Competition, Cooperation and Coopetition (Dagnino & Padula, 2002)

	Competition strategy (Competition) PORTER school **Dominated 1980**	**Cooperation strategy (Collaboration) BARNARD school Dominated 1938**	**Coopetition strategy (Coopetition) BRANDENBURGER & NALEBUFF school Dominated 1996**
Drivers	Satisfying own interests, regardless of the impact on other parties to the game (Robbins, S.J. and Judge, T.A. 2007)	Complexity of technological systems & Increasing turbulence in the competitive scenario	Fast moving complex environment
Aim	Above normal profit realised from advantageous position or distinctive resources leading to superior products (rent-seeking behaviour) Horizontal interdependence aiming for an advantageous position in the industry by offering superior products with rent-seeking behaviour through value-creation strategies	Interfirm relationships are considered as strategic assets and source of strategic leadership towards strategic flexibility and learning capability	Aim for economic and competitive benefits. Value creation in knowledge value by increase in interfirm knowledge stock and economic value by cost reduction and revenue increase, speed (reduced time to market) Nurtures value creation & favours entrepreneurial oriented behaviour
	Vertical interdependence with value appropriation strategies determining economic exchanges/sharing according to allocative efficiency		

Table 3.

Comparing the Market System and Economic Interest of Competition, Cooperation and Coopetition (Dagnino & Padula, 2002)

	Competition strategy (Competition) PORTER school **Dominated 1980**	**Cooperation strategy (Collaboration) BARNARD school** **Dominated 1938**	**Coopetition strategy (Coopetition) BRANDENBURGER & NALEBUFF school Dominated 1996**
Market system	Atomistic structure based on instant exchange Short term supplier relationships. Exit-based procurement strategy (discourages communication between purchaser & supplier)	Interactive & continuous relationships in which firms progressively strengthen reciprocal commitments and realize a process of mutual adaptation & joint value creation	Interactivity could be limited to project or time horizon in dyadic (2 firm) or network (> 2 firm) coopetition in simple (single) level or complex (several) levels in the value chain. Long term stable supplier relationships. Voice-based procurement strategy (insists on effective & timely transfer of process information among participants in the supply chain)
Economic interest to maintain current relationship & enter new ones in future	Smithsonian individual interest search	Reputational concerns keep partners aligned to trustworthy behaviour	Reputation incentives are weak Capability to detect opportunistic behaviour is weak with development of trust
	Room for Williamson's opportunistic behaviour	Reduced room for Williamson's opportunistic behaviour	Development of increased trust weakens firm control processes resulting in an incentive to opportunistic behaviour

An example of collaboration towards efficiency is that of the Dell computer company “supply chain symphony” as described by Friedman (2005, p. 417). According to him it is important that stake holders know each other personally to constantly work on process improvements, real-time demand and supply balancing. Demand shaping can also be applied to direct customer demand to match production or supply or improved processes (Friedman, 2005, p. 418).

According to Friedman (2005) the interaction between the traditional global threats and the newly emergent supply chains has lead to the evolution of supply chains that have produced prosperity and stability between countries. This can be applied to the health environment where improved processes between medical aid scheme and doctors may lead to reduced suspicion and increased collaboration towards common goals.

Kaplan and Norton (2001) describe Mobil’s strategy focusing on the profitability of franchise holders to increase profitability. This strategy could apply to the health care environment where similar relationships in the value chain exist between hospitals and professional service doctors.

Inamdar and Kaplan (2002) depict how the balanced scorecard (BSC) could be implemented in health care and emphasises the need to obtain cooperation from the service doctor. Cooperation is an important driver of efficiency and a component of the coopetition strategy to be applied. Endsley et al. (2004) confirm that pay for performance (P4P) as incentive shift doctor focus to cost as well as quality.

Table 4.

Theoretical Framework of Competition, Cooperation & Coopetition

THEORETICAL FRAMEWORK	**Competitive perspective (Competition) PORTER school 1980**	**Cooperation perspective (Collaboration) BARNARD school 1938**	**Coopetition perspective (Coopetition) BRANDENBURGER & NALEBUFF school 1996**
Creation of economic value	Occurs within the firm	Joint process Occurs from a network of strategic interdependence of firms	Occurs from firm interdependence by means of coopetitive advantage
Appropriation or Distribution of value	Influenced by the interfirm interactions according to allocative efficiency. Instant fairness principle or use of opportunistic behaviour	Mutual benefits. The more successful a partner the bigger the benefit for the other partner & vice versa. Fair benefit distribution.	Mutual benefit. By value sharing. Uncertain & not necessarily fair benefit distribution.
Game Theory game type	Zero-sum game (Competitive success & value appropriation means defeat & loss of value for the other stakeholders)	Positive-sum game mutual dependence game structure	Variable-positive-sum game structure.
Interfirm interest functions of firms involved in the game	In Unrecoverable contrast. Firm resources diminish if they are shared.	Convergent interest	Partial or incomplete interest congruence (partially convergent) Supreme interests of partners not necessarily aligned.

The possible efficiencies achievable in quality and reduced cost by service doctors are discussed by Casalino, Devers, Kelly and Brewster (2003). Changes in business strategy made by managed care organisations regarding access to service doctors are discussed by Draper, Hurley, Lesser, Cara and Bradley, (2002). They contend that MCO's are moving away from restrictive measures towards more choice and flexibility to include rather than exclude doctors and toward less contentious contractual relationships with doctors. These changes also apply to South Africa and have cost implications due to reduced control and beg for alternative more doctor friendly measures to be considered. Such should foster improved relations between stake holders to align the focus on quality and cost of services to balance market place preferences.

2.2.9. COOPETITION (BRANDERBURGER & NALEBUFF THINKING 1996)

Definition

In the case of the multiple parties involved in a value network the following definition applies:

Network coopetition concerns a structure of complex relationships among more than two firms and includes coopetition along several levels of the value chain (Complex network coopetition) (Dagnino and Padula, 2002).

Key requirements

- Firm interdependence based on value creation and value sharing (Dagnino and Padula, 2002).
- Variable-positive-sum game with mutual but not necessarily fair benefits to partners.
- Partially convergent interest (and goal) structure where both competitive and cooperative issues are simultaneously present.
- Leads to a
- Strategic interdependence called coopetitive system of value creation
- Economic and competitive benefits
- The value creation can be at
- Dyad (two parties) or
- Network (multiple parties) level and can be of economic or knowledge value.

The key dimensions underlying coopetition are (Morris, Kocak and Ozer, 2007):

- Mutual benefit
- Trust
- Commitment

According to Chin et al (2008) the critical coopetition success factors are:

- Management leadership* (* Most critical factors)

- Development of trust*
- Common goals
- Adopt mutual org culture
- Long-term commitment
- Conflict management system
- Knowledge and risk sharing
- Organisational learning
- Information system support

Six of these critical success factors are communication dependent and it can thus be reasoned that effective communication is critically important to the successful implementation of the coopetition strategy!

The value ad is moving from finite resource sharing to infinite value ad (coopetition) from knowledge brand value added (Dagnino & Padula, 2002).

An example of the benefits is the cost reduction stemming from Nike's relationship with partners and the increased profit leading to increased share of margin and increased profit (Friedman, 2005).

Coopetition strategy definition

According to Dagnino & Padula (2002, p. 13) "coopetition strategy refers to a kind of interfirm strategy which consents the competing firms involved to manage a partially convergent interest and goal structure and to create value by means of coopetitive advantage."

Coopetition perspective

The coopetition perspective pays attention to the variable-positive-sum game structure (Dagnino and Padula, 2002) in which economic value creation can take place as well as economic value sharing. It allows for mutual but not necessarily fair benefit to partners. Firm interdependence is based on a partially convergent interest function. (Table 1)

Table 5.

Critical success factors for Coopetition Strategy

Critical success factors of Coopetition strategy
1. Management leadership* 2. Development of trust* 3. Common goals 4. Adopt mutual org culture 5. Long-term commitment 6. Conflict management system 7. Knowledge and risk sharing 8. Organisational learning 9. Information system support Secret: willingness to solve technical and economic problems • * Most critical factors according to Chin, K. Chan, B.l. & Lam, P. (2008)

An example of coopetition strategy from Chin et al. (2008) is the 7 firms that increased the size of the pie by creating the DVD standard in collaboration but competed intensely amongst each other for pieces of the bigger pie.

According to Dagnino and Padula (2002, p. 14) “network coopetition concerns a structure of complex relationships among more than two firms along one single level of the value chain” (i.e. parallel sourcing) for which the Japanese auto market is well known.

Table 6.

Examples of Coopetition

Type	Firm 1	Firm 2	Joint Products
Dyadic Agreement	Daimler-Chrysler	BMW	Engines for Mini & PT Cruiser
	Volkswagen	Porsche	Sport Utility Highest market end
	PSA (Peugeot)	Renault	Engines & Automatic gears
	PSA (Peugeot)	Toyota	Compact car
	Opel	Suzuki	Micro Monovolumes (Agila & Wagon R+)
	PSA (Peugeot)	Fiat	Monovolume (FIAT Ulysse, Lancia Z, Peugot 806, Commercial light vehicles)
	GM	Fiat	Product plan Power trains + Transmissions
	Honda	Isuzu	Diesel engines Common rail type
	Coca-Cola	Nestle	Canned coffee in Hong Kong & Korea (Ma, H. 2004)
Firm level coopetition	Teams from different functional departments Product planning Design Engineering,	Styling Development Factory operations marketing	For duration of project lifetime through different stages, Speed up processes Solve R&D problems. Time-to market reduction.

In such a network, cooperation can take place at the R&D level while they compete at the distribution level i.e. BMW-Daimler Chrysler – known as “allied in costs, rival in markets” or “marry nobody, collaborate with everybody”. (Dagnino and Padula, 2002, p. 15).

2.2.10. THEORY SUMMARY

Game theory and the prisoner’s dilemma share communication as key determinate of the outcome to determine whether competition strategy or coopetition strategy will be chosen. If communication is limited between prisoners they are likely to lack trust and are likely to cooperate with authorities and choose a competition strategy for self preservation. In case of unlimited communication prisoners are likely to develop trust and more likely choose coopetition as strategy. The learning is that a key requirement for coopetition strategy success is unrestricted communication in order to share knowledge and to create trust. If sufficient attention is not given to communication the other communication dependent requirements will not develop i.e. trust and coopetition strategy will not deliver the results expected. An important aspect to successful communication is leadership commitment because leadership exert influence via the encouragement or restriction of communication.

Coopetition in the game theory value net framework, describes a viable interdependent relationship to create value (cooperate to increase the pie) and to allocate the increased value (compete to divide the pie) by incentive to

create a positive-sum game (win-win relationship). The rule of the game is the distribution of the pie based on efficiency.

Translated into the healthcare environment, the medical doctor functioning in a coopetitive relationship in a value network producing health service goods is likely to do so most efficiently if incentivised appropriately. S/he will create the most value (surplus) to the system which in turn creates the opportunity to share (divide by gain share incentive) the system surplus (profit or saving) between the value adding stake holders as incentives i.e. pay for performance (P4P) ultimately to the benefit of the system (organisation) reflected as value capture (increased pie) inside the firm (Ma, 2004).

The greater efficiency created (lower cost & increased quality) in the coopetitive relationship will reflect in lower contribution increases towards medical insurance. More affordable medical insurance contributions for lower income earners as well as their employers contributing a subsidy will grow the market (increased pie) allowing for healthy competition for share of the bigger pie (competing to allocate the created value).

The validity of this theory will be tested by measuring and comparing the efficiency of a competition strategy and a coopetition strategy while taking note of the development stage of the coopetition strategy implementation.

2.3. COMPETITION STRATEGY CONTRASTED TO THE COOPETITION STRATEGY IN THE HEALTH INDUSTRY

2.3.1. COMPETITION STRATEGY BETWEEN DOCTORS & MCO'S

Competition managed care strategy is the predominant strategy implemented by MCO's in SA. A prescriptive, punishing and questioning culture and attitude (retains all savings) towards doctors is evidence of a competition strategy. For the purpose of this study a MCO has been identified which has a competition managed care strategy in place with one group of doctors and a coopetition managed care strategy with another group of doctors. The efficiency of the two strategies will be compared.

The competition strategy status equates to the control sample namely the non-contracted doctors group servicing the MCO membership base. The hospital (groups) and doctors in the healthcare network value chain maintain an adversarial relationship with the MCO (funders). A general practitioner refers to a specialist who in turn relies on a hospital facility where s/he may have beds and theatre access to admit and treat patients. Doctors compete with each other for referrals from general practitioners but also rely on each other to perform investigations like radiology and apply anaesthetics for procedures. Along with the hospital they compete in an adversarial relationship with the MCO as purchaser of healthcare services for revenue.

The extent to which these participants cooperate or collaborate influence the quality and cost of the service delivered. Allee (2002, p. 20) states that "successful value networks require trusting relationships and a high level of integrity and transparency on the part of participants". In the adversity that exists between doctors and the MCO such a value network thus does not function efficiently.

The paradox of the relationship between the hospitals and specialist doctors is that they compete with each other for share of revenue while they also collaborate in patient referrals and patient servicing. They also compete with the MCO (customer) for share of revenue while they should be cooperating to deliver the appropriate care to members. In the process they divide value (Porter and Teisberg, 2004) in stead of creating it. Doctors cooperate to gain bargaining power in negotiations on discounts to funders/MCO's and in the process divide value. Competition strategies make for adversity, reduced quality and increased cost as reflected in the current health care system (Porter and Teisberg, 2004).

Much adversity exists between doctors and MCO's (funders). The intervention of MCO's is based on the "wrong measurement" (cost alone) (Porter and Teisberg, 2004 p. 67) in stead of the measuring of value at the disease and treatment level. MCO's treat health care service as a commodity as if all doctors are commodity sellers and are more or less the same. This assumption cannot be applied to health care. In reality the competency and proficiency of doctors differ as much as the patients and their diseases differ

and this factor is reflected in their efficiency. Doctors are compelled by current MCO strategy to focus on cost and respond with deep discounts in fees in exchange for volume. Competition between doctors focussed on cost has risen cost even more (Porter and Teisberg, 2004).

Current competition strategy applied by MCO's is based on the resource constraint theory which regards resources as finite. Stake holders should compete for such finite resources and whoever controls the most wins according to the competitive perspective. This makes for a "Zero-sum game" (Dagnino and Padula, 2002, p. 7) with winners and losers.

Current predominant competition MCO strategy equates to cost management that contributes to the adversarial relationships (Porter and Teisberg, 2004) and culminates in an outcome of escalating cost without realising the desired outcome of increased affordability and reduced cost (improved efficiency).

The control sample of non-contracted doctors will thus be selected according to the described characteristics of a competition strategy MCO not operating in a value network (Figure 1)

Table 7.

Comparison of the characteristics of the Competitive MCO and Coopetition MCO strategies. Adapted from the table "Transforming the roles of health plans", according to Porter and Teisberg (2004, p. 231).

ROLES	**Competition(MCOx) OLD ROLE** Culture of denial	**Coopetition (MCOa) NEW ROLE** Enable value based competition on results
Restrict patient: • **choice of doctor** • **choice of treatment**	 +++ Restricted +++ Restricted	 - Informed Choice - Informed Choice
Micromanage doctor • **Case pre-auth** • **HUM Case management** • **Policing the doctor** • **Innovation**	 +++ +++ +++ -	 - MembershipVerification - - Assist doctor + Doctor
Measure and reward doctors based on results • **Profiling(Efficiency)** • **Knowledge sharing** • **Gain share arrangement**	 - Focus on cost - - MCO retains all savings	 +++ Focus on efficiency ++ Innovation & Communication ++ Doctor shares in savings
Cost	+++ Minimise cost	- Maximise value of care
Complex paperwork	++ Used as hurdle	- Minimise paperwork
Compete on minimising premium increases	+	+ Should be on outcomes & efficiency
Compete on subscriber health results	-	++ Quality measure

(The tabled characteristics contrasting the competition strategy to the coopetition strategy correlate with the characteristics of the two doctor group strategies in play between doctors and MCO).

.

2.3.2. COOPERATION (COLLABORATION) STRATEGY BETWEEN DOCTORS & MCOS

Where cooperation does exist between competitors and limited information is shared the cooperative perspective makes for a “Positive-sum game” (Dagnino and Padula, 2002 p. 8),(Table 4). It is not the aim to investigate and discuss pure collaborative strategy in MCO with doctors. This entails complete congruence of goals and may be applied to a staff model health maintenance organisation (staff model HMO) environment where doctors are the employees of the organisation (Chetty, 2000).

2.3.3. COOPETITION STRATEGY BETWEEN DOCTORS & MCOS

Coopetition managed care strategy is not the predominant strategy implemented by MCO’s in SA. Management leadership, trust, common goals, long term goals commitment and knowledge and risk sharing (gain share) towards doctors is evidence of a coopetition strategy. For the purpose of this study a MCO with a coopetition and a competition dual managed care strategy has been identified. The MCO applies a coopetition strategy towards contracted doctors and a competitive strategy towards non-contracted doctors. This offers the opportunity to study the efficiency of both strategies as applied in one MCO to determine the most cost efficient strategy. It offers the

benefit that many factors are equal which may have been different if compared to another MCO which makes for more in-depth analysis.

The sample MCO used for the statistical analysis thus displays certain characteristics of value networks and coopetition strategy and competition strategy. These doctors are interdependent in delivering the different service components of the service funded by the MCO and should thus be regarded as multiple service providers/doctors in a value network. The doctors are mainly limited to one hospital group but not limited to any geographical area of South Africa.

The multitude of coopetition stake holder doctors and the MCO function in a web of non-adversarial relationships with partially convergent goals that contributes to efficiency and generates tangible and intangible value. The value may be a traditional tangible exchange (Goods, health service or revenue) or it may be intangible exchange (Knowledge like doctor profiles and feedback, or benefits like customer loyalty) in a “Positive-but-variable game structure” (Dagnino and Padula, 2002).

Agreements with multiple service doctors termed “parallel sourcing” in the Japanese-like buyer-supplier relationship is in place (Dagnino and Padula, 2002). Information is shared in the form of doctor profiling to adjust cost and quality issues. Incentives in the form of gain share arrangements between the MCO (or funder) and doctors on an equal basis are in place in exchange for participation in the network. It is foreseen that the incentive structure will

evolve to a differential pay for performance gain share arrangement and the system design allows for this.

Multiple suppliers exist to keep constant pressure on the transfer of services and information on process techniques among the participants in the supply chain, discouraging obnoxious opportunistic behaviours from one of the parties as may occur in a bilateral monopoly. This is associated by competitive incentives for supplier performance (Richardson, 1993). Commitment to long-term cooperation need not exclude abandonment of competition between suppliers.

According to Dagnino and Padula (2002 p.16) “The secret to fusing cooperation and competition lies in the willingness to work with a supplier to solve technical and economic problems” instead of simply switching immediately to an alternative source. This principle is applied in the coopetition MCO strategy model to get the desired outcome (reduced cost & improved quality) and implies a long term commitment.

Key value network requirements present according to Porter and Teisberg (2004)

- Move away from restrictive measures
- More clinical freedom but accountable (indirectly to fellow doctors and the scheme)
- Doctor profiling, benchmarking and information sharing
- Incentives i.e. gain sharing from saving as Pay for Performance

- Improved relations with doctors
- Multiple suppliers as parallel supply lines (Competition)
- Common product
- Interaction working with doctors to encourage compliance

It can thus be concluded that the sample MCO strategy should display characteristics of coopetition strategy theory and value network strategy theory and that some measure of increased efficiency could be expected from doctors congruent with this these strategies compared to non-cooperative doctors.

2.4. SUMMARY

It is postulated that the predominant MCO competition strategy could be described as competition between stake holders i.e. doctors and MCO in a linear value chain reflecting low efficiency, and if contrasted to the coopetition strategy described as coopetition between stake holders in a non-linear value network, it should reflect high efficiency.

This hypothesis will be tested by comparing the efficiency index mean of the contracted (Coopetition strategy) doctors in the network with the efficiency index mean of the non-contracted (Competition strategy) doctors in a quantitative study.

2.5. CONCLUSION

For managed care to be successful in improving efficiency it should implement a coopetition strategy based on the basic tenet of economic and management theory that it makes more sense to set goals (benchmark) and measure results (profile) than to specify methods and try and enforce them (Porter and Teisberg, 2004). Creating knowledge in a transparent manner and sharing it with doctors reinforced by incentives for improved outcomes and efficiency should nurture a constructive relationship between doctors and MCO's (and funders) to ensure the sustainability of the healthcare system based on maximising value to the member of the MCO and the patient of the doctor as the congruent goal.

It is expected that the coopetition strategy should be proven more efficient than the competition strategy.

3. CHAPTER 3: RESEARCH HYPOTHESES

According to the literature review it is evident that coopetition strategy is a viable strategy option for organisations to pursue efficiencies in order to compete. Coopetition strategy also holds promise for the health system of a countr and the world. This research will compare the efficiency of coopetition strategy and competition strategy in a MCO.

Competition strategy appears to be the predominant strategy applied by MCO's in managed care in South Africa in spite of some MCO's advocating a

coopetition strategy. The challenge appears to be the selective application of some characteristics of coopetition strategy that suits the MCO but ignoring some of the critical characteristics to achieve success in the execution of MCO strategy thus leaning more towards competition than coopetition strategy.

The question this study attempts to answer is if coopetition strategy results in statistically significant improved cost efficiency compared to competition MCO strategy.

Analysis 1 will compare the efficiency of two main strategies in the study.

Analysis 2 and 3 will compare two subgroups in the coopetition strategy with the competition strategy efficiency based on the strategy characteristics displayed. Differentiation is made between one doctors group strategy displaying the most coopetition characteristics and the other the least.

Analysis 3 will compare the efficiency of the contracted surgeons to the non-contracted surgeons.

Please note: For the sake of simplification of description and analysis doctor strategy status will be equated to his/her choice to contract or not with the MCO in the following manner:

- Non-Contracted status = (NC) = Competition strategy
- Contracted status = (C) = Coopetition strategy
- The following abbreviations will be used:

- Contracted Group = (C) = Coopetition strategy
- Coopetition strategy subgroups
- Individually contracted sub-group = (IC) = Individual coopetition strategy
- Group contracted sub-group = (GC) Group coopetition strategy
- Non-Contracted Group = (NC) = Competition strategy
- Surgeon & Paediatric Surgeon group = Surgeon group = (S)
- Contracted surgeons = (SC) = Coopetition strategy surgeons
- Non-contracted surgeons = (SNC) = Competition strategy surgeons

3.1. RESEARCH HYPOTHESIS 1:

Proposition 1:

Contracted doctor groups (C) are more cost efficient than non-contracted doctor groups (NC).

The efficiency index mean (μC) of the contracted (C) and the mean (μNC) non-contracted doctors group will be compared statistically in a quantitative non-ordinal analysis to determine the more efficient (lowest mean PI) of the two groups (strategies). The lesser the productivity index (PI) the more cost efficient the doctor and conversely the greater the PI the less cost efficient the doctor.

Hypothesis 1:

The contracted doctor's efficiency mean (μC) is equal to the efficiency mean (μNC) of non-contracted doctors group.

- Ho: μC= μNC two sided test α = 0.1 (level of significance)
- The contracted doctor's efficiency mean (μC) is not equal to the efficiency mean (μNC) of non-contracted doctors group.
- Ha: μC ≠ μNC

The contracted group (C) efficiency mean (μC) is not equal to or greater than the efficiency of non-contracted doctors (NC) efficiency mean (μNC).

- Ho: μC ≥ μNC one sided test α = 0.05 (level of significance)
- Ha: μC < μNC

3.2. RESEARCH HYPOTHESIS 2:

Proposition 2:

Individually contracted doctor subgroups (IC) are more cost efficient than non-contracted doctor groups (NC).

The efficiency index mean (μC) of the individually contracted doctor subgroups (IC) of contracted doctors group and the efficiency index mean of the non-contracted group (μNC) will be compared statistically in a quantitative study to determine the more efficient (lowest mean PI) of the two groups (strategies).

Hypothesis 2:

The individually contracted doctors (IC) of the contracted doctors' efficiency mean (μIC) is equal to the efficiency mean of non-contracted group (μNC).

- Ho: μIC= μNC two sided test α = 0.1 (level of significance)

The individually contracted doctors (IC) of the contracted doctor group efficiency mean (μIC) is not equal to the efficiency mean (μNC) of non-contracted group.

- Ha: μIC ≠ μNC

- Ho: μIC ≥ μNC one sided test α = 0.05 (level of significance)
- Ha: μIC < μNC

3.3. RESEARCH HYPOTHESIS 3:

Proposition 3:

Group contracted doctors (GC) are more cost efficient than non-contracted doctor groups (NC).

The efficiency index mean (μC) of the group contracted doctor subgroups (GC) of the contracted doctors group and the mean (μNC) non-contracted (NC) will be compared statistically in a quantitative study to determine the more efficient (lowest mean PI) of the two groups (strategies).

Hypothesis 3:

The group contracted doctor subgroup (GC) of the contracted doctors' efficiency mean (μGC) is equal to the efficiency mean (μNC) of non-contracted group.

- Ho: μGC = μNC two sided test α = 0.1 (level of significance)

The group contracted doctor subgroup (GC) efficiency mean (μGC) is not equal to the efficiency mean (μNC) of non-contracted doctors group.

- Ha: μGC ≠ μNC
- Ho: μGC ≥ μNC one sided test α = 0.05 (level of significance)
- Ha: μGC < μNC

3.4. RESEARCH HYPOTHESIS 4:

Proposition 4:

Surgery & paediatric surgery groups are referred to as surgeon subgroup (S).

The contracted surgeons (SC) are more cost efficient than non-contracted surgeon subgroup (SNC).

The efficiency index mean (μSC) of the surgeon contracted doctor subgroup and the efficiency mean (μSNC) of the non-contracted doctors group will be compared statistically in a quantitative study to determine the more efficient (lowest mean PI) of the two groups (strategies).

Hypothesis 4:

The surgeon contracted doctor subgroup (SC) efficiency mean (μSC) is equal to the efficiency mean (μSNC) of the surgeon non-contracted doctors group (SNC).

- Ho: μSC= μSNC two sided test α = 0.1 (level of significance)

The contracted surgeon doctors subgroup or (SC) efficiency mean (μSC) is not equal to the efficiency mean (μSNC) of surgeon non-contracted doctors group (SNC).

- Ho: μSPC≠ μSPNC
- Ho: μSC ≥ μSNC one sided test α = 0.05 (level of significance)
- Ha: μSC < μSNC

3.5. SUMMARY

The lowest mean PI contract status will reflect the more efficient of the two strategies i.e. either the coopetition (contracted doctors) or the competition strategies (non-contracted doctor).

4. CHAPTER 4: RESEARCH METHODOLOGY

4.1. INTRODUCTION

The lower the productivity index (PI) the more efficient the group.

The contracted group (C) was regarded as coopetition strategy doctors (exercising a coopetition strategy) comprising out of two groups of contracted

doctors namely individually contracted doctors (IC) and group contracted doctors (GC).

The individually contracted doctors were regarded as the more pure coopetition strategy doctors and expected to be more compliant and coopetitive than the group contracted group.

The group contracted doctors were regarded as less pure coopetition strategy doctors and expected to be less compliant and less coopetitive in strategy than the individually contracted group.

The non-contracted group (NC) was regarded as competition strategy doctors (exercising a competition strategy).

The analysis started high level in an attempt to determine if the mean PI value was different for:

- Group 1 (C): doctors contracted (coopetition strategy)
- Group 2 (NC): doctors not contracted (competition strategy)

The analysis then drilled down to determine if the mean PI value was different for:

- Group 1 (IC): doctors who contracted to the MCO as individuals
- Individual coopetition strategy doctors
- Group 2 (NC): doctors that were not contracted
- Competition strategy doctors

Then it compared

- Group 1 (GC): doctors who contracted collectively in negotiation groups
- Group coopetition strategy doctors
- Group 2 (NC): doctors not contracted
- Competition strategy doctors

Lastly it compared

- Group 1 (SC): Contracted surgeons & paediatric surgeons
- Coopetition surgeon group
- Group 2 (SNC): Not contracted surgeons & paediatric surgeons
- Competition surgeon group

As discussed before, the PI value is an indicator of cost efficiency. The lower the PI value the better the cost efficiency.

The PI value has a fairly sensitive number and even the smallest difference in this value would be assumed will have some statistical significance. It should be noted that the coopetition doctors groups (contracted) were reimbursed at 30% more than the competition strategy doctors (non-contracted doctors) and that this amount is reflected in their performance index (PI). It implies that should their performance index be equal to the competitive doctors that they had actually saved on other resources and that the saving was paid to them as part of their incentive without sacrifice in quality.

4.2. POPULATION AND SAMPLING

4.2.1. POPULATION OF RELEVANCE

The population of relevance for propositions 1, 2, 3 and 4 is the medical doctor population who treated members of the relevant medical aid scheme managed by the MCO (Zikmund, 2003). The doctors are the target population whose efficiency was analysed to determine the most efficient MCO strategy.

4.2.2. UNIT OF ANALYSIS

The health care system is the unit of analysis. The data was collected at individual doctor level but it was the aggregate data that went into the analysis - the mean PI's of the doctors of each of the different strategy groups. The strategy group mean efficiency results were reflections of the efficiency of the strategies in place in MCO as part of the health care system. The research investigated the efficiency of competition and coopetition strategy in existence between a MCO and the doctor groups it purchased services from as part of the health care system (Zikmund, 2003).

The research was performed on the health care system in a hierarchical model. Even though data at the doctor level was available, aggregates were used in the analysis. In social research these hierarchies of analysis units have spawned an area of statistical analysis referred to as hierarchical modelling. This is used in education, for instance, where classroom performance is compared but achievement data is collected at the individual student level.

4.2.3. CALCULATION OF EFFICIENCY (PI)

Efficiency was expressed as a performance index (PI) (Pope, 2007). For the measurement of efficiency the diagnoses (ICD10 codes) and procedure codes with tariffs were matched to clinical clusters (CC's) based on an internationally used episode treatment grouper (ETG). The average cost per episode was calculated, and the relative value units (RVU's) calculated were divided by the number of episodes to obtain the specialists case mix index (CMI) which reflected the severity of cases treated. The CMI was multiplied by the doctor average cost to calculate the doctor CMI adjusted average cost, which was divided by the overall CMI adjusted average cost (Total of the doctor CMI adjusted average cost) to determine the performance index (PI) of each doctor. The higher the PI the less efficient the doctor is and the lower the PI the more efficient a doctor.

The efficiency index PI number is determined by the sum of the cost, episodes, intensity and quality of the health service provided.

The PI value has a fairly sensitive number and even the smallest difference in this value was assumed to have some statistical significance.

It should be noted that the coopetition doctors groups (contracted) were reimbursed at 30% more than the competition strategy doctors (non-contracted doctors) and that this amount is reflected in their performance index (PI). It implies that should their performance index be equal to the competitive doctors that they had actually saved on other resources and that

the saving was paid to them as part of their incentive without sacrifice in quality.

On profiling the doctor this PI value (transparent process) was compared to the group average as benchmark (creating knowledge) and forwarded to the provided for self review (sharing knowledge).

The means of the group performance indexes (µPI's) was used to analyse the MCO strategies according to doctor group contractual relationships as reflection of the strategy in play.

4.2.4. ASSUMPTIONS

It was assumed that the contractual relationships maintained between the doctors and the MCO reflected the strategic relationship that was maintained between the two parties at the time of the research.

The fact that doctors did not contract with the MCO indicated that they did not want to interact with the MCO in a coopetitive strategic relationship and opted to interact in a competitive strategic relationship. They were assumed to focus only on their own income generation in a Zero sum game.

The fact that the MCO invited all doctors in the target population to contract with it in an attempt to establish a coopetitive relationship but that some doctors declined the offer was regarded as ending in a competitive strategic relationship. It is noted that some non-contracted doctors are not aware of the

opportunity and will thus be regarded as competitive although they may be willing to act coopetitive.

It was assumed that individually contracted doctors expressed more willingness to trust in contracting and were regarded as expressing more of the characteristics of a coopetitive strategic relationship than those doctors that were only prepared to contract following group representation via negotiation groups. Those contracting via their groups were not as informed and motivated due to lesser or non-ideal communication processes.

4.2.5. LIMITATIONS OF THE RESEARCH

This research was not a causal study and served only to determine the more efficient MCO strategy by measuring the difference in mean efficiency (PI) between the doctor groups.

4.2.6. RELEVANT KEY VARIABLES

The different population demographic profiles (age, sex, socio-economic status and geographic areas) of the sample scheme in different regions of the South Africa may influence the number of the procedures performed as well as the intensity of disease in which such a case may resort (Minor or major) i.e. alcohol consumption and it's complications may be higher in some regions than in others. The allocation of the events into clinical clusters and calculation of cost efficiency (PI) method normalised for these factors. The biggest single factor was severity of disease that could have influenced the data and outcomes. This was addressed in the auditing process by the MCO

processes by the allocation of episodes into the correct clinical clusters (Pope, 2007).

The data may also be from different hospitals in a group. This is taken note of but it is not determined to what extent the hospital efficiency influences the doctor efficiency but it can be assumed that there will be some correlation. It is expected of the doctor as leader of the team to manage most of these factors under his control to improve efficiency in the hospital. The hospital data was not available and this factor was not researched.

Benefits differed between contracted doctors and non-contracted doctors. In the case of contracted doctors they were reimbursed at NHRPL (National Healthcare Reference Price List) tariff plus 30% as a gain share incentive for contracting or participation in expectation of coopetitive behaviour. Non-contracted doctors where only reimbursed at NHRPL tariff. The reimbursement amount was used to calculate the PI. This may have been a factor that marginally increased the PI of the contracted group and may cause their PI to be closer to that of the non-contracted group. It is important to consider when the efficiency index differences are calculated because the incentive paid out may lessen the difference in PI. This incentive influence was noted for consideration in the interpretation of the results.

4.2.7. SAMPLE SCOPE

The PI values were extracted to perform the statistical analysis. See Figure 1 for an example of the data extraction performed.

The complete data set was drawn from the MCO database for the calendar year of 2007. The source was the doctor profile information from the MCO.

These profiles were based on 2007 claims information from:

- A closed membership medical aid scheme registered in South Africa with the Council of Medical Schemes (CMS) with a membership of 14 000 principles and 33 000 beneficiaries. Principles are all in the employ of one employer in the healthcare industry.
- Serviced by two distinct groups of doctors
- One group did not contract with the MCO and was regarded as competitive doctors because they followed a strategy to compete and not collaborate with the MCO towards improved cost-efficiency. They were assumed to focus only on their own income generation in a zero-sum game.
- The other group did contract with the MCO and was regarded as contracted doctors because they followed a strategy to cooperate or collaborate but not to compete with the MCO to achieve improved cost-efficiency. In this group two distinct subgroups were identified:
- Those individual doctors who contracted with the MCO in their individual capacity (IC). This group may tend to be better informed due to the personal contact during the initial phases of their

contracting. They may be more motivated and may display more trust in the MCO motives.

- Those individual doctors who contracted collectively via a representative body or negotiation group were regarded as group contracted (GC). This group may tend to be less informed due to little or no individual contact and limitations on communication.
- In the case of both IC and GC the contracted (coopetition) group of doctors the coopetition strategy was implemented that included an incentive of 30% above NHRPL (130% of tariff) for participation or contracting.
- No incentive was paid to doctors from the non-contracted service (NC) doctor group (Competitive doctors).

The PI data was sourced from one MCO for the mentioned medical scheme. The scheme's members were served by the three distinct doctor groups engaged via one of two managed care strategies. For the non-contracted (NC) group no incentives or other criteria of coopetition strategy were applied, only competition characteristics applied. For the contracted groups (C and CI & CG) the alternative coopetition strategy applied, i.e. a gain share arrangement (153% of tariff) to share in savings as an incentive. The means of the performance indexes (µPI's) of the two distinct doctor groups were calculated and compared to demonstrate the cost efficiency of the two doctor groups by statistical analysis.

4.2.8. SAMPLING METHOD

The sample was a convenience sample for an observational (Albright *et al*. 2006) study to compare efficiency between medical doctor groups with different contract statuses (strategies) or differently put different strategies namely competition (non-contracted) and coopetition (contracted) managed care strategies with contracted subgroups individual (IC) or group contracted (GC).

The MCO prepared to make unidentified 2007 claims information available was identified and permission to access the information was granted by the client scheme.

The non-contracted group of doctors (NC) was subject to the standard managed care interventions namely competitive managed care strategy.

The contracted group of doctors (C) was subject to the alternative strategy namely coopetition MCO strategy that included gain share incentives. This was valid for both the contracted subgroups; individual (IC) and group (GC) contracted subgroups.

The sampling method was an observational convenience sample. All doctor profile information (PI) was included. The population of relevance was all doctors who treated patients of the medical aid scheme in hospital. The data included the complete set of doctor profiles expressed as performance indexes (PI's). The complete data set was already audited and allocated to clinical clusters (CC's) and calculated to performance indexes (PI's).

Some MCO strategies i.e. competitive structuring in the form of savings benefits (cost cutting strategies) or benefit limitations and authorisation hurdles lead to adversarial relationships with doctors and resultant competitive doctor behaviour and inefficiency. Benefits differed between contracted doctors and non-contracted doctors. In the case of contracted doctors they were reimbursed at NHRPL (National Healthcare Reference Price List) tariff plus 30% as a gain share incentive for contracting. Non-contracted doctors where only reimbursed at NHRPL tariff. The enhanced reimbursement amount of contracted doctors was included in the PI calculation. This may have been a factor that marginally increased the PI of the contracted group and may cause their PI to be increased or approximate to that of the non-contracted group. The inclusion was regarded as a fair measure assuming that the doctor should be saving more than the amount he is incentivised with.

All other related investigations (radiology and pathology) were linked into episodes of care and included in the PI value calculations of each doctor group. The PI means for the doctor groups were calculated and compared by statistical analysis. The data availability allowed for inclusion of all cases for 2007. It was not necessary to draw a random sample since the complete data set was available (Zikmund, 2003).

Figure 1.

Sample Data Illustration

TOTAL SOUTH AFRICAN MEDICAL AID SCHEME CLAIMS DATA					
	MCO Contracted (Coopetition Doctor claims)		**MCO Non-Contracted** (Competition Doctor claims)		
Tertiary Care Expenses	**Other expenses**	**CC Expenses**	**CC Expenses**	**Other expenses**	**Hospital**
Providers Doctors		PI calculations from 2007 SAMPLE DATA	PI Calculations from 2007 SAMPLE DATA		Theatre Disposables Medicine Ward
Secondary Care Expenses					Specialist In-Hospital & Procedural
					Out of Hospital Consultation
Primary Care Expenses					GP & Chronic medicine

4.2.9. DATA COLLECTION

The data was secondary data from hospital, doctor and other related claims used to bill and pay for services delivered. The claims data of the MCO was de-identified. Only coded information was used (diagnostic & procedure codes sorted into clinical clusters based on the ETG classification grouper adapted for South Africa). Only claims that qualified for reimbursement were included

in the data used to calculate the PI's of doctors. These were audited in the normal MCO process and calculated into PI per doctor and extracted for the statistical analysis. The doctor data discriminated whether a doctor was contracted or non-contracted. It further indicated whether a contracted doctor contracted voluntarily as an individual wanting to participate or as a member of a negotiation group where the leadership contracted on their behalf. The communication preceding and following contracting differed in its process, intensity and efficiency. The individually contracted doctors went through a more thorough personal information and negotiation session which was not the case for those contracting as a group. Most of the doctors who contracted individually did so early in the program and had longer experience cooperating with the MCO.

Efficiency was expressed as a performance index (PI). The PI values were calculated according to the method described in Chapter 4 point 4.3. The PI values were extracted from the MCO system to perform the statistical analysis. See Appendix A for an example of the data.

The data was extracted from a managed care system database according to specification. The first result appeared skewed due to the inclusion of an HIV account used by the MCO to allocate all HIV episodes to. HIV episodes were considered outliers. The HIV outlier account was excluded and the data extraction was re-run. The data was scrutinised for other possible anomalies before progressing to analysis. A pivot table was used to sort the data into the relevant doctor groups for analysis.

The data extracted was for the period 1 January 2007 to 31 December 2007 in Excel format and consisted of the following fields:

Practice number indicating a specific specialist type as well the practice responsible for the admission and treatment of the event. The number of doctor records was 1124. This included records where a minimum of 1 episode was performed.

Name of the practice was included in the specification to control with the practice number. This was for control purposes and the data audit to ensure the quality of the data and was discarded before analysis and reporting on in the final report.

Date accepted field indicating when the doctor practice contracted up to participate as doctor in the network. This field is relevant because the time of participation may have an influence on the data as well as on compliance measurement. This field is important because it indicates that a doctor joined voluntarily as individual and not only because his/her network (i.e. Surgico or GMG) signed up on his/her behalf. The dates of providers contracting to the network spans January 1999 to the end of the period of data extraction which is 31 December 2007.

Surgico/GMG field indicates whether a practice was a member of one of two negotiation groups of doctors (Surgico is a surgeon group and GMG a obstetrician & gynaecology group) who signed up collectively in January 2007). “True” indicates that the doctor is a member of the two groups and

"False" that the member is not. The initially signed up doctors were restricted to one hospital group only while doctors in these two group fields may be linked to other hospital groups and may be admitting smaller numbers of patients.

The negotiation and communication pre and post contracting differed for the individually contracted doctor group and for the negotiation group contracted doctor group. It could be expected that the individually contracted group would be more informed and motivated to be cost efficient than the group contracted doctors who did not voluntarily contract and did not enjoy the opportunity to be fully informed of the goals of the strategy.

Total Cost field reflects the total cost per episode incurred. This amount was made up of professional fees, cost of radiology and pathology requested as well as ward and theatre hospital fees. It also included the cost of recurrence of the same condition due to complications or failed treatment. The total value of cases reported on is R73 113 880.95 for the period 2007.

Episodes field indicates the number of cases treated by the doctor in question. Where a doctor has treated few cases it may not be reliable to profile the individual doctor but all cases will be included to calculate other values for the aggregate. The aggregate number of cases is 4 353 cases for the 2007 period.

Actual Average Cost field is the total amount divided by the number of episodes. The average cost per episode was R16 796.20.

CMI (Case Mix Index) field accounts for the difference in severity of the cases treated. Patient age, complicating conditions, co-morbidities, and major surgeries have been factored in to calculate the CMI (Pope, 2007). The higher the CMI the greater the case severity.

Case Mix Index Adjusted Average field reflects the average cost adjusted to the severity of episodes treated to ensure similar episodes are compared in the measurement.

PI (Performance Index) field measures overall cost efficiency after adjusting for the case mix. The higher the performance index the greater the cost inefficiency. The lesser the PI the greater the cost efficiency of the relevant doctor. The PI was communicated to doctors in profiles to encourage behaviour change towards increased cost efficiency along with the categories of service used to calculate the PI compared to the benchmark for all doctors. The PI was also used to divide doctors into quartiles for profiling and future P4P gain share reimbursement arrangements. For the analysis the PI mean was calculated and used to compare groups of doctors sorted on their contracted status (Pope, 2007).

4.3. RESEARCH DESIGN

Descriptive research has been performed in a quantitative study on managed care organisation data generated from medical aid audited claims data. The study was observational (Albright, Winston & Zappe, 2006) but factorial in design.

Only cases that were hospitalised were taken into account following which all costs including ambulatory care was included to calculate total episode cost.

The measurement was based on the premise that the lowest productivity index (Lowest PI = most cost efficient) to produce health goods (service of equal quality) will produce the most benefit (profit) to the client (Medical aid scheme) expressed in the system equation; Surplus or Profit = Risk Premium – Cost of service. Thus the lower the PI value the more efficient a doctor and the lower the cost to the system resulting in more surplus or profit to the system (medical aid scheme).

The aim of the study was to identify the most cost efficient strategy (contract status group with the lowest mean PI).

The difference in efficiency was measured by comparing the means of the productivity indexes (μPI) of the different groups. The PI value is a fairly sensitive number and even the smallest difference in this value was assumed would have some statistical significance.

The unit of analysis was the doctor (doctor or specialist physician) (Zikmund, 2003). The population of relevance was the doctors that has treated members of the medical aid scheme in hospital and profiled by the MCO. The independent variable was the group contract status (Zikmund, 2003).

The sample was an observational convenience sample (Albright et al. 2006) from a managed care organisation data base. The data was audited by the MCO staff. The data set outliers were identified by the system, audited and re-

allocated to appropriate CC's or eliminated if proven to be exceptional. The whole data set was used and no sample subset was drawn.

4.3.1. PROPOSITION 1

Compared Contracted to Non-contracted groups.

A. Test to determine if the variances are equal between the two groups.

An F-test for two samples (groups) was used to compare variances between the group's PI means to make inferences about the means. The F-test determines whether there is more variability in the scores of one sample than in the scores of another sample (Zikmund, 2003). The F-test utilises measures of sample variance rather than the sample standard deviation because standard deviations cannot be summed.

B. Hypothesis Tests

The Non-contracted group (Competitive doctors or NC) efficiency mean (μNC) was compared to the Contracted group (Coopetition doctors or C) efficiency mean (μC). The efficiency of doctors expressed as performance index (PI) was obtained from the system database.

Ho: MeanC = MeanNC

Ha: MeanC ≠ MeanNC

A t-test for two-samples (assuming unequal variances) were used to test the hypothesis that the mean PI values for specialists not contracted (NC) were

greater than the PI values of the contracted group (C) (C includes both group and individual contracted specialists). (Zikmund, 2003).

4.3.2. PROPOSITION 2

Compared individually contracted group (IC) to Not-contracted group (NC).

A Test to determine if the variances are equal between the two groups

An F-test for two samples (groups) was used to compare variances between the group's PI means to make inferences about the means. The F-test determines whether there is more variability in the scores of one sample than in the scores of another sample (Zikmund, 2003). The F-test utilises measures of sample variance rather than the sample standard deviation because standard deviations cannot be summed.

B Hypothesis Tests

The Individually-contracted group (Coopetition doctors or IC) efficiency mean (μIC) was compared to the Non-Contracted group (Competitive doctors or C) efficiency mean (μC). The efficiency of doctors expressed as a productivity index (PI) was obtained from the system database.

Ho: MeanIC = MeanNC

Ha: MeanC ≠ MeanNC

A t-test for two-samples (assuming unequal variances) were used to test the hypothesis that the mean PI values for specialists Individually contracted (μIC)

were smaller than the mean PI values of the Non-contracted group (μNC). (Zikmund, 2003).

4.3.3. PROPOSITION 3

Compared the group contracted (GC) group to the Non-contracted group (NC).

A Test to determine if the variances are equal between the two groups

An F-test for two samples (groups) was used to compare variances between the group's PI means to make inferences about the means. The F-test determines whether there is more variability in the scores of one sample than in the scores of another sample (Zikmund, 2003). The F-test utilises measures of sample variance rather than the sample standard deviation because standard deviations cannot be summed.

B Hypothesis Tests

The Group-contracted group (Coopetition doctors or GC) efficiency mean (μGC) was compared to the Non-Contracted group (Competitive doctors) efficiency mean (μNC). The efficiency of doctors expressed as performance index (PI) was obtained from the system database.

Ho: MeanGC = MeanNC

Ha: MeanGC ≠ MeanNC

A t-test for two-samples (assuming unequal variances) were used to test the hypothesis that the PI values for specialists Group contracted (GC) were smaller than the PI values of the Non-contracted group (NC). (Zikmund, 2003).

4.3.4. PROPOSITION 4

Compared the Contracted surgery and paediatric surgery groups to Non-contracted surgery and paediatric surgery groups.

A Test to determine if the variances are equal between the two groups

An F-test for two samples (groups) was used to compare variances between the group's PI means to make inferences about the means. The F-test determines whether there is more variability in the scores of one sample than in the scores of another sample (Zikmund, 2003). The F-test utilises measures of sample variance rather than the sample standard deviation because standard deviations cannot be summed. A p one-tail larger than 0.1 did not reject the null hypothesis hence a two sample equal variance t-test was used.

B Hypothesis Tests of the Surgery and Paediatric surgery C & NC

The Non-contracted surgery group (Competitive surgeon doctors or SNC) efficiency mean (μSNC) was compared to the Contracted surgeon group (Coopetition surgeon doctors or SC) efficiency mean (μSC). The efficiency of surgeon doctors expressed as performance index (PI) was obtained from the system database.

Ho: MeanSC = MeanSNC

Ha: MeanSC ≠ MeanSNC

A equal variance t-test for two-samples (assuming equal variances) were used to test the hypothesis that the mean PI values for surgeons not contracted (SNC) were greater than the PI values of the surgeon contracted group (SC) (C includes both group and individual contracted surgeon and paediatric specialists). (Zikmund, 2003).

4.4. METHODOLOGY

4.4.1. CONSIDERATIONS BEFORE APPLYING THE T-TEST

Characteristics considered before applying the Student's t-test:

- Was it a paired or unpaired comparison? In this case the comparison was paired because every doctor was operating independently.
- Did the population follow a normal distribution? A histogram was done to determine if the population followed an estimated normal distribution simulating a Gausian Bell shape curve. The result was affirmative (GraphPad Prism, 1999).
- Was the data quantitative or qualitative? In this case the data was pure quantitative data.

Based on these three criteria it was decided to use the t-test.

Things considered when using the Students t-test:

- There are 2 types of t-test, one accepts equal variances and the other unequal variances. The f-test was used to decide if the variances were equal or unequal.
- The one sided and the two sided test results were supplied.
- The level of significance (P-value) used was 0.1 (10%) (Zikmund, 2003).

4.4.2. HYPOTHESIS TEST DESCRIPTION

The f-test was performed to determine if the two variances were equal or unequal.

Based on the f-test outcome the appropriate two sample t-test assuming unequal or equal variance tests were performed.

A two-sided test with a p-value ($\alpha = 0.1$) as well as a one-sided test with a p-value ($\alpha = 0.5$) were selected as the respective levels of significance.

Ho: $\mu C = \mu NC$ two sided test $\alpha = 0.1$ (level of significance)

Ha: $\mu C \neq \mu NC$

Ho: $\mu C \geq \mu NC$ one sided test $\alpha = 0.05$ (level of significance)

Ha: $\mu C < \mu NC$

Depending on the p-values the Ho would be rejected or not

Two sided test

p value > 0.1 could not reject the null hypothesis or conversely if p < 0.1 would reject the null hypothesis

One sided test

p value > 0.05 could not reject the null hypothesis or conversely if p < 0.05 would reject the null hypothesis

These above tests were performed for each of the 4 hypotheses comparing the PI means of the negotiation groups namely the:

Contracted – Non-contracted.

Individually contracted – Non-contracted.

Group Contracted – Non-contracted.

Surgery contracted – Surgery non-contracted. To investigate and determine if there was a relationship between the specialty type, contract group and efficiency (PI mean group). A bar graph was drawn to illustrate the relationships.

4.5. CONCLUSION

It was expected to find an increased efficiency (lower mean PI) to be associated with the contracted doctors (C) when their mean PI's were compared to mean PI of non-contracted (NC) group of doctors. These

contract statuses would translate into strategy terms that it was expected that the coopetition doctor groups would be more efficient than competition doctors.

It further leads to the expectation that the individually contracted doctors (coopetition doctors) would be more cost efficient than the group contracted doctors because of the assumption that communication was more effective than for the group contracted group. The contracted group was also incentivised for participation in the expectation that they would be more cost efficient. Thus the expectation that the more criteria fulfilled per group in the implementation of coopetition strategy the more efficiency was to be expected stood to be tested and proven.

5. CHAPTER 5: RESULTS

5.1. INTRODUCTION

Efficiency was expressed as a performance index (PI). The PI values were calculated according to the method described (Chapter 4 point 4.2.3.). The PI values were extracted from the MCO system database to perform the statistical analysis. See Appendix A for an example of the data extraction.

5.2. DATA

Table 8

Data extraction fields (For context only)

Practice No	Date Accepted	Surgico / GMG Group	Total Cost	Episodes	Actual Average Cost	CMI	CMI Adjusted Average	Productivity Index PI
1201875		FALSE	3,979.41	1	3,979.41	0.1656	24,030.25	0.7832
1470256		FALSE	20,722.99	1	20,722.99	0.8312	24,931.41	0.8125
4000001 42174		FALSE	110,979.16	1	110,979.16	3.6276	30,593.00	0.9971
4200000 05142	09 Mar 1999	FALSE	163,916.25	11	14,901.48	0.5036	29,589.91	0.9644
4200000 15040		TRUE	114,733.63	10	11,473.36	0.4226	27,149.46	0.8848
4200000 17965	09 Mar 1999	FALSE	8,207.70	1	8,207.70	0.2732	30,042.83	0.9791
4200000 18678		TRUE	145,262.56	6	24,210.43	0.7203	33,611.59	1.0954

The data extracted was for the period 1 January 2007 to 31 December 2007 in Excel format and consisted of the following fields:

Practice number indicating a specific specialist type as well the practice responsible for the admission and treatment of the event. The number of doctor records was 1124. This included only records where a minimum of 1 episode was performed.

Date accepted field indicating when the doctor practice contracted up to participate as doctor in the network. This field indicates that a doctor joined voluntarily as individual and not as part of a network.

Surgico/GMG field indicates whether a practice was a member of one of two negotiation groups of doctors (Surgico was surgeon group and GMG a

obstetrician & gynaecology group) who signed up collectively in January 2007). “True” indicates that the doctor is a member of the two groups and “False” that the member is not.

Total Cost field reflects the total cost per episode incurred. The total value of cases reported on is R49 349 693 for the period 2007.

Episodes field indicates the number of episodes treated by the doctor in question. The aggregate number of cases is 4 039 cases for the 2007 period.

Actual Average Cost field is the total amount divided by the number of episodes. The average cost per episode was R12 218.

CMI (Case Mix Index) field accounts for the difference in severity of the cases treated. The higher the CMI the greater the case severity.

Case Mix Index Adjusted Average field reflects the average cost adjusted to the severity of episodes treated to ensure similar episodes are compared in the measurement.

PI (Performance Index) field measures overall cost efficiency after adjusting for the case mix. The higher the performance index the greater the cost inefficiency. The lesser the PI the greater the cost efficiency of the relevant doctor.

5.2.1. OVERALL DESCRIPTIVE

The extract yielded 1124 PI records. 230 doctors were contracted in groups and 267 were individually contracted doctors. 627 of the doctors were not contracted.

The contracted individual group had a PI of 0.9897 (Std. deviation 0.1580) while the contracted group had a PI of 0.9953 (Std. deviation 0.1205). The not-contracted group had a PI of 1.0053 (Std. deviation 0.1736).

Table 9.

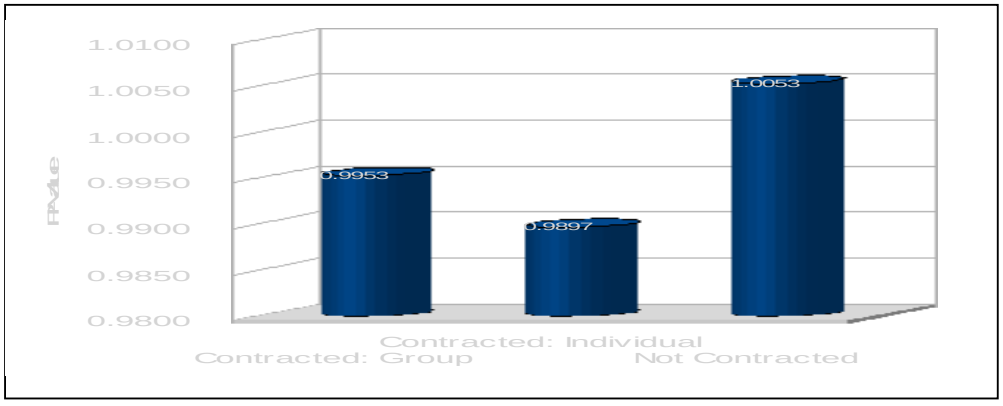
Overall Descriptive

A.

Group	Average PI	Standard Deviation	Observations
Contracted: Group	0.9953	0.1205	230
Contracted: Individual	0.9897	0.1580	267
Not Contracted	1.0053	0.1736	627

Figure 2.

Average PI values per Group



5.2.2. SPECIALITY TYPE

Table 10.

Average PI per Specialty Type

B.
1. Average (PI)

	Group		
Practice Type	**Contracted: Group**	**Contracted: Individual**	**Not Contracted**
CARDIOLOGY		1.01	1.02
DERMATOLOGY			0.78
GASTROENTEROLOGY		1.00	0.93
GENERAL DENTAL PRACTICE			1.02
GENERAL PRACTITIONER			0.91
GROUP PRACTICE		1.10	
MAXILLO-FACIAL AND ORAL SURGERY		0.97	1.01
MEDICAL ONCOLOGY			1.09
NEUROLOGY		0.94	1.10
NEUROSURGERY		1.02	1.00
OBSTETRICS & GYNAECOLOGY (O&G)	1.00	1.01	0.98
OPTHALMOLOGY		1.06	0.96
ORTHOPAEDICS		1.01	1.01
OTORHINOLARYNGOLOGY		1.04	0.98
PAEDIATRIC CARDIOLOGY			1.03
PAEDIATRICS		0.98	0.98
PHYSICIAN		0.94	1.05
PLASTIC AND RECONSTRUCTIVE SURGERY		0.94	1.02
PSYCHIATRY			1.05
PULMONOLOGY		1.03	0.99
RADIOTHERAPY			0.98
SURGERY / PAEDIATRIC SURGERY	0.99	0.92	1.00
THORACIC SURGERY		1.06	1.19
UROLOGY		1.03	1.01

Group contracted PI average

It should be noted that only two groups contracted as groups, namely the surgeon group (surgeons and paediatric surgeon group) and the obstetrician and gynaecology (O&G) group with mean PI values for the group contracted doctors of 0.99 and 1.00 respectively.

The surgery (surgery and paediatric surgery) group had PI value of 0.92 for individual contracted, 0.92 for group contracted and 1.00 for non-contracted groups.

Contracted group lower PI values

For the thoracic surgery doctors the individually contracted group PI was 1.06 and for the not-contracted group 1.19. The physician individually contracted individual average PI was 0.94 and not-contracted group 1.05. Neurology group PI averages where 0.94 for individually contracted and 1.1. for the non-contracted doctors group.

Non-contracted group lower PI values

For paediatrics and orthopaedics the contracted not-contracted PI values were equal on 0.98 and 1.01 respectively.

The neurosurgeon PI values were 1.02 (contracted) and 1.00 (not-contracted). Otolaryngology PI values were 1.04 (contracted) and 0.98 (non-contracted).

Table 11

Observations Speciality Number in Groups

2. Observations

	Group		
Practice Type	**Contracted: Group**	**Contracted: Individual**	**Not contracted**
CARDIOLOGY		11	17
DERMATOLOGY			1
GASTROENTEROLOGY		6	4
GENERAL DENTAL PRACTICE			64
GENERAL PRACTITIONER			5
GROUP PRACTICE		1	
MAXILLO-FACIAL AND ORAL SURGERY		12	33
MEDICAL ONCOLOGY			1
NEUROLOGY		5	8
NEUROSURGERY		16	13
OBSTETRICS & GYNAECOLOGY (O&G)	157	15	44
OPTHALMOLOGY		5	30
ORTHOPAEDICS		43	76
OTORHINOLARYNGOLOGY		22	61
PAEDIATRIC CARDIOLOGY			1
PAEDIATRICS		35	71
PHYSICIAN		29	65
PLASTIC AND RECONSTRUCTIVE SURGERY		7	18
PSYCHIATRY			19
PULMONOLOGY		5	6
RADIOTHERAPY			6
SURGERY / PAEDIATRIC SURGERY (SURGERY)	73	33	41
THORACIC SURGERY		7	3
UROLOGY		15	40

The observations reflect the number of doctors in the categories.

Group contracted observations

Two of the groups contracted as groups. Their count/observations were as follows:

Of the surgeon group (surgeons and paediatric surgeon group) had 33 doctors contracted individually, 73 in groups and 41 did not contract with the MCO.

Of the O&G obstetrician and gynaecology group 15 contracted individually and 157 as a group while 44 did not contract with the MCO at all.

For the thoracic surgery doctors the individually contracted group had 7 doctors and not contracted group had 3 doctors. Neurology group had 5 contracted and 8 not contracted doctors.

For paediatrics 35 were individual and 71 not contracted while orthopaedics had 43 contracted and 76 not-contracted doctors.

The neurosurgeon doctors had 16 contracted and 13 not contracted. Otolaryngology had 22 contracted and 61 not contracted.

Table 12

Standard Deviation Specialist Group PIs

3.

Practice Type	Contracted: Group	Contracted: Individual	Not Contracted
CARDIOLOGY		0.09	0.18
DERMATOLOGY			-
GASTROENTEROLOGY		0.20	0.27
GENERAL DENTAL PRACTICE			0.19
GENERAL PRACTITIONER			0.08
GROUP PRACTICE		-	
MAXILLO-FACIAL AND ORAL SURGERY		0.08	0.12
MEDICAL ONCOLOGY			-
NEUROLOGY		0.19	0.14
NEUROSURGERY		0.17	0.11
OBSTETRICS & GYNAECOLOGY	0.10	0.10	0.12
OPTHALMOLOGY		0.10	0.16
ORTHOPAEDICS		0.13	0.13
OTTORHINOLARYNGOLOGY		0.18	0.12
PAEDIATRIC CARDIOLOGY			-
PAEDIATRICS		0.16	0.19
PHYSICIAN		0.16	0.21
PLASTIC AND RECONSTRUCTIVE SURGERY		0.13	0.23
PSYCHIATRY			0.21
PULMONOLOGY		0.18	0.32
RADIOTHERAPY			0.04
SURGERY / PAEDIATRIC SURGERY	0.15	0.19	0.18
THORACIC SURGERY		0.15	0.18
UROLOGY		0.14	0.18

The average standard deviation averages are reflected under 5.2.1.

5.3. HYPOTHESIS RESULTS

Introduction

The analysis started high level in an attempt to determine if the mean PI value was different for:

- Group 1 (C): doctors contracted
- Group 2 (NC): doctors not contracted

The analysis then drilled down to determine if the mean PI value was different for:

- Group 1 (IC): doctors who contracted to the MCO as individuals
- Group 2 (NC): doctors that were not contracted

Then it compared

- Group 1 (GC): doctors who contracted collectively in negotiation groups
- Group 2 (NC): doctors not contracted

Lastly it compared

- Group 1 (SC): Contracted surgeons & paediatric surgeons
- Group 2 (SNC): Not contracted surgeons & paediatric surgeons

5.3.1. HYPOTHESIS 1

Table 13

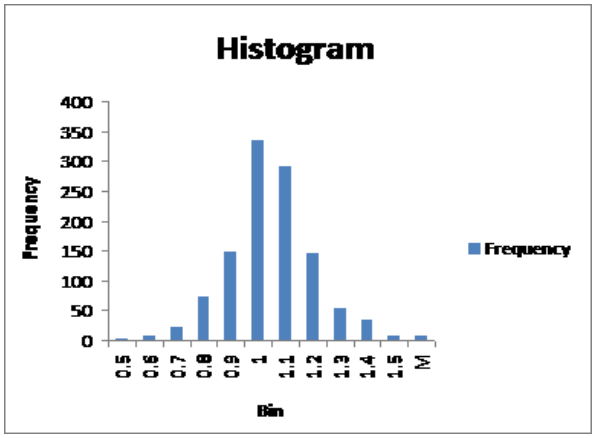
Hypothesis 1 Results

1. Contracted - Not Contracted		
A. Test to determine if the variances are equal between the two groups		
H_0: Variance $_A$ = Variance $_B$ H_A: Variance $_A$ not equal to Variance $_B$ **F-Test Two-Sample for Variances**	**C A**	**NC B**
	Contracted	**Not Contracted**
Mean	0.992325553	1.00531882
Variance	0.020183613	0.030173048
Observations	497	627
df	496	626
F	0.668928534	
P(F<=f) one-tail	1.48638E-06	
F Critical one-tail	0.89625155	
B. Hypothesis Tests H_0: Mean $_A$ = Mean $_B$ H_A: Mean $_A$ not equal to Mean $_B$ **t-Test: Two-Sample Assuming Unequal Variances**		
	Contracted	***Not Contracted***
Mean	0.992325553	1.00531882
Variance	0.020183613	0.030173048
Observations	497	627
Hypothesized Mean Difference	0	
df	1121	
t Stat	-1.379348063	
P(T<=t) one-tail	0.084031284	
t Critical one-tail	1.282307225	
P(T<=t) two-tail	0.168062567	
t Critical two-tail	1.646214053	

Table 14

Hypothesis 1 PI Values & Histogram

Bin	Frequency
0.5	2
0.6	7
0.7	22
0.8	73
0.9	148
1	335
1.1	291
1.2	145
1.3	53
1.4	34
1.5	7
More	7



The means were .99 contracted and 1.00 non-contracted.

Pure qualitative data combined with a paired sample and a Bell-shaped normal distribution (Table 14) histogram indicated that a t-test could be performed.

The F-test P-value 1.48638E-06 < 0.1 indicated the null-hypothesis could be rejected meaning the two populations had unequal variances therefore the t-test unequal variances was performed.

T-test results

Based on the f-test outcome the appropriate two sample t-test assuming unequal variance tests were performed.

A two-sided test with a p-value ($\alpha = 0.1$) as well as a one-sided test with a p-value ($\alpha = 0.5$) were selected as the respective levels of significance.

Ho: $\mu C = \mu NC$ two sided test $\alpha = 0.1$ (level of significance)

Ha: $\mu C \neq \mu NC$

Ho: $\mu C \geq \mu NC$ one sided test $\alpha = 0.05$ (level of significance)

Ha: $\mu C < \mu NC$

Depending on the p-values the Ho would be rejected or not

Two sided test

p value 0.16 > 0.1 (Borderline) could not reject the null hypothesis that the mean of A (contracted group) is equal to the mean of B (non-contracted group).

5.3.2. HYPOTHESIS 2

Table 15

Hypothesis 2 Result

2. Individual - Not Contracted **F-Test Two-Sample for Variances**	**IC** **A**	**NC** **B**
	Individual	**Not Contracted**
Mean	0.98973221	1.00531882
Variance	0.025068252	0.030173048
Observations	267	627
df	266	626
F	0.830816032	
P(F<=f) one-tail	0.039835337	
F Critical one-tail	0.873334012	
t-Test: Two-Sample Assuming Unequal Variances		
	Individual	**Not Contracted**
Mean	0.98973221	1.00531882
Variance	0.025068252	0.030173048
Observations	267	627
Hypothesized Mean Difference	0	
df	547	
t Stat	-1.307946452	
P(T<=t) one-tail	0.095720431	
t Critical one-tail	1.283101162	
P(T<=t) two-tail	0.191440863	
t Critical two-tail	1.647644064	

Pure qualitative data combined with a paired sample and a Bell-shaped normal distribution (Table 14) histogram indicated that a t-test could be performed.

The F-test P-value 0.039835337 < 0.1 indicated the nul-hypothesis could be rejected meaning the two populations had unequal variances therefore the t-test unequal variances was performed.

T-test results

Based on the f-test outcome the appropriate two sample t-test assuming unequal variance tests were performed.

A two-sided test with a p-value ($\alpha = 0.1$) as well as a one-sided test with a p-value ($\alpha = 0.5$) were selected as the respective levels of significance.

Ho: $\mu IC = \mu NC$ two sided test $\alpha = 0.1$ (level of significance)

Ha: $\mu IC \neq \mu NC$

Ho: $\mu IC \geq \mu NC$ one sided test $\alpha = 0.05$ (level of significance)

Ha: $\mu IC < \mu NC$

Depending on the p-values the Ho would be rejected or not

Two sided test

p value 0.19 > 0.1 (Borderline) could not reject the null hypothesis that the mean of A (individual contracted group) is equal to the mean of B (non-contracted group).

5.3.3. HYPOTHESIS 3

Table 16

Hypothesis 3 Result

3. Group - Not Contracted **F-Test Two-Sample for Variances**	**GC** **A**	**NC** **B**
	Group	*Not Contracted*
Mean	0.995336087	1.00531882
Variance	0.014580946	0.030173048
Observations	230	627
df	229	626
F	0.483244055	
P(F<=f) one-tail	2.22453E-10	
F Critical one-tail	0.866294097	
t-Test: Two-Sample Assuming Unequal Variances		
	Group	*Not Contracted*
Mean	0.995336087	1.00531882
Variance	0.014580946	0.030173048
Observations	230	627
Hypothesized Mean Difference	0	
df	585	
t Stat	-0.945314626	
P(T<=t) one-tail	0.172444273	
t Critical one-tail	1.283000388	
P(T<=t) two-tail	0.344888546	
t Critical two-tail	1.647462516	

Pure qualitative data combined with a paired sample and a Bell-shaped normal distribution (Table 14) histogram indicated that a t-test could be performed.

The F-test P-value 2.22453E-10 < 0.1 indicated the nul-hypothesis could be rejected meaning the two populations had unequal variances therefore the t-test unequal variances was performed.

T-test results

Based on the f-test outcome the appropriate two sample t-test assuming unequal variance tests were performed.

A two-sided test with a p-value ($\alpha = 0.1$) as well as a one-sided test with a p-value ($\alpha = 0.5$) were selected as the respective levels of significance.

Ho: $\mu GC = \mu NC$ two sided test $\alpha = 0.1$ (level of significance)

Ha: $\mu GC \neq \mu NC$

Ho: $\mu GC \geq \mu NC$ one sided test $\alpha = 0.05$ (level of significance)

Ha: $\mu GC < \mu NC$

Depending on the p-values the Ho would be rejected or not

Two sided test

p value 0.344888546 > 0.1 (Not borderline) could not reject the null hypothesis indicating the means of the two samples are not different and thus GC is not more efficient than NC.

One sided test

p value 0.172444273 > 0.05 (Not borderline) could not reject the null hypothesis indicating the means of the two samples are not different and thus GC is not more efficient than NC.

5.3.4. HYPOTHESIS 4

Figure 3

Specialist Group PI means Graph

(Please see Appendix B for full size Barr Graph)

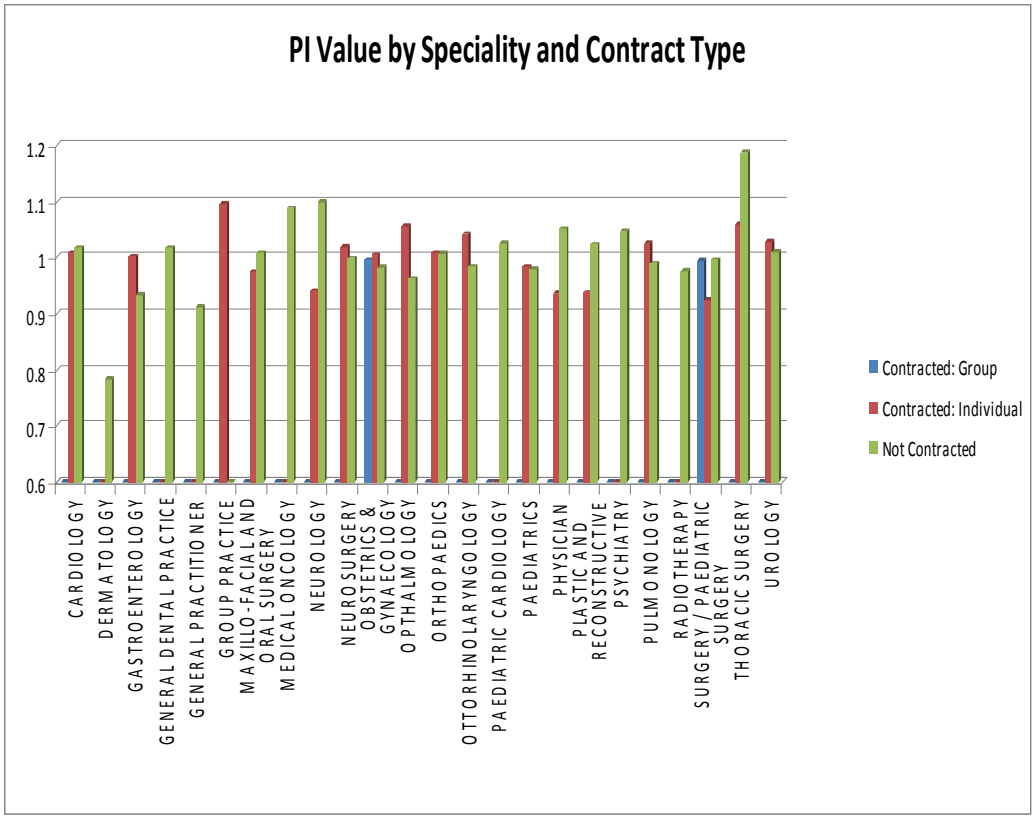


Table 17

Hypothesis 4 Result

4. Contracted - Not Contracted (Surgery & Paed. Surgery)		
F-Test Two-Sample for Variances	**SC A**	**SNC B**
	Contracted	**Not Contracted**
Mean	0.972834906	0.99657561
Variance	0.027710742	0.034096421
Observations	106	41
df	105	40
F	0.812717018	
P(F<=f) one-tail	0.201217494	
F Critical one-tail	0.725850102	
t-Test: Two-Sample Assuming Equal Variances	**A**	**B**
	Contracted	**Not Contracted**
Mean	0.972834906	0.99657561
Variance	0.027710742	0.034096421
Observations	106	41
Pooled Variance	0.029472309	
Hypothesized Mean Difference	0	
df	145	
t Stat	-0.751921859	
P(T<=t) one-tail	0.226658426	
t Critical one-tail	1.287417319	
P(T<=t) two-tail	0.453316852	
t Critical two-tail	1.655430252	

Pure qualitative data combined with a paired sample and a Bell-shaped normal distribution (Table 14) histogram indicated that a t-test could be performed.

The F-test P-value 0.201217494 > 0.1 indicated the nul-hypothesis could not be rejected meaning the two populations had equal variances therefore the two sample t-test equal variances was performed.

T-test results

A two-sided test with a p-value (α = 0.1) as well as a one-sided test with a p-value (α = 0.5) were selected as the respective levels of significance.

Ho: μSC = μSNC two sided test α = 0.1 (level of significance)

Ha: μSC ≠ μSNC

Ho: μSC ≥ μSNC one sided test α = 0.05 (level of significance)

Ha: μSC < μSNC

Depending on the p-values the Ho would be rejected or not

p value 0.453316852 > 0.1 (Not borderline) could not reject the null hypothesis indicating the means of the two samples are not different and thus SC is not more efficient than SNC.

One sided test

p value 0.226658426 > 0.05 (Not borderline) could not reject the null hypothesis indicating the means of the two samples are not different and thus SC is not more efficient than SNC.

5.4. CONCLUSION

The histogram of the PI value data reflected a normal distribution.

The results of the different contract group mean PI values reflected the mean PI values of the contracted groups to be less or equal to than for the non-contracted group.

The F-test analysis result showed unequal variances for hypothesis 1 to 3 and equal variances for hypothesis 4.

The appropriate t-test for unequal variances was performed for hypothesis 1 to 3 reflecting a borderline p-value that could not reject the Ho given an α 0.1. The p-value rejected the Ho given an α 0.2 for both hypothesis 1 and 2.

In the case of hypotheses 3 and 4 the p-value was greater than α 0.1 and both Ho's were rejected.

The graph comparing the different specialty mean PI values for individual contracted, group contracted and non-contracted doctor groups reflected a variety of combinations. For some specialties the individual contracted doctor PI means were less than the non-contracted doctors PI means and in other cases the opposite was true. No consistence was noticible.

6. CHAPTER 6: DISCUSSION OF RESULTS

6.1. RESULTS DISCUSSION

The non-contracted status in each comparison was regarded as competitive strategy in place between MCO and provider.

The theory describes the strategy characteristics of coopetition or competition strategies. The research results reflect the cost efficiency of the two respective strategies.

The discussion explores the relationship between the theory and the empirical reality. It illuminates the promise that coopetition strategy holds as strategy in managed care but it also emphasises the dependence of the success of the strategy on the MCO's ability to implement and execute.

The discussion further dissects the results to expose critical elements required to direct organisation resources to bring the coopetitive strategy to fruition.

The analysis starts high level in an attempt to determine if the mean PI value (cost efficiency) is different for:

- Group 1 (C): doctors contracted (coopetition strategy)
- Group 2 (NC): doctors not contracted (competition strategy)

The analysis then drills down to determine if the mean PI value is different for:

- Group 1 (IC): doctors who contracted to the MCO as individuals (individual coopetition strategy)

- Group 2 (NC): doctors that were not contracted (competition strategy)

Then the research compares

- Group 1 (GC): doctors who contracted collectively in negotiation groups (group coopetition strategy)
- Group 2 (NC): doctors not contracted (competition strategy)

Lastly it compares

- Group 1 (SC): Contracted surgeons & paediatric surgeons (Surgeon coopetition strategy)
- Group 2 (SNC): Not contracted surgeons & paediatric surgeons (Surgeon competition strategy)

In each comparison the results are discussed to address the following points:

- Is the question answered?
- What are the implications for the strategy?
- What are the implications for the research?
- Implication to improve the strategy or it's implementation?

6.1.1. HYPOTHESIS 1

Proposition 1:

Contracted doctor groups (C) are more cost efficient than non-contracted doctor groups (NC).

Translated to strategy, proposition 1 assumes that the efficiency (mean PI) of the MCO doctor coopetition strategy (mean GC PI) is more efficient than MCO doctor competition strategy (mean NC PI). The performance index means of the coopetition strategy (0.99) is lower than the performance index means of the competition strategy (1.00) indicating that the coopetition strategy may be more efficient than the competition strategy. The t-test measured if the difference is statistically significant. It is taken into account that the PI value is a fairly sensitive number and that even a 0.01 reduction in mean PI may be associated with improved efficiency.

Hypothesis 1

Ho: $\mu C = \mu NC$ two sided test $\alpha = 0.1$ (level of significance)

Ha: $\mu C \neq \mu NC$

Ho: $\mu C \geq \mu NC$ one sided test $\alpha = 0.05$ (level of significance)

Ha: $\mu C < \mu NC$

The two sided t-test result is borderline at a 90% probability level. With a p-value 0.16 which is greater than the α of 0.1 so the null hypothesis cannot be rejected implying that the efficiency mean of the coopetition strategy is equal to the mean of competition strategy.

The one sided t-test result is also borderline, at 95% significance level (α of 0.05), with a p-value at 0.084 which is greater than the α and therefore the null hypothesis cannot be rejected. This implies that the efficiency mean of the

coopetitive strategy is equal to and not more efficient than the mean of competitive strategy (Zikmund, 2003).

Even though the null hypothesis (Ho) cannot be rejected at an α of 0.1 there is enough evidence to indicate that there is a possible difference in mean values given a slightly higher α–value of 0.2 (confidence level of 80% two-sided test). The p-value of 0.16 is less than the α of 0.2 (two-sided) and 0.08 at an α of 0.1 (one sided) would reject the null hypothesis indicating that the coopetitive strategy is more efficient than the competitive strategy at the 80% confidence level.

Implication for the coopetition strategy

The conflicting evidence regarding the coopetitive strategy efficiency at the two confidence levels is interpreted as an indication that this may be due to the fact that insufficient critical coopetition strategy criteria were implemented to ensure the success of the coopetition strategy. This exposes the vulnerability of any strategy to failure in the absence of the ability of a MCO to implement the critical criteria required to ensure the success of such a strategy.

The evidence of results at α-level 0.2 supporting improved efficiency is encouraging and indicates that the coopetition strategy has brought about some improved efficiency but that it requires commitment to implement the critical requirements for coopetition strategy to be successful.

A lack of effective communication with the whole group of doctors may be a reason why the coopetition doctor group may not be significantly more cost efficient than the competition doctors group. Communication before contracting and concurrent communication thereafter is essential to successful coopetition strategy execution (Table 5). The 230 group contracted doctors following the coopetition strategy make up 46% of the contracted group. The group contracted coopetition strategy doctors were not engaged individually before contracting to allow for in-depth communication and understanding of the philosophy to create congruency of goals or a long term commitment. Up to 2007 all communication had to go through the group representative leadership and no direct communication from MCO to negotiation group doctors was allowed.

The distribution of the pay for performance (P4P) incentive was done on the basis of participation (contracting) up to now. Incentives based on performance are a critical element of the coopetition strategy that may determine success or failure of the coopetition strategy. Since this was not adhered to it could explain the failure of the coopetition strategy result to be significantly better than the competition strategy result.

The implication for coopetition strategy is that the critical success factors should be identified and implemented to give the coopetition strategy a reasonable chance of success in a complex environment like the health care environment.

Implication for the research

The unequal sample size reflected in the number of coopetition doctors (497) compared to the competition doctors (627) is not conducive toward demonstrating a significant difference in strategy efficiency. A larger sample of equal size may be beneficial for future research.

Implication to improve strategy or implementation

The MCO will have to attend to the critical coopetition success factors (Chin *et al.* 2008) like management leadership and effective pre-contracting and concurrent communication to develop goal congruency between MCO and doctors and leaders. It will require transparency to develop trust so that doctors will accept pay for performance incentives as alternative reimbursement mechanism. This will assist to entrench the key dimensions underlying coopetition (Morris *et al*. 2007) namely mutual benefit, trust and commitment (chapter 2.2.8) from both doctors and their leaders.

The number of doctors contracted will have to be increased. This is required to service the beneficiaries currently serviced by competition strategy doctors to manage cost and quality of services. It will also be beneficial should a follow-up study be commissioned to this research.

6.1.2. HYPOTHESIS 2

Proposition 2:

Individually contracted doctor subgroups (IC) are more cost efficient than non-contracted doctor groups (NC).

Translated to strategy proposition 2 assumes that the efficiency (IC mean PI) of the MCO individual doctor coopetition strategy (mean GC PI) is more efficient than MCO doctor competition strategy (mean NC PI). The MCO individual coopetitive doctor strategy represents the coopetition strategy in its purest form in this research since the group coopetition strategy group has been eliminated from the sample.

The performance index means of the coopetitive strategy (μIC = 0.989) is lower than the performance index means of the competition strategy (μNC = 1.005) indicating that the coopetition strategy may be more efficient than the competition strategy. The t-test measured if the difference is statistically significant. It is taken into account that the PI value is a fairly sensitive number and that even a 0.01 reduction in mean PI may be associated with improved efficiency.

The efficiency index mean (μIC) of the individually contracted coopetition strategy doctor subgroup (IC) and the efficiency index mean of the competition strategy group (μNC) was compared statistically in a quantitative study to determine the more efficient (lowest mean PI) of the two strategies.

Hypothesis 2

Ho: $\mu IC = \mu NC$ two sided test $\alpha = 0.1$ (level of significance)

Ha: $\mu IC \neq \mu NC$

Ho: $\mu IC \geq \mu NC$ one sided test $\alpha = 0.05$ (level of significance)

Ha: μIC < μNC

The two sided t-test result is borderline at a 90% probability level. With a p-value 0.19 which is greater than the α of 0.1 the null hypothesis cannot be rejected implying that the efficiency mean of the individual coopetitive strategy is equal to the mean of competitive strategy.

The one sided t-test result is also borderline, at 95% significance level (α of 0.05), with a p-value at 0.096 which is greater than the α and therefore the null hypothesis can not be rejected. This implies that the efficiency mean of the individual coopetitive strategy is equal to and not more efficient than the mean of competitive strategy (Zikmund, 2003).

Even though the null hypothesis (Ho) cannot be rejected there is enough evidence to indicate that there is a possible difference in means given an increased α of 0.2 significance in the two-sided test. The p-value 0.19 < α–value 0.2 thus allows rejection of the Ho: μIC = μNC in which case the one-tail t-test p-value 0.09 < α–value 0.1 would reject Ho: μIC ≥ μNC thus the alternative hypothesis Ha: μIC < μNC would be accepted indicating that the individual coopetitive strategy is more efficient than the competitive strategy at the 80% confidence level.

Implication for the strategy

The lack of evidence to prove that the individual coopetitive strategy is more efficient than the competitive strategy (α 0.1) and the conclusion that this may be due to fact that insufficient criteria were implemented exposes the

vulnerability of the coopetitive strategy to failure in the absence of the ability to implement or the critical success factors.

The evidence of results at α-level 0.2 supporting the proposition that the individual coopetition strategy is the more efficient strategy is encouraging but that it requires commitment to implement the critical requirements for coopetitive strategy before it can be proven successful at α 0.1 significance.

The distribution of the pay for performance (P4P) incentive was done on the basis of participation (contracting) up to now. Incentives based on performance are a critical element of the coopetitive strategy that may determine success or failure and could contribute to a reduced mean PI differential between the two strategies. The fact that incentives were paid for participation only and not based performance may have lacked effect and influence on behaviour.

Implication for the research

The unequal sample size reflected in the number of individual coopetitive doctors (267) compared to the competitive doctors (627) is not conducive toward demonstrating a significant difference in efficiency.

Another reason why the individual coopetition group may not reflect as significantly more cost efficient (α 0.1) than the competitive doctors group is due to the relatively small sample group of individually contracted doctors compared to the competition strategy doctors. The sample size differs substantially. The 267 individual coopetition strategy doctors make up 53.7%

of the contracted group. The individual coopetition strategy doctors make up 30% of the sum of the individual strategy and the competition strategy groups (Zikmund, 2003).

A larger sample of equal size would improve the experiment and the chance of a successful t-test to prove the efficiency.

Implication to improve strategy or implementation of strategy

The MCO management will have to attend to the critical coopetition success factors (Chin *et al* (2008) like concurrent communication to emphasise transparency and to build trust so that the MCO could change the incentive structure from reward for participation to reward for performance. This will assist to develop the key dimensions underlying coopetition (Morris *et al*. 2007) in place namely mutual benefit, trust and commitment (Chapter 2.2.8).

6.1.3. HYPOTHESIS 3

Proposition 3: Group contracted doctors (GC) are more cost efficient than non-contracted doctor groups (NC).

Translated to strategy this compares the efficiency (mean PI) of the MCO doctor group coopetitive strategy to the efficiency (mean PI) of MCO doctor competition strategy in its transition form since it eliminates the individual contracted doctors from the contracted sample.

The performance index means of the group coopetitive strategy (μGC = 0.995) is lower than the performance index means of the competition strategy

(μNC = 1.005) indicating that the group coopetition strategy may be more efficient than the competition strategy. The t-test measured if the difference is statistically significant. It is taken into account that the PI value is a fairly sensitive number and that even a 0.01 reduction in mean PI may be associated with improved efficiency.

The efficiency index mean (μGC) of the group coopetition doctor subgroup (GC) of the coopetition doctors group and the mean (μNC) non-contracted (NC) will be compared statistically in a quantitative study to determine the more efficient (lowest mean PI) of the two groups (strategies).

Hypothesis 3

Ho: μGC = μNC two sided test α = 0.1 (level of significance)

Ha: μGC ≠ μNC

Ho: μGC ≥ μNC one sided test α = 0.05 (level of significance)

Ha: μGC < μNC

Based on the two sided test p-values p value 0.344 > 0.1 (Not borderline) the null hypothesis could not be rejected indicating the means of the two samples are not different and thus the group coopetitive strategy (GC) is not more efficient than the competitive MCO doctor strategy (NC).

According to the one tail t-test p value 0.172 > 0.05 (Not borderline) the null hypothesis could not be rejected indicating the means of the two samples are

not different and thus GC is not more efficient than NC. The GC mean of 0.99 could statically be regarded as equal to the NC mean of 1.00 (Zikmund, W.G. 2003).

Implication for the coopetition strategy

The lack of evidence to prove that the group coopetitive strategy is more efficient than the competitive strategy (α 0.1) and the conclusion that this may be due to fact that insufficient criteria were implemented exposes the vulnerability of any strategy to failure in the absence of the ability to implement such critical success factors.

The evidence of results at α-level 0.2 confirms no efficiency improvement tested at this level of significance confirming that the mean PI's of the two groups are the same and that the strategies do not differ in efficiency.

The implication for the coopetition strategy proposition is that though in form a coopetition strategy was adopted it was not effective in the case of the group coopetition providers (GC).

The other factor that should be accepted about the group coopetition doctors is that it is a stage in strategy progress. It is a first step in engaging competitive doctors previously not contracted at all to come into the fold and accept profiling and to eventually develop trust based on transparency. The communication process is established initially via the negotiation group leadership up to early 2008. This has evolved to a level of trust where the leadership of the groups has agreed that profiles and communication can be

forwarded directly to member doctors. Other characteristics of a coopetitive strategy for which the MCO technology system is developed can now be implemented in a planned approach culmination in P4P and a long term relationship in which knowledge created can be shared and in which doctor innovation may increase.

It is assumed that the lack of effective communication with the group coopetitive doctors may be a reason why the group coopetitive doctors (which excludes the individual coopetition doctors) is not significantly more cost efficient than the competitive doctors group. Communication before contracting and concurrent communication thereafter is essential for successful coopetitive strategy execution (Table 5). The 230 group contracted doctors following the coopetitive strategy make up 46% of the contracted coopetitive strategy doctors group. The group contracted coopetitive strategy doctors were not engaged individually before contracting to allow for in-depth communication and understanding of the philosophy to create congruency of goals or a long term commitment. Up to 2007 all communication had to go through the negotiation group representative leadership and no direct communication from MCO to negotiation group doctors was allowed.

The distribution of the pay for performance (P4P) incentive was done on the basis of participation (contracting) up to now. Incentives based on performance are a critical element of the coopetitive strategy that may determine success or failure of the coopetitive strategy. Since this was not

adhered to it would explain the failure of the group coopetition strategy result (μGC) to be significantly better than the competition strategy result.

The implication for coopetition strategy is that the critical success factors should be identified and implemented to give the coopetitive strategy a reasonable chance of success in a complex environment like the health care environment.

Implication for the research

The unequal sample size reflected in the number of group coopetitive doctors (GC = 230) compared to the competitive doctors (627) is not conducive toward demonstrating a significant difference in strategy efficiency. A larger sample of equal size may be beneficial for future research.

Implication to improve strategy or implementation

The MCO will have to attend to the critical coopetition success factors (Chin *et al.* 2008) like management leadership buy-inn and effective pre-contracting and concurrent communication to develop goal congruency between MCO and doctors and leaders. It will require transparency to develop trust so that doctors will accept pay for performance incentives as alternative reimbursement mechanism. This will assist to entrench the key dimensions underlying coopetition (Morris *et al*. 2007) namely mutual benefit, trust and commitment (Chapter 2.2.8) from both doctors and their leaders.

The number of doctors contracted will have to be increased. This is required to service the beneficiaries currently serviced by competition strategy doctors to manage cost and quality of services. It will also be beneficial should a follow-up study be commissioned to this research.

6.1.4. HYPOTHESIS 4

Based on the bar graph (Figure 3) illustrating the mean PI values of the different specialties the surgeon and paediatric surgeon group was identified for a comparative study between its contracted (group and individual) and non contracted groups.

Proposition 4

Surgery & paediatric surgery groups are referred to as surgeon subgroup (S).

The contracted surgeons (SC) are more cost efficient than non-contracted surgeon subgroup (SNC).

The efficiency index mean ($\mu SC = 0.972$) of the surgeon contracted coopetitive strategy doctor subgroup and the efficiency mean ($\mu SNC = 0.996$) of the non-contracted competitive strategy doctors group will be compared statistically in a quantitative study to determine the statistically more efficient (lowest mean PI) of the two groups (strategies).

Hypothesis 4

The F-test P-value 0.20 > 0.1 indicated the null hypothesis could not be rejected meaning the two populations had equal variances therefore the two sample t-test equal variances was performed.

Two tail t-test assuming equal variance results

A two-tail with a p-value (α = 0.1) as well as a one-sided test with a p-value (α = 0.5) were selected as the respective levels of significance.

Ho: μSC = μSNC two sided test α = 0.1 (level of significance)

Ha: μSC ≠ μSNC

Ho: μSC ≥ μSNC one sided test α = 0.05 (level of significance)

Ha: μSC < μSNC

The two tail test p value 0.45 > 0.1 (Not borderline) could not reject the null hypothesis indicating the means of the two samples are not different and thus SC is not more efficient than SNC.

The one sided t-test p value 0.22 > 0.05 (Not borderline) could not reject the null hypothesis indicating the means of the two samples are not different and thus SC is not more efficient than SNC.

The result is thus interpreted that the coopetitive surgeon strategy was not more efficient than the competitive surgeon strategy.

The lack of improved efficiency in the coopetitive (contracted) surgeon group may be ascribed to implementation factors like lack of communication, lack of trust and lack of goal congruency. The incentive structure rewarding participation only and not efficiency may be a key factor.

It may also be that the increased efficiency in the coopetitive individually contracted surgeon group is masked by the inefficiency of the coopetitive group contracted surgeons whose PI values are equal to that of the competitive non-contracted doctors according to the graph. This assumption is supported by the graph illustrating a difference in efficiency between the individually contracted and contracted surgeons.

The research shows that the coopetitive surgeon strategy did not deliver the intended improved efficiency and that the implementation of strategy should be changed to improve the communication effectiveness and the P4P incentive for efficiency as opposed to an incentive for participation. The leadership element buy-inn is critical to create mutual benefit, trust and commitment amongst their doctor colleagues.

The graph brings forth similarities between the surgeon mean PI values, the mean PI values of the obstetrics and gynaecology group (O&G). The O&G group also consist of an individual contracted group and a group contracted doctors group. In the case of the surgery group coopetitive strategy doctors were not more efficient than the competitions strategy group doctors (non-contracted group) and the O & G group coopetitive strategy (group contracted) doctors were less efficient than the non-contracted competition

strategy doctors group. It can thus be assumed that they contracted to benefit from the incentive to participate but that their participation did not add value in proportion to the incentive paid to the system.

The implication is that the group coopetitive strategy doctors should be moved to the next level of the strategy to incentivise the individual doctors based on their efficiency and not for contracting only. This insight is valuable in convincing such collective doctor leadership of the importance of their participation and sharing of the goals and not to protect the less efficient doctors at the cost of those that are adding more value to the system. This should not be regarded as an attack on the less efficient doctors but should act as a call for self assessment, to learn best practice principles and self improvement. The finding should also not be used to criticize the doctor leadership or to break down their standing with the profession.

The finding should rather be regarded as knowledge created and shared accordingly with the leadership to create goal congruence towards collaborating to improve efficiency in the system while also competing better based on value for a bigger portion of the pie.

6.2. CONCLUSION

The research indicates that statistically there is not enough evidence to support the proposition that there is a significant (α 0.1) difference between the coopetition and competition strategies. On the drill-down into the specialist groups some differences are observed but in many cases the observations

were not enough or the difference in the sizes of the groups are too great to show a statistical difference at α 0.1 significance.

The results do however look promising and on an overall level the differences are border-line statistically significant. The test results may have been more positive if more doctors were contracted. The contracted group is fairly small if compared to the non-contracted group.

Chapter 2.2.10 raises free and effective communication as central to the successful outcome of coopetition strategy. Communication implies information sharing which leads to trust and common goal setting and requires the support of the leadership to be free.

Game theory, Battle of the Sexes and the prisoner's dilemma share communication as solution to change the game and as key determinate of the outcome whether competition strategy or coopetition strategy will be chosen (Lipsey and Chrystal, 2004). If communication is limited between prisoners they are likely to lack trust and are likely to cooperate with the police and choose a competition strategy for self preservation (Chapter 2.2.4). In case of unlimited communication prisoners are likely to develop trust and more likely choose coopetition as strategy. The fact that stake holders are not restricted in choice by a lack of communication offers the opportunity to change the rules of the game and follow an alternative more beneficial strategy. The learning is that a key requirement for coopetition strategy success is unrestricted communication in order to share knowledge and to create trust (Chapter 2.2.9). If sufficient attention is not given to communication the other

communication dependent requirements will not develop i.e. trust, and coopetition strategy will not deliver the expected efficiency results. An important aspect to successful communication is leadership commitment because leadership exert influence via the encouragement or restriction of communication (Chapter 2.2.9). Even the incentive or reward alone will lack the desired effect if not accompanied by an effective communication effort by the leadership of the MCO as well as the doctor group leadership. These factors are strategy implementation related and thus under the control of MCO and or doctor group leadership control or in case of individual doctors, their own control.

As the research unfolded the differences in efficiency between the two contracted groups (individual-coopetition strategy and group-coopetition strategy) brought to the fore that these groups were in fact different stages in the evolution towards a higher degree of coopetition strategy (Chapter 2.2.9). As the characteristics of these strategy stages developed so did the efficiency of the strategy stages improve towards, but not achieving full coopetition strategy efficiency.

Figure 4.

Increased efficiency associated with evolution towards coopetition

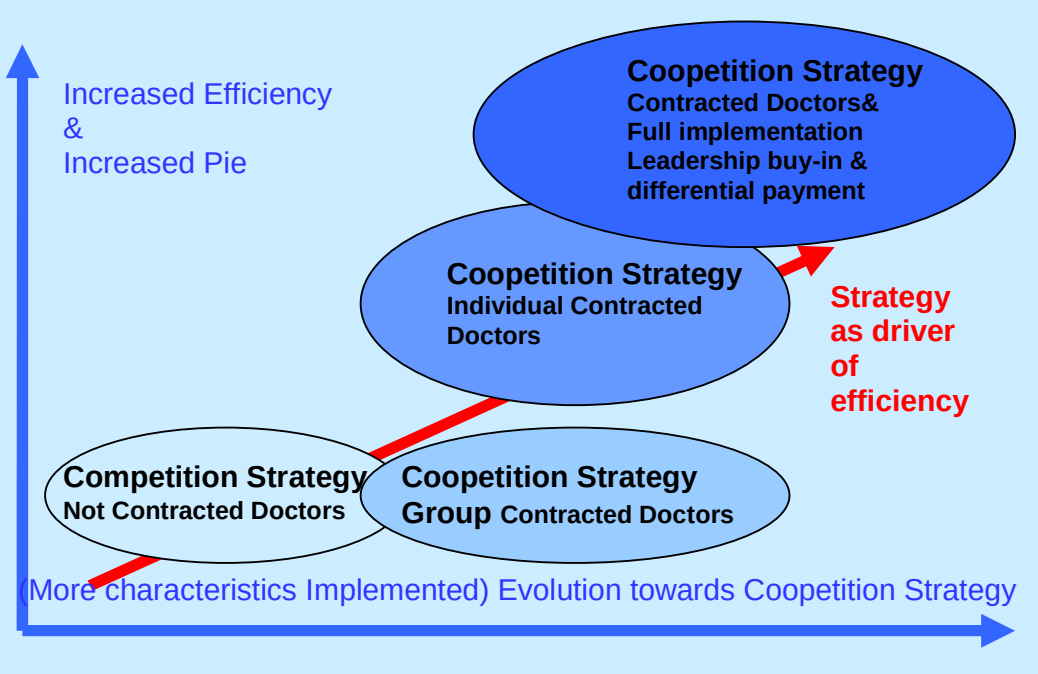


Figure 4 demonstrates the evolution of coopetition strategy and the resultant increased efficiency as more of the essential criteria develop with improved communication and reward. An example of complete coopetition strategy is not identified in the research but it is expected to develop once differential payment incentive (Chapter 2.2.2.) and a critical mass of critical success factors has been implemented with the full support of both leadership elements. This correlates with the research findings that there is improved efficiency (α 0.2) (Chapter 6.1.2) associated with the individually contracted coopetition strategy group (Chapter 5.3.2) but not with the group contracted

coopetition strategy group. It further illustrates that there is still some way to go regarding implementation before the coopetition strategy will come to full fruition in the sample MCO.

Choice of strategy as well as the ability to implement the strategy determined the outcome (efficiency measurement) thus it was not only the strategy but also its implementation that was measured in this research. This was demonstrated in the comparison of the two contracted groups' results where the same coopetitive strategy was applied but with different outcomes. At α 0.1 significance level the coopetition strategy (individual contract) (Chapter 6.1.2) showed borderline improved efficiency while the coopetition strategy (group contracted) showed no improved efficiency (Chapter 6.1.1). It is thus concluded that the coopetition strategy (individual contracted group) was more efficient than the coopetition strategy (group contracted group) and that this correlated with implementation issues (limited characteristics implemented).

The contract status reflected the choice of strategy while the individual or group contract status reflected the influence of implementation on efficiency. This was an unexpected learning from the study and contributed much to direct future MCO negotiation objectives and to strengthen negotiation power to implement more of the requirements that were previously resisted in this regard. It identified a critical constraint in the process that could guide MCO and doctor leadership where organisation resources should be applied to relieve the constraint in order to improve efficiency, namely improved communication, and P4P incentives (Chapter 2.2.2) based on doctor

efficiency (accountability) and not only participation. The point made should not be regarded as criticism against the incentive for participation (Chapter 2.3.3). The participation incentive made the first level of engagement possible to open channels for communication and to build trust so doctors would accept accountability based on the measurements (Refer Figure 1)

The results illuminated the fact that the acceptance of coopetition strategy in managed care may be instantaneous but that the implementation is an evolutionary process requiring engagement with doctors to move from adversity, suspicion and competition to common goals, trust, long-term commitment, knowledge sharing and ultimately increased efficiency and full out coopetition.

The MCO was initially impelled by the group negotiation to communicate via group leadership and not to communicate directly with group contracted doctors. It was also not allowed to communicate the complete efficiency profile of the doctors to them. The MCO management had insufficient direct and one-on-one contact with the doctors during the implementation phase as well as subsequent phases which limited the opportunity for the doctors to develop a sufficient understanding of the philosophy underpinning the coopetition strategy resulting in limited buy-inn. Thus, as per the theory requirement it was evident that the communication was suboptimal, the created knowledge was not shared and trust was not developed. All of this was due to a lack in leadership buy-inn and participation (Chapter 2.2.10). Lack of support from the leadership may be due to two factors namely lack of

trust or lack of incentive or both. The negation group leadership only negotiated an incentive on behalf of doctor members but were not awarded a personal or organisational performance reward for engaging and inspiring their members.

The individually contracted doctors had open communication, direct contact and personal buy-inn which generated improved efficiency measurements.

Following the comparison of competition and coopetition strategy efficiency it could thus be concluded that there is enough evidence (α 0.2) to indicate that there is a possible improved efficiency brought about by the coopetition strategy.

7. CHAPTER 7: CONCLUSION

7.1. INTRODUCTION

The results of the strategy research have been encouraging in confirming the efficiency of coopetition strategy in managed health care in South Africa although not conclusively so. The literature research on coopetition strategy theory has set “forth a new and different vision of the health care system” of which the researched MCO system displayed many characteristics (Chapter 2.3).

For coopetition strategy to be successful will require insight from stakeholder leadership into the critical requirements for its successful implementation. Should the leadership not understand the prerequisites and the potential of

coopetition strategy they will not inspire doctors to cooperate with this strategy.

It requires the creation of a common vision between doctor leadership and doctors, funder communities, and policy makers to realise the full potential of the coopetition strategy. It requires leadership to make it the predominant strategy in the South African health care industry, not only in the private sector but also in the public health care sector to benefit of the people of South Africa. Coopetition strategy can become the interface between the public and the private sectors. The coopetition strategy offers the potential to focus all stakeholders in the health care system on patient health, on improving value for patients supported by appropriate reward for performance based on accountability (Chapter 6.2).

The health care leadership should acknowledge that health care is on a collision course with patient needs and economic realities. The South African Government is tempted to intervene while countries with government-dominated systems are moving away from that model (Porter & Teisberg, 2006).

The challenge to the South African leadership in health care is to change the health care structure to a system that serves patients better. This research indicates that the coopetition strategy may hold the solution in collaborating towards improved efficiency (to increase the pie) and to compete on value (divide the pie). This holds the promise of a positive-sum game in which all

stakeholders in the system can win in a world where economic realities and personal values are not in conflict (Porter & Teisberg, 2006).

7.2. POSSIBLE FOLLOW-UP RESEARCH QUESTIONS

Repeat the research when the MCO strategy has evolved further to compare the efficiency of the two strategies again.

Research and contrast the efficiency of group contracted doctors and individually contracted doctors.

Develop a methodology to demonstrate the impact of a coopetition strategy on a health system or MCO.

Test the validity of the findings on competitive strategy and coopetitive strategy on another population sample.

Repeat the current study on 2008 data.

Repeat the current study in 2010 to determine the impact of the adapted 2009 strategy adaptations (incentive according to efficiency).

Investigate the MCO progress to determine the evolution or progress of coopetitive strategy in 1-2 years time.

Test the efficiency in 1-2 years time on the same population sample to assess the impact of some of the recommendations implemented.

Determine the predominant MCO strategy in SA at the hand of competition, coopetition strategy theory.

Determine the characteristics of the SA MCO strategies.

Perform the same test on the data from another environment i.e. another MCO or two.

Identify, compare and contrast other MCO strategies based on PI data. (Limitation may be the availability of PI data – in this case audited concurrently through the year).

Perform an in-depth study to confirm the assumption that the sample MCO does in dead follow a coopetition strategy.

REFERENCES

- Albright, S.C. Winston, L.W. Zappe, C. (2006) *Data Analysis & Decision Making with Microsoft Excel.* Mason: Thomson South-Western.
- Allee, A. (2002) A Value Network Approach for Modelling and Measuring Intangibles, *Transparent Enterprise.* Madrid.
- Axelrod, R. (1984) *The evolution of cooperation*. New York: Basic Books.
- Barnard, C.I. (1938, 1979) *The Functions of the Executive*. Cambridge: Harvard University Press.
- Barney, J.B. (1986) Strategic factors markets: expectations, luck and business stategies. *Management Science*, 32, 1231-41.
- Borg, K.A. (1991) Problem shifts and market research: the role of network in business relationships. *Scandinavian Journal of Management,* 7, 285-295.
- Casalino, L.P. Devers, K.J. Brewster, L.R. (2003) *Health Affairs,* 22(6).
- Chetty, M.N. (2000) *Introduction to the basics of managed care*. AHS & UKUSA Healthcare Consultants.
- Chin, K. Chan, B.L. Lam, P. (2008) Identifying and prioritising critical success factors for coopetition strategy. *Industrial Management & Data Systems,* 100(4) 437-454.
- Choosing The Right Test. http://www.socr.ucla.edu/Applets.dir/ChoiceOfTest.html (Accessed 2008/11/09)
- Dagnino, G.B. Padula, G. (2002) Coopetition strategy. Towards a New Kind of Interfirm Dynamics for Value Creation. *The European Academy of Management*,. 2nd Annual Conference, 1-25.
- Draper, D.A. Hurley, R.E. Lesser, C.S. Strunk, B.C. (2002) Changing Face of Managed Care. *Health Affairs*, 21(1).
- Eiser, A.R. Eiser, B.J. (1996) Primary care and the congruence model of Nadler and Tushman. *Physician Executive,* Oct, 1996.
- Endsley, S. Kirkegaard, M. Baker, G. Murcko, A.C. (2004) Getting Rewards you're your Results: Pay-for-Performance Programs. *Family Practice Management.*
- GraphPad Prism. http://www.graphpad.com/articles/interpret/analyzing_two_groups/choos_anal_comp_two.htm (accessed 2008/11/09)
- Friedman, T.L. (2005) *The World is Flat*. A Brief History of the Twenty-first Century. New York: Farrar, Stratis and Giroux.
- Harvey, F. (1996) Consumer Product Branding Strategy and the Marketing of Physicians' Services. *Health Marketing Quarterly,*13(2), 87-98.
- Inamdar, I. Kaplan, R.S. Jones, M.L.H. Menitoff, R. (2000) The Balanced Scorecard: A Strategic Management System for Multi-Sector Collaboration and Strategy Implementation. *Quality Management in Health Care,* 8(4), 21-39.

- Inamdar, N. Kaplan, R.S. 2002 Applying the Balanced Scorecard in Healthcare Provider Organizations. *Journal of Healthcare Management,* 47(3), 179.
- Kaplan, R.S. Norton, D.P. (2001) *The Strategic-Focussed Organisation: how balanced score card companies thrive in the new business environment*. Boston: Harvard Business School Publishing Company.
- Keating, B. Quazi, A. Kritz, A. Coltman, T. (2008) In pursuit of sustainable supply chain: insights from Westpack Banking Corporation. *Supply Chain Management: An International Journal,* 13(3), 175-179.
- Kim, W.C. Mauborgne, R. (2004) Blue Ocean Strategy *Harvard Business Review.*
- Kippenberger, T. (1998) Applying game theory to strategic moves. *The Antidote* 3(7), 23-26.
- Lipsey, R.G. and Chrystal, K.A. (2004) *Economics*. New York: Oxford University Press.
- Ma, H. (1999) Anatomy of competitive advantage: a SELECT framework. *Management Decision,* 37(9), 709-718.
- Ma, H. (2004) Toward global competitive advantage. *Management Decision* 42(7), 907-924.
- Morris, M.H. Kocak, A. Ozer, A. (2007) COOPETITION AS SMALL BUSINESS STRATEGY: IMPLICATIONS FOR PERFORMANCE. *Journal of Small Business Strategy* 18(1).
- Pope, T. (2007) Managed Care Accreditation Application.
- Porter, M. E. (1979) How competitive forces shape strategy. *Harvard Business Review;* Mar/Apr79, Vol. 57 Issue 2, p137-145.
- Porter, M.E. Teisberg E.O. (2004) Redefining Competition in Health Care. *Harvard Business Review*, 82(6) p. 64.
- Porter, M.E. Teisberg E.O. (2006) *Redefining Health Care*. Boston. Harvard Business School Publishing.
- Reader, A. (2002) *Strategy for Business.* SAGE Publications.
- Richardson, R. (1993) Parallel Sourcing and Supplier Performance in the Japanese Automobile Industry. *Strategic Management Journal*, 14:339-350.
- Robbins, S.J. and Judge, T.A. (2007) *Organizational Behaviour*. 12th ed. New Jersey: Pearson Prentice Hall.
- Ullman, S.G. (2003) "Out of Our Crisis": The lack of Long-Term Relationships in the provision of Managed Care. *Hospital Topics*, 81(2).
- Weber, D.O. (2001) A Better Gauge of Corporate Performance. *The Health Forum Journal* 44(3) p. 20-25.
- Wicks, A.M. St. Clair, L. (2007) Competing Values in Healthcare: Balancing the (Un) Balanced Scorecard. *Journal of Healthcare Management*, 52(5) p. 309-324.
- Zikmund, W.G. (2003) *Business Research Methods, 7th Edition*, Mason: South-Western, a division of Thomson Learning.

APPENDICES

APPENDIX A:

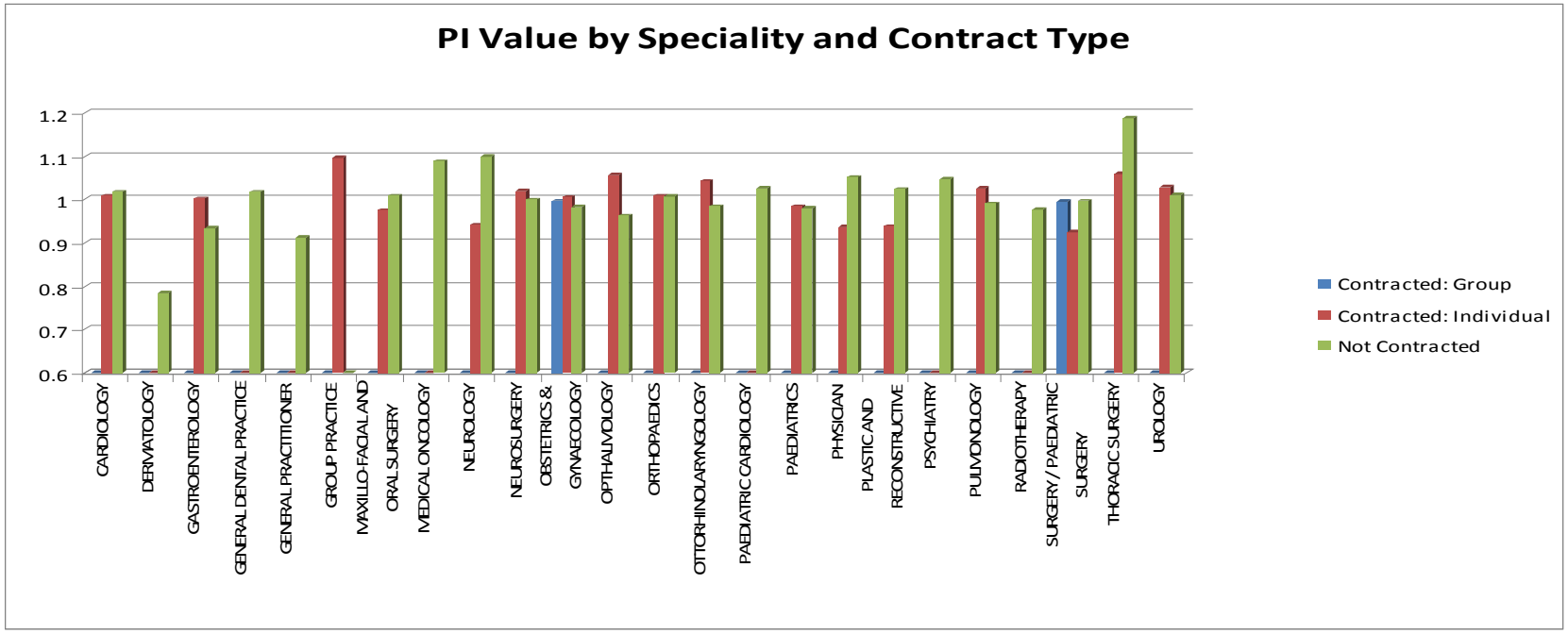
Data extraction fields (Extract from actual records)

Practice No	Date Accepted	Surgico / GMG	Total	Episodes	Actual Average Cost	CMI	CMI Adjusted Average	Productivity Index PI
1201875		FALSE	3,979.41	1	3,979.41	0.1656	24,030.25	0.7832
1470256		FALSE	20,722.99	1	20,722.99	0.8312	24,931.41	0.8125
400000142174		FALSE	110,979.16	1	110,979.1	3.6276	30,593.00	0.9971
420000005142	09 Mar 1999	FALSE	163,916.25	11	14,901.48	0.5036	29,589.91	0.9644
420000015040		TRUE	114,733.63	10	11,473.36	0.4226	27,149.46	0.8848
420000017965	09 Mar 1999	FALSE	8,207.70	1	8,207.70	0.2732	30,042.83	0.9791
420000018678		TRUE	145,262.56	6	24,210.43	0.7203	33,611.59	1.0954
420000019569	09 Mar 1999	TRUE	69,774.59	5	13,954.92	0.4438	31,444.16	1.0248
420000026875	09 Mar 1999	FALSE	64,108.69	3	21,369.56	0.7122	30,005.00	0.9779
420000029459		FALSE	65,068.68	4	16,267.17	0.5204	31,258.97	1.0188
420000033227	10 Dec 2003	FALSE	276,176.32	10	27,617.63	0.8726	31,649.82	1.0315

Appendix B

Figure 3

Specialist Group PI means Graph



GLOSSARY

Case mix index	Index of the Episode Treatment Grouper reflecting severity of disease
CC	Clinical Cluster based on adapted ETG
Cost index	Efficiency index controlled for degree of severity of disease
Employers	Unions, business health coalitions, national companies
ETG	Episode Treatment Group from Symmetry®

on which Clinical Clusters is based

Funder	Medical aid scheme
Government	National, state, military, public health
HUM	Hospital Utilisation Management is those services by which the MCO manage, reduces and or control the overuse or abuse of hospital based medical services by prescribers, doctors and/or members.
MCO	Managed Care Organisation
Member	Individual belonging to a medical aid scheme (insurer)
Negotiation Group	Group of doctors that collectively negotiate arrangements or collectively enter into a contract with a MCO.

NRPL	National Reference Price List
Payer	Health plans, commercial insurers, medical aid scheme
PI	Productivity Index
Provider	Clinician professionals permitted by law to provide health services
Provider Network	Any network of doctors or providers with which a managed care organization can contract and from which beneficiaries must choose a service provider when they have to access specialist clinician services
Redo	Repeat surgery following failed surgery
SHER	Specialist Hospital Efficiency Ratio reflecting efficiency level in quartiles (Albright, Winston & Zappe, 2006)
Suppliers	Investors, medical device and pharmaceutical companies
Value network	Any web of relationships that generates tangible and intangible value through complex dynamic exchanges between two or more individuals, groups, or organisation.