

**USING BALANCED SCORECARD TO HELP IMPROVE
THE QUALITY OF CARE AND SERVICE FOR THE
PRIVATE CLINICS IN TAIWAN**

By

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Abstract

Aesthetic as opposed to National-Health-Insurance-Bureau (NHIB) affiliated clinics are largely unregulated by healthcare authorities in Taiwan. Their management is mainly focused on financial performance. Consequently, the quality of care and services cannot be easily assessed or measured.

Two aims and fifteen specific hypotheses were established at the start of the study design: Aim one, Examine whether the implementation of Balanced Scorecard (BSC) improves organizational performance; Aim two, Examine whether the implementation of BSC improves patient care.

With two clinics of similar characteristics in size, medical and service personnel and customers, one serving as the intervention or experimental group, the other one as the non-intervention or comparison group, after defining the organization's mission, core values, vision, and strategies, breaking down the strategies into its component parts through the objectives and measures, and articulating goals for time, quality, performance and service, and translate them into measures, we selected the Balanced Scorecard (BSC) as the measuring management tool, designing an implementation model for the experimental group only, with key performance indicators (KPIs) in each of the following perspectives: financial, customer, internal processes and learning and growth.

Data were collected for six months in both groups or clinics, subsequent analyses yielding convincing results in the intervention group with increased BSC scores in Financial and Customer perspectives compared to the non-intervention group, optimistic and confident scores in the Internal processes, with increased BSC scores in employee satisfaction and staff turnover, mixed results in others concerning the Learning and Growth perspective. Based upon these scores and results, both aims and twelve out of fifteen hypotheses were confirmed and accepted.

Influences of instrumentation, attrition and contamination were cited as internal threats, whereas Hawthorne effect was mentioned as external threats to validity.

The main strengths of this study are that this is the first BSC study designed for aesthetic clinics which could serve as the guidelines of establishing regulation parameters to the healthcare authorities. Meanwhile, due to the lack of time and allocated resources, the small sample size and short duration of data collection were the most evident limitations; hopefully we can expand the scope of the study in the near future.

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Abbreviations

ACE= Angiotensin-Converting-Enzyme

ACS= American College of Surgeons

AHCPR= Agency for Healthcare Policy and Research

A/R= Account Receivable

BEM= Business Excellence Model

Botox= botulinum toxin

BSC= Balanced Scorecard

CAHPS= Consumer Assessments of Health Plans Study

CAM= Complementary and Alternative Medicine

CEO= Chief Executive Officers

CQC= Care Quality Commission

DHEA= Dehydroepiandrosterone

EFQM= European Foundation for Quality Management

HER= Electronic Health Records

ER= Emergency Room

FACCT= the Foundation for Accountability

GMP= Gross Margin Percentage

HGH= Human Growth Hormone

HMO= Health Maintenance Organization

HRSA= The Health Resources and Services Administration

ICES= Institute for Clinical Evaluative Science

ICU= Intensive Care Unit

IHAS= Independent Healthcare Advisory Services

IHF= Independent Health Facilities

IOM= Institute of Medicine

JCAH= Joint Commission on Accreditation of Hospitals

KPI= key performance indicators

MBNQA = Malcolm Baldrige National Quality Award

PA/P/V= Purchase amount per patient per visit

PDCA= Plan-Do-Check-Action

QFD= Quality Function Deployment

ROI= Return on Investment

TEFRA= Tax Equity and Fiscal Responsibility Act

TQM= Total Quality Management

UK= United Kingdom

US= United States

USA= United States of America

USD= United States Dollar

VIP= Very-Important-Person

Chapter One

Introduction

1.1. Background

1.1.1. Aesthetic medicine

Aesthetic medicine is a term that has been used by medical professionals to describe surgical procedures (viz. Aesthetic / cosmetic surgery) and medical treatments that aim to improve a person's appearance or subjective sense of well-being. The line dividing conventional and aesthetic medicine is blurring as more people begin to regard aesthetic medicine as a form of medical science. Indeed, it is a practice of "medicalised" beauty therapy (Tan, 2007). In a society where beauty is increasingly seen as an essential ingredient of health (Moosa, 2002), the demand for aesthetic medicine drives more doctors to provide aesthetic services as part of their medical practice. It is different from other forms of medical services, in that it is a treatment for "want" rather than for "need". Some aesthetic / cosmetic procedures don't involve surgery. These include muscle paralysis, such as injections of botulinum toxin (Botox) to relax facial muscles and to make lines and wrinkles less obvious; dermal fillers, injected into wrinkles or creases to fill them out; micro-dermabrasion, by which doctor uses fine crystals and a vacuum to remove dead skin

cells; Non-surgical laser and intense light treatments, such as hair removal; meso-therapy, using a combination of naturally occurring compounds administered through a series of micro-injections for the purpose of fat reduction to improve body contour.

Some other similar medical treatments include some which have been on the market for many years in the Complementary and Alternative Medicine (CAM) industry, but have recently been rebranded as 'anti-aging'. These include vitamins, anti-oxidants, supplements such as β -carotene, selenium and coenzyme Q10, homeopathic products etc. Other products used in 'anti-aging' manner are hormone therapies, testosterone, melatonin, Human Growth Hormone (HGH), and Dehydroepiandrosterone (DHEA). And these anti-aging products and procedures are not only provided in aesthetic / cosmetic clinics but also in the so called anti-aging clinics. In Taiwan, many private clinics provide some of these procedures. There are a lot of private clinics under the name of Aesthetic or Cosmetic clinic, which perform only less invasive (non-surgical) services.

These less invasive procedures can be carried out in medical clinics, which are mainly office-based procedures that require minimal or no local anesthesia. In fact, we can find in lesser developed countries that some of these procedures are carried out in beauty salons. In the United Kingdom (UK), providers of cosmetic treatments that do not involve surgery do not have to be registered with the Care Quality

Commission (CQC). The CQC is the independent regulator for health services in England. On the other hand, providers of injectable cosmetics such as Botox, can choose to register with the IHAS (Independent Healthcare Advisory Services) registry of injectable cosmetic providers – Treatments you can trust. This registry only accepts doctors, dentists and nurses who meet the standards and training principles required to give injectable cosmetics safely. (NHS Choices, Non-surgical cosmetics procedures)

1.1.2. Regulation of aesthetic medicine

A brief global scan of health regulatory systems revealed that the practice of aesthetic medicine has been marginally regulated, even in the more developed countries (Tan, 2007). However, the rising concerns of existing health regulations are that they may not be adequate or appropriate to ensure the safe practice in aesthetic medicine.

In the United States (U.S.), dozens of doctors, pharmacists and clinic owners have been prosecuted for illegally dispensing anabolic steroids and growth hormone to patients under the guise of anti-aging medicine. There are 34 states with a prescription drug monitoring program, which is a so-called layer of protection against

abuse and fraud. Under the programs, pharmacies are required to enter into the database information about every prescription they fill for controlled dangerous substances, a category that includes anabolic steroids like testosterone. Regulators would therefore have a snapshot of every doctor's prescribing habits. In the UK, private practitioners have to provide the Healthcare Commission with patients' records and patient satisfaction surveys. In Australia, there are no specific regulations governing the practice of cosmetic procedures.

Another concern is about human resources. In the UK, doctors who perform aesthetic medicine procedures are not required to receive any special training in this field. There is no specialist registry for aesthetic medicine and doctors from any medical specialty can provide such services. In 2000, the Care Standard Act forces the general practitioners to be on the specialist registry or to have undertaken specialist training relevant to the aesthetic / cosmetic procedures they are providing. In Canada, there are fewer regulations applied to clinics that use anesthesia (Independent Health Facilities (IHF) Act, Ontario Regulation), and the physicians in Ontario can delegate aesthetic procedures to non-qualified personnel under his/her supervision.

The regulations of aesthetic / cosmetic medicine in Taiwan are not strict either. Although most of the healthcare organizations have contracted with Bureau of

National Health Insurance, and are required to enter the information into the database; the prescriptions of most aesthetic/ cosmetic procedures are not included because the money is not paid by insurance but directly out-of-pocket. The qualification of the practitioners of aesthetic / cosmetic procedures is not required as in many other countries. Concerns about quality of aesthetic / cosmetic procedures are not rare occurrences in Taiwan, and the highly competitive nature of the industry with little published evidence and the fear of disclosure of trade secrets cause aesthetic / cosmetic clinics to be distrusted by potential customers.

1.2. Study Objective and Significance

Our study is to develop and implement a framework of Balanced Scorecard (BSC) for a group of direct chain (regular chain) aesthetic/ cosmetic clinics that perform less invasive aesthetic/ cosmetic procedures. There are two types of chain enterprises including the direct chain/ regular chain, and joined chain (franchise chain, or contractual chain). Direct chain means the clinics are directly operated by the head office of a company or a corporate. The joint chain clinics are owned and operated by independent practitioners or business enterprises supported by the direct chain headquarters which is responsible for expanding its marketing network, enhance its brand and improve its image. Choosing chain clinics makes the actions of adoption of the BSC more synchronized, and helps the selection of measures less disputable.

Since 1992, there are lots of studies about the implementation of BSC. The BSC is a management tool originally applied to businesses in the private sector, and is thought to be “a multidimensional framework for describing, implementing and managing strategy at all levels of an enterprise by linking objectives, initiatives and measures to an organization’s strategy”. Some of these studies have applied BSC to different types of healthcare organizations. According to the article of MacStravic (MacStravic 1999, cited in Chan & Ho, 2000), there were at least six benefits that

could be gained by healthcare providers from a true BSC approach, namely, increased customer insight, refocused internal operations, energized internal stakeholders, strengthened customer relations and increased loyalty and return of value.

In 2003, Zelman et al. reviewed different types of healthcare organizations that have adopted BSC suggest the theory and concepts of the BSC are relevant to health care, but modification to reflect the industry and organizational realities is necessary. In 2004 the Institute for Clinical Evaluative Science (ICES), based in Ontario, Canada, released a report, “Developing a BSC for Public Health”, that introduced a public health specific BSC framework for performance measurement (BMC Public Health 2009). The report adapts the four quadrants (or perspectives) to fit the role of public health against business organizations. As a result, BSC has been reported as a popular management tool adopted by lots of different types of healthcare organizations but not in aesthetic / cosmetic clinics.

In our research, the aesthetic / cosmetic clinics face the realities of business competition and marginal regulation of healthcare organizations. The main study objective is that we will address the inner or potential regulation guidelines by the strategies and measures design and link to performance by using BSC as the conceptual framework. That is to demonstrate if BSC can help the management team and medical and non-medical services providing staff to improve the quality of care

and services in aesthetic / cosmetic clinics. Moreover, to find important indicators that may support the establishment of the framework of regulations, and to provide more high quality aesthetic / cosmetic services beyond the regulations.

1.3. Specific Aims and Hypotheses

We have two special aims in our research. For Aim one, we have six hypotheses and for Aim two we have eight. These Aims and hypotheses will be described as follows.

1.3.1 Special Aim One

The first specific aim of the study is to examine whether the implementation of BSC improves organizational performance or not.

One of our main goals with implementing BSC is to achieve better organizational performance. According to Richard et al. (Richard 2009), organizational performance comprises the actual output or results of an organization as measured against its intended outputs (or goals and objectives). It encompasses three specific areas of firm outcomes: (a) financial performance (profits, return on assets, return on investment, etc.); (b) product market performance (sales, market share, etc.); and (c) shareholder return (total shareholder return, economic value added, etc.).

In representing the measures of organizational performance, we have chosen the measures of two perspectives: Financial Perspective and Learning and Growth

Perspective; and leave the other two perspectives (Internal process Perspective and Customer Perspective) to evaluate the performance of patient care.

1.3.2 Six hypotheses related to Aim One

The hypotheses of organizational performance include:

- **Hypothesis 1a (H 1a):** the implementation of BSC for a period of time can help improving lagging indicators such as Gross Margin Percentage.
- **Hypothesis 1b (H 1b):** the implementation of BSC for a period of time can help improving lagging indicators such as Purchase Amount per Patient (per) Visit.
- **Hypothesis 1c (H 1c):** the implementation of BSC for a period of time can help improving lagging indicators such as Return on Investment (ROI).
- **Hypothesis 1d (H 1d):** the implementation of BSC for a period of time can help improving performance indicators such as Staff Turnover.
- **Hypothesis 1e (H 1e):** the implementation of BSC for a period of time can help improving performance indicators such as Access to Training.
- **Hypothesis 1f (H 1f):** the implementation of BSC for a period of time can

help improving performance indicators such as Employee Satisfaction.

1.3.3 Special Aim Two

The second specific aim of the study is to examine whether the implementation of BSC improves patient care.

As described in project summary, we are dedicated to provide high quality aesthetic /cosmetic services beyond what the regulations require. Thus we would like to focus on improving the quality of patient care by implementing BSC.

1.3.4 Eight hypotheses related to Aim Two

To demonstrate whether the implementation of BSC improves patient care, we came up with some hypotheses based on the two perspectives of Internal Process Perspective and of Customer Perspective such as:

- **Hypothesis 2a (H 2a):** the implementation of BSC for a period of time can help improving patient care by measures such as decreased Complain Rate.
- **Hypothesis 2b (H 2b):** the implementation of BSC for a period of time can help improving patient care by measures such as increased Patient Repeat

Rate.

- **Hypothesis 2c (H 2c):** the implementation of BSC for a period of time can help improving patient care by measures such as increased Patient Referral Rate.
- **Hypothesis 2d (H 2d):** the implementation of BSC for a period of time can help improving patient care by measures such as increased Customer Satisfaction Rate.
- **Hypothesis 2e (H 2e):** the implementation of BSC for a period of time can help improving patient care by measures such as an adequate amount of Time of Physician Consultation.
- **Hypothesis 2f (H 2f):** the implementation of BSC for a period of time can help improving patient care by measures such as decreased Waiting Time in the waiting room.
- **Hypothesis 2g (H 2g):** the implementation of BSC for a period of time can help improving patient care by measures such as an adequate Time to Get an Appointment.
- **Hypothesis 2h (H 2h):** the effort of adopting Balanced Scorecard can improve the quality of medical services, by which can be highly valued by

customers and also can be served as accreditation criteria by health policy regulators.

Chapter 2

Literature Review

2.1. Theoretical Background of the Balanced Scorecard

Kaplan and Norton (1992) argued that managers should take both financial and non-financial criteria into account when taking decisions (Braam and Nijssen 2004).

When the financial and non-financial perspectives integrated carefully and in a balanced manner in a “scorecard” it would provide managers with a brief but comprehensive and timely view of their business. Four different key perspectives were identified as being critical: the financial, the customer, the internal business process, and the learning and growth. In 1996, the same authors extended their view stressing the importance of aligning the scorecard information with the business strategy (Kaplan and Norton 1996).

To translate the strategic goals efficiently into tangible objectives and measures, Kaplan and Norton suggested four interrelated management processes: (1) clarifying and translating vision and strategy; (2) communicating and linking strategic objectives and measures; (3) business planning and target setting; and (4) enhancing strategic feedback and learning.

Finally, in 2001 Kaplan and Norton introduced five principles to keep strategy the focus of organizational management processes: (1) translating the strategy into operational terms; (2) aligning the organization to the strategy; (3) making strategy everyone's everyday job; (4) making strategy a continual process; (5) mobilizing change through executive leadership (Kaplan and Norton 2001).

And the BSC has been gradually moved from being defined as a comprehensive performance measurement system to taking the BSC as a strategy implementation tool to facilitate and control performance measurement and management. The conceptual development history allowed the BSC a variety of interpretations and usages.

2.2. Why Balanced Scorecard was Chosen

Before knowing which tool to select for measuring the performance of health care organizations, and certainly before choosing the BSC as the “golden” performance-measuring instrument, we have to ask why even measure them in the first place? What are the purposes and motivators behind the initiative of these projects?

In a study focused on the public agencies, Behn identified eight major purposes that public managers have for measuring performance: to evaluate, control, budget, motivate, promote, celebrate, learn, and improve (Behn, 2003). Although other experts cited other purposes including demands for evidence of program effectiveness (Wholey, 1997), increase accountability or to hold organizations accountable (Ammons, 1995; Osborne, 2000), decision making, resource allocation and facilitating the devolution of authority to lower levels of the hierarchy (Kravchuck, 1996). The list could be longer or shorter depending on the organization type, but for Behn, the only real purpose is “to improve performance”, all other purposes are just “sub-purposes” aiming to achieve the ultimate purpose of improving performance outcomes (Behn, 2003).

Performance measurement in health care is not a new-, fashionable concept proposed by the most resourceful medical centers. In the 18th century, there was

evidence showing that the hospital of the University of Pennsylvania collected patient outcome data. McIntyre and colleagues overviewed the history of performance measurement and came up with the following classification of four phases (McIntyre, 2001).

The first phase (1750-1910) can be described as “Early Attempts at Performance Measurement”. The most important cases included: (1) The Pennsylvania Hospital collected patient outcome data tabulated by diagnostic groups in 1754. (2) Ernest A. Codman, a surgeon at Massachusetts General Hospital, proposed the “end result system of hospital standardization,” a health care performance assessment system, in 1910. Three years later, the American College of Surgeons (ACS) was founded by Franklin Martin, M.D., a colleague of Codman.

The second phase (1910-1950) can be labeled as “Birth of the Modern Era and New Delivery Systems”. The significant cases included: (1) In 1910, the Western Clinic in Tacoma, Washington, and its providers offered a broad range of medical services for a premium of 0.5 USD per member per month. It was considered the first Health Maintenance Organization (HMO). (2) In 1918, the ACS begun conducting hospital inspections to determine facility-level compliance with the “Minimum Standards for Hospitals”, activities that led to the formation of the “Joint Commission on Accreditation of Hospitals (JCAH) 33 years later. Interesting

enough, of the 692 hospitals inspected, only 89 met the requirements. (3) In 1929, Michael Shadid, M.D., created a cooperative health plan in Elk City, Oklahoma, selling shares of 50 dollars to local farmers in order to raise capital for a new hospital. The farmers received in return medical services at a discount. (4) Also in 1929, Baylor Hospital in Texas established the Blue Cross system providing prepaid health care services to a group of approximately 1,500 teachers. (5) In 1937, the Kaiser Foundation Health Plans was organized. (6) In 1939, medical societies in California created Blue Shield plans.

The major cases in the third phase (1950-1980) or the phase of “The Golden Years” included: (1) The JCAH published the “Standards for Hospital Accreditation” in 1951 and begun offering accreditation to hospitals. (2) In 1964, the JCAH started charging fees for accreditation inspections. In 1965, the Congress passed the Social Security Amendments, which included a provision that in order to participate in Medicare and Medicaid programs, the hospitals must be accredited by the JCAH.

In the fourth phase (1980-2000), “The Age of Information and Consumerism”, the important cases included: (1) The Tax Equity and Fiscal Responsibility Act (TEFRA) passed in 1985, allowing Medicare HMOs to enroll Medicare beneficiaries under a capitated risk program. (2) The consumers demanded more information about the services they are receiving to know exactly what they are paying for. (3)

In order to satisfy the increasingly sophisticated customers, health care organizations and the plans they offer begun focusing on achieving higher standards of care quality.

Knowing that the quality of care and services must improve on a constant and consistent basis, and knowing the need of measuring the performance of the care- and service giving organizations, we must next select the appropriate measuring tools to accomplish the mission. The following questions should be answered: (1) What are the available tools? (2) How do they compare to each other? How does the BSC compare to other tools? (3) Is the BSC a better or even the best choice?

After searching the literature, we have found many “performance measures” or “performance measurement indicators” but only a few “organization performance measurement systems” available. In fact, the only widely adopted system besides the BSC is the Business Excellence Model (BEM) designed by the European Foundation for Quality Management (EFQM).

Andersen *et al.* compared the BEM with the BSC and concluded that while the BEM was a good diagnostic tool, the BSC was clearly the better performance measuring system with explicit strategic management relevance to the organizations using it (Andersen, 2000).

Other health care measurement systems developed by the US government or non-profit agencies include (Leneski, 2005): (1) Oryx: the JCAHO developed this

system to evaluate hospitals and other health care organizations with the primary function of accountability. (2) FACCT: the Foundation for Accountability developed this set of measures to help consumers evaluate the quality of health care they receive with the primary function of accountability and selection. (3) Consumer Assessments of Health Plans Study (CAHPS): developed by the Agency for Healthcare Policy and Research (AHCPR). It measures the consumers' satisfaction with the healthcare services they receive with the function of helping consumers make proper selections. (4) Conquest: Harvard developed these measures for clinical performance, quality and appropriateness of healthcare services with the main function of helping consumer selection. (5) Health People 2010: developed by the US Department of Health and Human Service. It is basically a collection of measures that monitor the nation's health with the main purpose of improving healthcare quality.

All these performance measurement systems were useful in accomplishing one or several purposes described by Behn (Behn, 2003), but none of them offered such a comprehensive, integrated collection of measures that like the BSC, can help health care organizations translate their vision, communicate their strategy up and down the organization, enable business planning, and give the organization the capacity to feedback and learn strategically (Kaplan, 1996).

Since the implementation of BSC had been successful by many healthcare organizations in USA, the other countries begun to evaluate if it actually improves the performance of hospitals. In China, the following investigators like Zhijun L., Zengbiao Y., and Liqun Z. (Zhijun L 2014) investigated that BSC improves organizational and personal performance of public hospitals in China. Also in Canada and Greece, two studies agree that BSC is a useful tool in improving performance of health sector (Nippak P. M. 2016).

2.3. The Impact of Implementing BSC

With such various applications and interpretations, the BSC has been called one of the most important management innovations of the 20th century (J. Steele, 2001). It has been adopted in a broad range of industries from manufacturing to health care, both in the US and abroad (Zelman *et al.*, 2003). There were some inspiring findings regarding the use of BSC. Hoque and James (2000) made a survey of 66 Australian manufacturing companies and found the greater BSC usage is associated with improved performance. Iselin *et al.* (2008) interviewed fifty Chief Executive Officers (CEOs) from the manufacturing corporations with sales revenue greater than \$100 million. The report shows that the strength of the alignment of strategic goals and the performance reporting system is positively associated with performance. Ittner *et al.* (2003) surveyed 140 US financial services firms, and the result of the study suggested that the use of BSC is associated with higher measurement system satisfaction but not improved accounting and stock market performance. In contrast, Crabtree and DeBusk (2008) investigated BSC adopters in the three-year period following adoption. They reported the BSC-adopters significantly outperformed their industry counterparts who did not adopt BSC.

Since 1994 (J.R. Griffith, 1994), more and more articles related to the implementation of BSC in healthcare organizations have been published. Zelman *et*

al. (2003) has pointed out that BSC is well into his growth phase in healthcare. The basic principles of the BSC are well documented in the health care literature (e.g., Baker and Pink, 1995; Chow et al., 1998; Zelman et al., 2003; and Oliveira J., 2001).

As the application of BSC became popular, Zelman *et al.* (2003) have stated that Baker and Pink (1995) were among the first to argue that the theory and concepts of the balanced scorecard were relevant to hospitals. Castaneda-Mendez *et al.* (1998), demonstrated that in order to connect practices, outcomes, quality, value, and costs, health care organizations must use a balanced scorecard. Chow *et al.* (1998), interviewed administrators about the BSC and concluded that each organization must engage in the full range of strategic management activities, from defining its mission to the selection of goals and strategies, in order to develop its own unique scorecard and to assist progress toward the selected goals. Sahney (1998) outlined how the BSC could be used by a managed care organization. Zelman *et al.* (1999) investigated the concept of the BSC in relation to academic healthcare centers and concluded that their unique characteristics may mitigate the full benefit of the approach.

Table 2.3.1. Types of Health Care Organizations That Have Implemented the

BSC

Organization Type	Examples	Source
Hospital Systems	Henry Ford Healthcare System	Sahney (1998)
	Ontario Ministry of Health and Ontario Hospital	Pink <i>et al.</i> (2001)
Hospitals	Duke's Children's Hospital	Meliones <i>et al.</i> (2000, 2001)
	Sunnybrook Health Science Centre	Gordon <i>et al.</i> (1998)
	Peel Memorial Hospital	Harber (1998)
	Duke Women's Services	Jones and Filip (2000)
	University of Colorado Health Sciences Center, Burn Center	Wachtel <i>et al.</i> (1999)
University Departments	Department of Anesthesiology, Yale	Rimer (2000) Rimer and Garstka

	University	(1999)
	Yale Faculty Practice Plan	Rimer (2000)
	Baylor	Garson <i>et al.</i> (1999)
Long-Term Care	Ebenezer Social Services	Potthoff <i>et al.</i> (1999)
	The Sisters of Charity of Ottawa Health Service	MacDonald (1998)
Psychiatric Centers	Hudson River Psychiatric Center	Hudson River Psychiatric Center Web Site (2002)
Insurance Companies	Kaiser Permanente	Kaiser Permanente (2001)
Pharmaceutical Companies	Wyeth Pharmaceuticals	Business Wire (2001)
National Health Care Organizations	National Women's Health Quality Initiative	Inamdar <i>et al.</i> (2000)
	JCAHO	Employee Benefit Review (1995)
Federal Government	US Military Health Services System	Krakauer <i>et al.</i> (1998)
	Veteran's Administration	VA Web Site (1999)

	DHHS for Mental Health Services- “The Evaluation Program”	Department of Health and Human Services (1996)
Local Government	Department of Health, Washington, DC	Department of Health Web Site (2001)

Source: Zelman (2003)

As Braam and Nijssen (2004) stated, the BSC can be and is used in different ways involving many different functional areas and indicators (measures). Different ways of implementing and using the BSC may have different effects on company performance (Braam and Nijssen, 2004).

Zelman *et al.* (2003) had listed different types of healthcare organizations with implementation of BSC (Table 2.1) and different types of applications of BSC (Table 2.2). A study from Korea found that high degree of reliability and validity of this BSC suggests that it may be used for performance measurements of a Korean hospital nursing organization (Hong Y et al, 2008).

Table 2.3.2. Health Care Applications of the Balanced Scorecard

Type of Application	Examples	Source
Organizational Performance	Organizations Listed in Table 1.	See Table 1.
Public Information	Patient Care Report Cards	Lowe and Baker (1997) Badger (1998)
Clinical Pathway	Cardiac Prevention	Levknecht <i>et al.</i> (1997) Schriefer <i>et al.</i> (1997)
Hospital Department Performance	Operating Rooms	Mathias (2001)
	Information Technology	Niss (1999) Gordon and Geiger (1999)
	Medical Rehabilitation	Cohen <i>et al.</i> (1997)
Quality of Care and Outcome Measurement	Breast Cancer	West <i>et al.</i> (1997)
	Mental Health	Rosenheck (1998)
	Renal Transplant	Colaneri (1999)
	Renal Dialysis	Peters and Ryan (1999)
	Post-Op Nausea	Graumlich <i>et al.</i> (2000)

Managed Care Evaluation	HEDIS	Kenkel (1996)
Performance Measurement of a Consortia of Hospitals	CRISP	Bergman (1994)

Source: Zelman (2003)

These encouraging results and massive amount of information make BSC a good choice of management tool for healthcare institutions. In a large-scale investigation of the implementation of BSC in Sweden Healthcare organizations showed (Aidemark et al., 2009), that the prevalence of the BSC is 65% among Swedish emergency hospitals. This study results proved the convenience of implementing of BSC. Aidemark et al. (2009) once more demonstrated that the BSC contribute to creating goal congruence by becoming a common language that is used in communication about the hospitals' goals and strategies and that the task of implementing and working with a BSC creates wide-spread involvement in such strategic discussion.

The flexibility of widely adopted BSC and well- proved empirical results make the BSC a successful management tool for lots of industries including healthcare organization. In 2005, the HRSA (The Health Resources and Services Administration, an agency of the U.S. Department of Health and Human Services) had published “Balanced Scorecards for Small Rural Hospitals: Concepts Overview & Implementation Guidance” because they believe that the Balanced Scorecard can be useful and adaptable to small rural hospitals. This makes the BSC all the more credible.

For nurses turnover rate there was a study concluded that a balanced scorecard

with strategy map is an effective tool that demonstrates connection between the organizational mission and the outcomes of a nurse sabbatical program (Embree JL, 2015). In 2004, Ethiopia introduced a community-based Health Extension Program to deliver basic and essential health services. Teklehaimanot HD et al. used BSC to demonstrate that the implementation of BSC can improve specific elements of the program and its performance (Teklehaimanot HD. 2016). A recent study aimed at hemodialysis patients concluded that a balanced scorecard of quality performance should include three elements: population-based best clinical practice, patient perceptions, and individually crafted patient goals of care (Kliger AS, 2016). A study from Canada indicated that the planning and selection process used to determine the key indicators can aid in the development of a balanced scorecard for a health information management department (Nippak PM et al., 2016). A study from Iran showed that there is a continuous improvement of hospital performance with the success of the implementation of BSC model (Semnani F, 2016).

2.4. Objective and Measures of Each Perspective

The framework of BSC is to organize strategic objectives into the four perspectives (Kaplan and Norton, 2001). It is important to create performance objectives for each perspective of BSC. Niven (2002) points out that the best way is to examine each perspective of BSC in a form of a question: (1) Financial – What financial steps are necessary to ensure the execution of our strategy? (2) Customer – Who are our targeted customers, and what is our value proposition in serving them? (3) Internal Process perspective – To satisfy our customers and shareholders, in which processes must we excel? (4) Employee Learning and Growth – What capabilities and tools do our employees require to help them execute our strategy?

These are the key questions to find adequate and possible measures fitting into our BSC implementation framework. To accomplish the implementation of BSC, one of the vital principles is identifying those indicators / measures that accurately measure the accomplishment of strategies. Measuring performance has been a task of healthcare since long before the development of the Balanced Scorecard. As Hill & Powell (2005) described, there are three types of performance measures: input measures, output measures, and outcome measures. Input measures include staff time or budgetary resources. Output measures include number of people served or units produced by a program or service. Input and output measures demonstrate effort

expended and numbers served but tell little about whether these interventions are making a difference. Outcome measures track the benefit received by stakeholders as a result of an organization's efforts.

Most would agree that outcome measures provide the best information for decision-making. A BSC should include a mix of input, output, and outcome measures and a mix of lag and lead indicators. Lag indicators measure whether targets have been met, while lead indicators measure progress along the way. Employee satisfaction is an example of a lag indicator while absenteeism is an example of a lead indicator (Hill & Powell, 2005).

Kaplan and Norton have identified and suggested some outcome measures include: (1) Core Financial Measures: Return-on-investment / Economic value-added, Profitability, Revenue growth / mix, and Cost reduction. (2) Core Customer Measures: Market share, Customer acquisition, Customer retention, Customer profitability, and Customer satisfaction. (3) Core Learning and Growth Measures: Employee satisfaction, Employee retention, and Employee productivity.

Another example of measures is listed by Mohammed Ba-abaad (2009), according to each perspective of the BSC, a number of key performance indicators (KPIs) can be used in health care organizations such as: (1) Financial: Cash flow,

ROI, Return on capital employed, Return on equity. (2) Customer: Delivery performance to customer – by date, Quality performance to customer – by quality, Customer satisfaction rate, Customer loyalty, Customer retention. (3) Internal Business Processes: Number of activities, Opportunity success rate, Accident ratios, and Overall equipment effectiveness. (4) Learning & Growth: Investment rate, Illness rate, Internal promotions, Employee turnover, and Gender ratios.

And in the study of Hill & Powell (2005), there are some industrial specific measures included in the BSC implementing guidance for small rural hospitals: (1) Financial: Operating profit margin, Days of cash on hand, Commercial mix, Net revenue increase, Cost per patient day, Salary and benefit expense, and Nursing staff productivity. (2) Customer: MD loyalty index, Time to treating provider, Courtesy and respect, Patient engagement, Inpatient satisfaction, Emergency Department satisfaction, and Patient access index. (3) Internal Business Processes: Contractual allowances, Bad debt expense, Net days in Account Receivable (A/R), Unbilled A/R, MD engagement index, Average age of plant, Falls: acute care, Falls: swing beds, Medical error rate, Emergency Room (ER) waiting time, Responsiveness, Angiotensin-Converting-Enzyme (ACE) Inhibitor delivery, Beta Blocker delivery, Antibiotic delivery, and Aspirin delivery. (4) Learning & Growth: Nursing staff turnover, Staff turnover, Staff loyalty index, Medical error policy, Staff training

dollars, Access to training, Mission index, and Staff engagement index.

Although the measures of the four perspectives vary, and all the options seem to be hardly formed, there are still some rules for us to follow. Niven (2002) points out the general rule to find out the set of measures. He suggests that “less is more.” In order to ensure focus on the vitally essential objectives, the total number should be limited to approximately 15 scattered across the four perspectives.

Considering the scale and particularity of target aesthetic clinics, these are some possible measures we have chosen. For the Financial dimension, there are: (1) Gross Margin Percentage (GMP) is equivalent to $(\text{Revenue} - \text{Cost of goods sold}) / \text{Revenue}$. It is a measure of how well each dollar of a clinic's revenue is utilized to cover the costs of care provided. (2) Purchase amount per patient per visit (PA/P/V) is equivalent to $(\text{Monthly revenue from customers}) / (\text{Monthly patient visits})$. It is not a conventional financial indicator; it reflects how well the trained or untrained staff can or cannot create value for their organizations. (3) Return on Investment (ROI) is equivalent to $(\text{Gain from investment} - \text{Cost of Investment}) / (\text{Cost of Investment})$. ROI is an index showing how much profit or cost saving is realized and sometimes used as a way to grade how well a company is managed.

For the Customer dimension, there are: (1) Complain rate, (2) Patient repeat

rate, (3) Patient referral rate, (4) Customer satisfaction rate. For the Internal

Business Processes dimension, there are: (1) Time of physician consultation, (2)

Waiting time (in waiting room), (3) Time to get an appointment. For the Learning &

Growth dimension, there are: (1) Staff turnover, (2) Access to training, (3) Employee

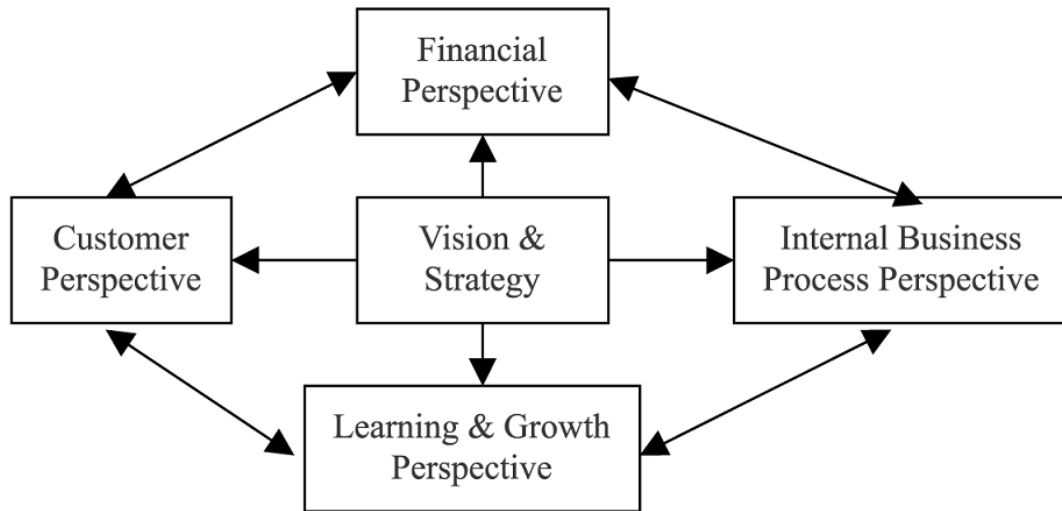
satisfaction.

2.5. The Implementation of Balanced Scorecard

The first step of creating the BSC is to clearly define the mission, core values, vision, and strategies before constructing the four perspectives. That is, translating the vision into operational goals. Mission is what one wants to achieve by starting the business. This must be re-examined and refreshed periodically if an organization is to remain dynamic. Values are clear in everything one does, how one operates. Articulating values provides everyone with guiding lights, ways of choosing among competing priorities and guidelines about how people will work together. Vision is what keeps the organization moving forward even against discouraging odds. Vision is the most powerful tool of motivating an organization. If it is vivid and meaningful enough, people can do astounding things to bring the organization's vision to life.

Niven (2002) suggested that to start to implement the BSC, the first thing to do is to clearly define the organization's mission, core values, vision, and strategy, since they are the bases of an effective BSC. This is the very first and most important task of all which leads the directions of the implementation of BSC.

Figure.2.5.1 The links between vision, strategy, and the four perspectives



Source: Kaplan and Norton, 1992.

The second step is to breakdown the strategies into its component parts through the objectives and measures fitted to each perspective. Kaplan (1992) suggests the next step should be to articulate goals for time, quality, performance and service, and translate them into measures. Almost all the measures should be calculated mathematically and be characterized by frequency, unit type, and polarity.

It is important to be able to communicate business strategies across to all organizational members for the purpose of alignment and attainment of the business strategic goals and objectives (Mohammed Ba-Abaad, 2009). The measurement links strategies and actions are needed to avoid inappropriate measures be applied. This is because such measures tend to lead to actions, which are incongruent with the strategies no matter how well they are formulated or communicated through the organizations (Oliveira J., 2001).

Another critical process of implementing BSC is to examine the entire data and reports periodically and weed out the inappropriate measures from the appropriate ones (Chang & Young, 1999). According to Brown (1996), assessing the performance measurement system to keep the right measures will ensure the future success of the organizations. Iterative assessing can help the management team accomplish their tasks in addressing the weaknesses and limitations in their systems which is not without problems. The concept of balance should be continuously

noticed by paying attention to the following:

1. Balance between financial and non-financial indicators of success
2. Balance between internal and external elements of the organization
3. Balance between lag and lead indicators (measures)

In addition to the principles of Kaplan and Norton, to successfully implement BSC, we need more experienced advisors' skill and advice. The book "Balanced Scorecard Step-By-Step" written by Paul R. Niven informs us some details of the very first about implementation of BSC.

One of the most important things is to form the most admissible Balanced Scorecard team. As Niven (2002) stated, when the Scorecard is driven down to all levels through a process of cascading, the alignment and focus derived across the organization can lead to real breakthroughs in performance. At first, all of the BSC team must realize why change is not an option but an imperative. Managers and supervisors make this happen with their understanding, acceptance, support of, and usage of the BSC.

However, not all members of these groups will demonstrate such a willingness to participate. While boisterous and open criticism of new senior management initiatives is fairly rare, managers and supervisors often remain silent or demonstrate

muted enthusiasm, which workers quickly interpret as a questionable show of support for the program (Janice A. Klein, 1984).

Table 2.5.1. Balanced Scorecard Team Roles and Responsibilities

Role	Responsibilities
Executive sponsor	<ul style="list-style-type: none"> ● Assumes ownership for the Balanced Scorecard implementation ● Provides background information to the team on strategy and methodology ● Maintains communication with senior management ● Commits resources (both human and financial) to the team ● Provides support and enthusiasm for the Balanced Scorecard throughout the organization
Balanced Scorecard champion	<ul style="list-style-type: none"> ● Coordinates meetings; plans, tracks, and reports team results to all audiences ● Provides thought leadership on the Balanced Scorecard methodology to the team ● Ensures all relevant background material is available to the team ● Provides feedback to the executive sponsor and senior management

	<ul style="list-style-type: none"> ● Facilitates the development of an effective team through coaching and support
Team members	<ul style="list-style-type: none"> ● Provide expert knowledge of business unit or functional operations ● Inform and influence their respective senior executives ● Act as Balanced Scorecard ambassadors within their unit or department ● Act in the best interests of the business as a whole
Organizational change expert	<ul style="list-style-type: none"> ● Increases awareness of organizational change issues ● Investigates change-related issues affecting the Balanced Scorecard implementation ● Works with the team to produce solutions mitigating change-related risks

Resource: Niven (2002)

Former U.S. Secretary of Labor Robert Reich has said that well-trained and dedicated employees are the only sustainable source of competitive strength. Thus when implementing the BSC to the target organizational unit, we should have an honest evaluation of the management team and supervisors who will participate and support for BSC implementation. Niven (2002) have some suggestions for the vital roles of Balanced Scorecard team which were listed in Table 3.

With a well-trained and well-positioned management team, and with executive sponsorship for BSC implementation, then we will be able to go through the next phases.

2.5.1 The Planning Phase

According to Niven (2002), to begin the work of building a BSC, there is some groundwork that lay ahead of the implementation. To summarize, the planning phase includes these six steps: (1) Develop a guiding rationale for BSC. (2) Determine the appropriate organizational unit. (3) Step 3. Secure executive sponsorship. (4) Form and train the BSC team. (5) Formulate the implementation plan. (6) Develop a communication strategy and plan for BSC implementation.

2.5.2 The development phase

It is important to get executive consensus throughout the development phase. However, it may prove virtually impossible to convene the senior management team this frequently. So Niven (2002) suggested if group meetings are not possible, we have to ensure all team members are consistently reporting to their “home” executives with team progress and gathering feedback from the executive to use to guide the future direction of the team’s work. In the development phase, there are some steps to follow:

(1) Gather and distribute background material.

The BSC is a tool that describes strategy. In order to fulfill this promise, the management team should have ample access to background material on the organization’s mission, vision, values, strategy, competitive position, and employee core competencies.

(2) Provide Balanced Scorecard education.

To make all employee population get familiar with BSC earlier, it is necessary to have a comprehensive BSC training session designed to outline the challenges that led you to select the Scorecard, fundamental principles of the model, success stories, and how you plan to guide the implementation.

(3) Develop or confirm mission, values, vision, and strategy.

It is important to generate a consensus of where our organization rests in terms of these critical items.

(4) Conduct executive interviews.

During these interviews with senior management, the team will gather feedback on the organization's competitive position, key success factors for the future, and possible BSC objectives and measures.

(5) Develop the Strategy Map.

The simple one-page graphical representation of strategy will describe and powerfully communicate to everyone in the company what is absolutely critical to your success in each of the four Balanced Scorecard perspectives.

(5a) Executive workshop.

Gain senior management consensus on the Strategy Map developed by the team. Capture and incorporate any recommendations from the executive group.

(5b) Gather employee feedback.

(6) Develop performance measures.

To translate each of the objectives on the Strategy Map into metrics that can be

tracked to provide insight into the execution of strategy and establish accountability throughout the company.

(6a) Executive workshop.

(6b) Gather employee feedback.

(7) Establish targets and prioritize initiatives.

Setting targets may be among the most challenging aspects of the entire implementation. All measures should be accompanied by initiatives designed to bring the targets to fruition.

(8) Step 8. Gather data for the first Balanced Scorecard report.

(9) Step 9. Make “Getting to first Balanced Scorecard Report” to be the number one priority in the initial stages of the implementation.

(10) Develop the ongoing Balanced Scorecard implementation plan.

Cascading accountability for results to lower levels of the organization, linking budgeting and planning to strategic aims, and aligning reward systems are all vital operations that can be positively impacted by the presence of an effective BSC.

2.5.3 Strategy Map

The strategy map plays an important role in implementing the BSC. To communicate strategy clearly and succinctly to all stakeholders of an organization, the strategy map allows BSC developers to quickly grasp important interdependencies, question assumptions, and simply create a better description of their unique strategies (Niven, 2002, 2005). It links objectives and strategies with arrows to depict patterns of cause and effect, and briefly presented as a one-page graphic of what must be done well in each of the four perspectives to execute strategies of the organization. In the manner of beginning the statements with a verb in each of the perspectives, the strategy map answers the questions of each objective, such as “increase the return on investment” or “close skill gaps” etc.

To build an effective strategy map, Niven (2002) indicates some of the sources of information that should be considered:

(1) Annual reports.

An invaluable source of information, annual reports not only contain detailed financial information but also discuss market position, key products, prospects for the future, and maybe even nonfinancial indicators of the organization.

(2) Mission statement.

Ask each member of BSC team to recite the organization's mission statement. After all, most organizations do have one.

(3) Values.

The purpose of establishing the value is to ask if the organization has established its guiding principles.

(4) Vision.

As with the mission, the team should be able to find a vision statement for the organization or it could be developed to reflect the reality of current organization.

(5) Strategic plan.

This is the mother lode of Map and Scorecard building information. A coherent strategic plan based on mission, values, and vision is a great start in the process. Most organizations have their BSC rollout delayed, or even derailed, as the organization struggles to produce a valid strategy.

(6) Project plans.

It is very important to gauge which projects appear to be aligned with

the strategy of the organization and have the support of influential executives. These initiatives may be candidates to remain as important action plans in achieving one or more Scorecard measures.

(7) Consulting studies.

Consultants most likely have provided background information that will prove very helpful in the review process.

(8) Performance reports.

Find reports of existing management system and review at least a year's worth of these reports to determine what indicators of performance are currently deemed critical to the organization's success.

(9) Competitor data.

Knowing what the competitors are doing and tracking may help us to determine some of the key objectives and measures. But don't simply copy the objectives and metrics of the competitors. They may have mature processes that focus on different aspects of the value chain.

(10) Organizational histories.

It will likely provide a wealth of information on why the organization

was started (mission), what the founders valued, key lessons learned over the years, and a picture of the future.

(11) Analyst reports.

If the organization is publicly traded, analyst reports will provide an excellent glimpse of what the market values the company. These documents often provide a wealth of statistical data as well.

(12) Trade journals and news articles.

These could have a strong impact on the objectives and measures the BSC team has chosen to influence public opinion.

(13) Benchmarking reports.

These documents provide good background and may stimulate discussion of potential measures. The objectives and measures we choose to represent that strategy may in some cases mirror those of other organizations, but it's the determination of the key drivers for our organization that will ultimately differentiate us from the rivals.

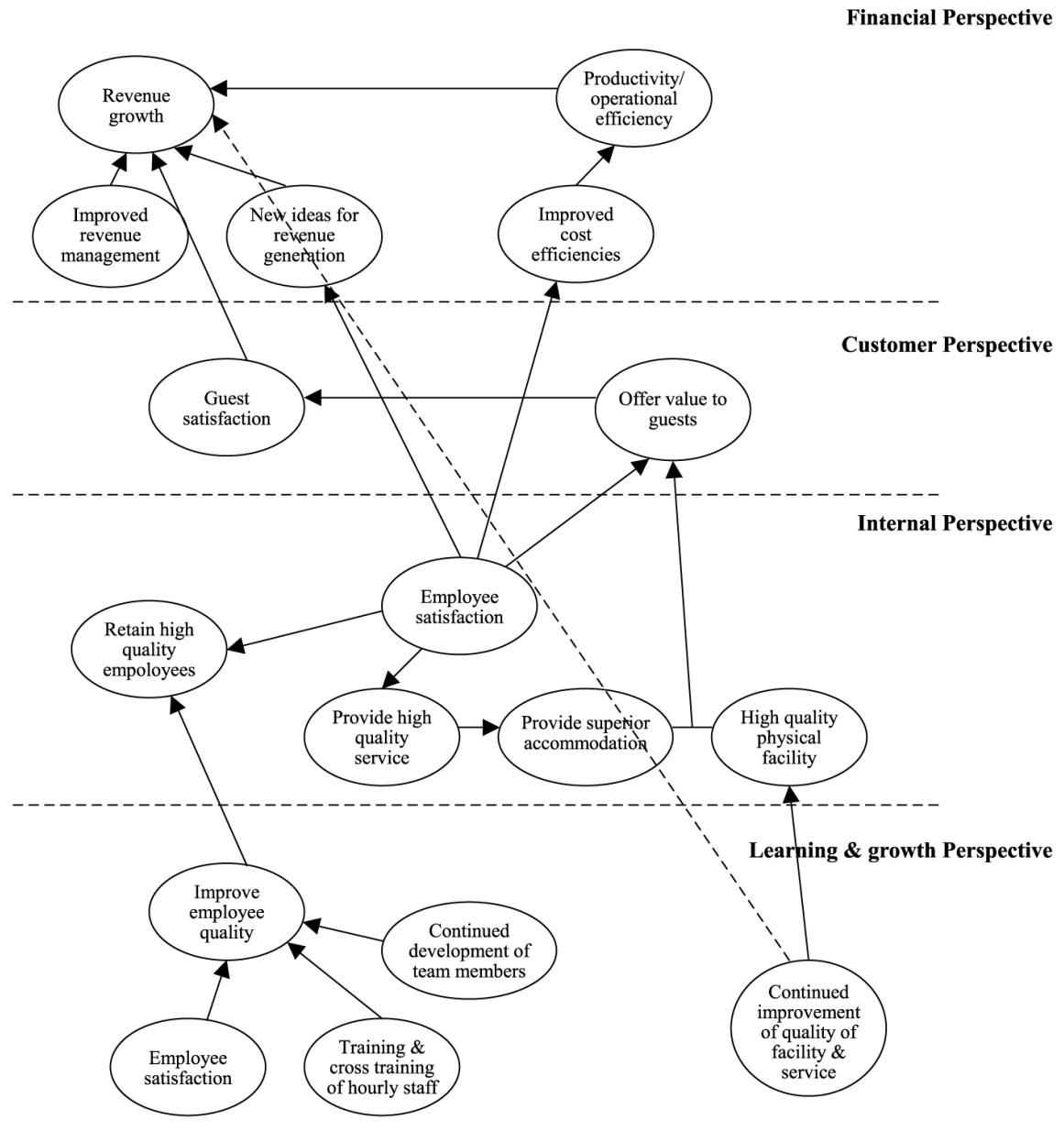
The Strategy Map would be helpful in developing the measures of BSC.

Although developing measures is a difficult work to begin with, there is a simple

method to avoid situations like this from blocking the progress of BSC, that is, to craft two to three-sentence narratives for each objective (Niven, 2002) after the accomplishment of the Strategy Map.

In healthcare sector, the value of organization indicates human-based and knowledge-intensive property. When a healthcare organization wants to improve financial performance, the other three perspectives should be prior to financial perspective. Learning and growth plays the initial driver for reaching both customer and financial performance through the mediator of internal process. Since the learning and growth perspective acts as a base for all other perspectives and they depend on it, healthcare organizations must continuously improve quality by educating staff and updating their internal process. Finally, according to above structure, healthcare organizations can increase customer satisfaction and productivity and improve the financial perspective (Raeisi AR, Yarmohammadian MH, Bakhsh RM, & Gangi H, 2012; Wu IL & Kuo YZ, 2012).

Figure 2.5.2 A Strategy Map Shows How the Organization Creates Value



Source: Adapted from Doran *et al.* (2002)

Table 2.5.2 The Sample of Scorecard

Perspective: Customer	Measure Number/Name: C01/Customer Loyalty Rating	Owner: G. Garfinkel, VP Marketing	
Strategy: Revenue growth		Objective: Increase customer loyalty	
Description: The customer loyalty rating measures the percentage of surveyed customers stating they prefer our products to competitor offerings and will purchase our products again. Our research indicates that loyal customers make more frequent purchases and tend to recommend our brands to others. Therefore, we believe increasing customer loyalty will help us achieve our strategy of revenue growth.			
Lag/Lead: Lag	Frequency: Quarterly	Unit Type: Percentage	Polarity: High values are good.
Formula: Number of quarterly survey respondents answering yes to survey questions #5: "Do you prefer our products compared to competitor offerings?" and #6: "Will you purchase our products again?" divided by the total number of surveys received.			
Data Source: Data for this measure are provided by our survey company, SST. Each quarter it performs a random survey of our customers and provides the results electronically to our marketing department. Data are contained in MS Excel spreadsheets (MKT SURVEY.xls, lines 14 and 15). Data are available the 10th business day following the end of each quarter.			
Data Quality: High—received automatically from third-party vendor		Data Collector: Sierra Burdette, Marketing Analyst	
Baseline: Our most recent data received from SST indicates a customer loyalty percentage of 59%.		Target: Q1 2001: 65% Q2 2001: 68% Q3 2001: 72% Q4 2001: 75%	
Target Rationale: Achieving customer loyalty is critical to our revenue growth strategy. The quarterly increases we're targeting are higher than in past years but reflect our increased focus on loyalty.		Initiatives:	
		1. Seasonal promotions	
		2. Customer relationship management project	
		3. Customer service training	

Source: Paul R. Niven (2002)

These measures can be translated into scorecards one by one and be categorized by four perspectives, as presented in Table 2.5.2.

2.6. Quality Improvement in Healthcare

Over sixteen years ago, the Institute of Medicine's (IOM) report "To Err is Human; Building a Safer Health SYSTEM" revealed that between 44,000 and 98,000 Americans die each year as a result of medical errors (Kohn *et al.*, 1999). This report had raised public awareness of healthcare quality and had initiated a series of activities of healthcare improvement. In 2001, IOM published "Cross the Quality Chasm: A New Health System for 21st Century". In this report, IOM identified 6 aims for improvement in healthcare:

1. Safe: avoiding injuries to patients from care that is intended to help them.
2. Effective: providing services based on scientific knowledge to all who could benefit, and refraining from providing services to those unlikely to benefit (avoiding underuse and overuse).
3. Patient-centered: providing care that is respectful of and responsive to individual patient preferences, needs, and values and ensuring that patient values guide clinical decisions.
4. Timely: reducing waits and sometimes harmful delays for both those who receive and give care.
5. Efficient: avoiding waste, such as waste of equipment, supplies, ideas, and energy.

6. Equitable: providing care that does not differ in quality because of personal characteristics such as gender, ethnicity, geographic location, and socioeconomic status.

Thereafter, healthcare began to take actions such as six sigma, continuous improvement, and Deming Plan-Do-Check-Action (PDCA) cycle to reduce medical errors and to improve quality of care. Six Sigma is a philosophy that seeks to reduce variation in processes that lead to defects (Chase *et al.*, 2006). By achieving Six Sigma, the failure rate is minimized to 3.4 defects per million opportunities, which translates to a 99.9996% success rate (Lanham and Maxon-Cooper, 2003). Continuous improvement and Deming PDCA cycle have been applied to sustain continuous improvement of healthcare performance.

On the other hand, quality in healthcare organizations may be evaluated using Donabedian's trilogy. These are structure such as how care is organized, for example, Intensive Care Unit (ICU) staffing with intensivists; process, what is done by caregivers, such as the percentage of patients with diabetes who have their glycated hemoglobin measured; and outcomes, like the results achieved, such as mortality rates following coronary artery bypass graft (Pronovost *et al.*, 2006).

Before the report of IOM, the increasing competition in the healthcare industry and the existence of continual pressure from the stakeholders of the healthcare

organizations, forced these institutions to look for alternative ways of adding values to their services while cutting down the cost of services-care deliveries to their customers and patients (Castandeda-Mendez, 1998). This is one of the incentives the healthcare organizations devote to some continuous quality improvement activities such as the implementation of Total Quality Management (TQM), industrial benchmarking and participation of hospital accreditation programs.

As described by Mohammed Ba-Abaad (2009), the initiatives are further strengthened by a large number of organizations' interest in hunting the national and international quality awards that are widely acknowledged by the public, such as the Baldrige Awards in USA, and European Foundations for Quality Management Awards. These prestigious awards are given to winning organizations in recognition of their substantial improvement in their business performances and contribute positively in boosting the reputation of the winners and increase their competitiveness. For healthcare providers, they have newly established Baldrige Healthcare Criteria to refer to in measuring their own performance excellence and meeting up the challenges of healthcare cost containment (Chow-Chua & Goh, 2002).

Medical organizations not only set up to achieve financial efficiency, but also to achieve several goals — present a broad view of performance, create transparency and accountability, communicate goals and engage faculty, and ensure they use data to

guide strategic decisions (Hwa M, Sharpe BA & Wachter RM, 2013; Nippak PM, et al., 2016). Recently, more and more studies report that the BSC is favorable in the organizational performance, in helping the decision making process, and successful in absorbing customer satisfaction (Ajami S, Ebadsichani A, Tofighi S, & Tavakoli N, 2013; de Matos Nasser E, Reis da Costa SR, 2013)

Furthermore, hospitals use the BSC to help improve clinical care. Smith et al. (2014) applied it to hip and knee replacements. They found measurable improvements in all quality dimensions, including shorter hospital stays and wait times, higher bed utilization, earlier patient ambulation, and better patient outcomes. In Taiwan, an academic medical center builds up the BSC red light tracking warning system, which improved controllable costs, infection rates, and the medical records completion rate. The medical center concludes that the system is an effective and efficient tool where improvement depends on ongoing and consistent attention in a continuing effort to better administer medical care and control costs (Chen HF, Hou YH, & Chang RE, 2012).

CHAPTER 3

Research Methods

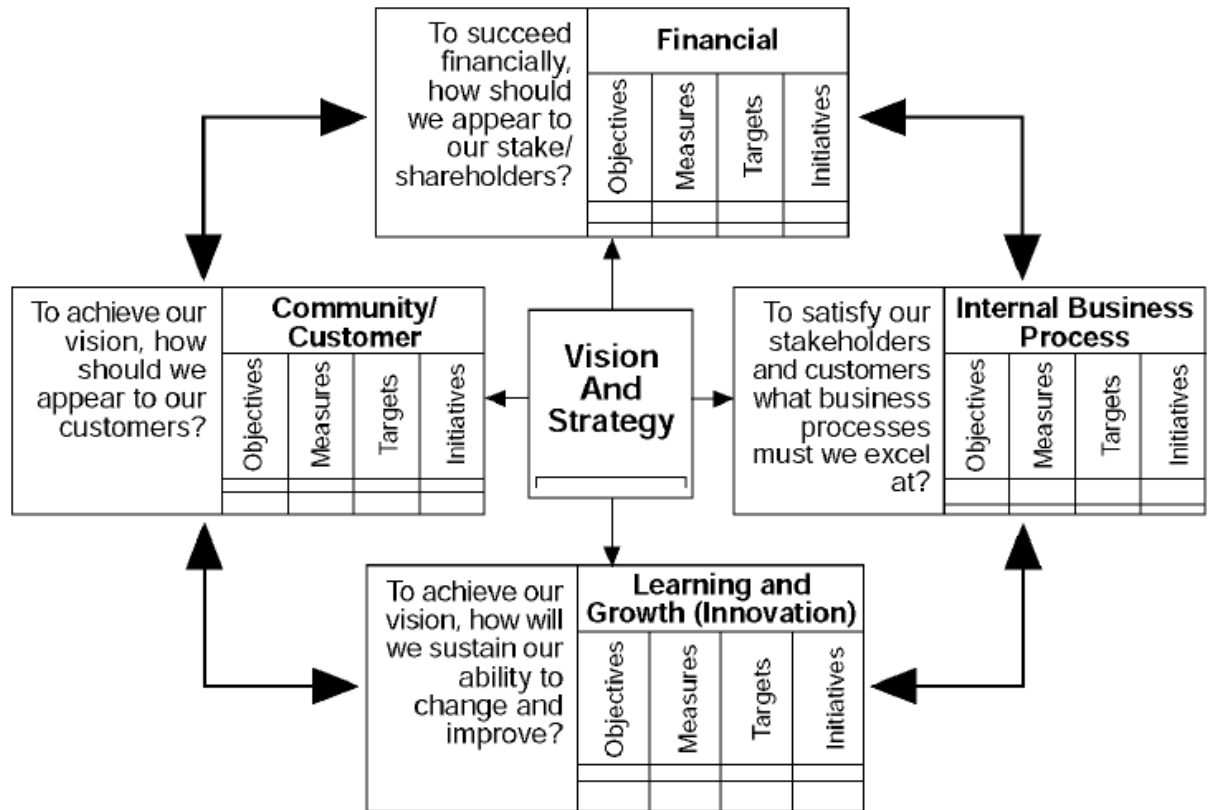
3.1. Conceptual Framework and Study Design

3.1.1 Conceptual Framework of Study

Figure 3.1.2 represents the conceptual framework of the study. To accomplish the study, we must first translate the vision into operational goals, then breakdown the strategies into measures of the four perspectives; gather the data of all measures for periodical checking, revision and hypothesis testing. The study is constructed based on the implementation of BSC, thus the conceptual framework of BSC is also mentioned in Figure 3.1.

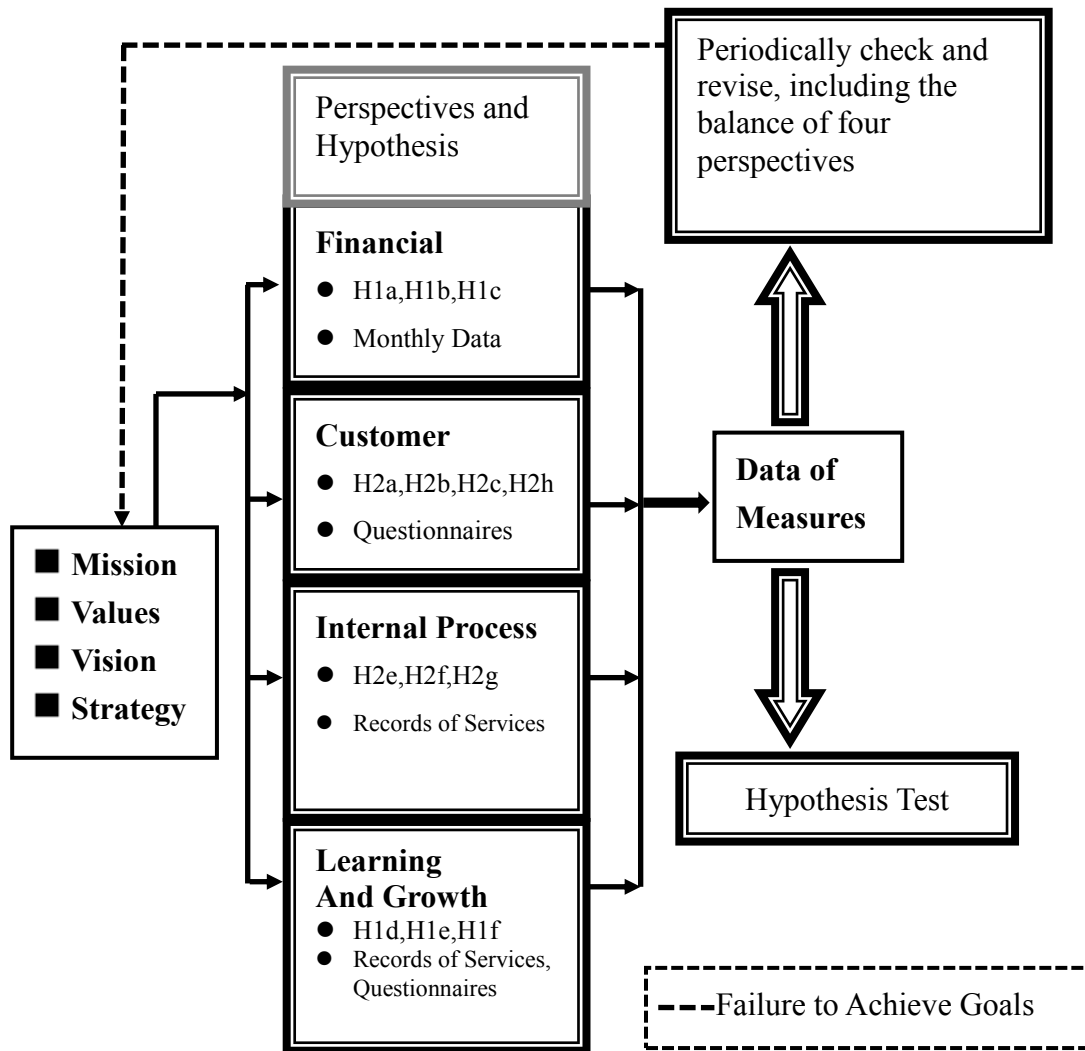
By checking the data collected from the measures, every set goal would be compared with it ; if the data of an individual measure failed to achieve the goal, then both the scorecard and the data should be reviewed by the BSC team and be revised if necessary (dashed line with an arrow).

Figure 3.1.1 Conceptual framework of BSC



Source: Kaplan and Norton, 1996

Figure 3.1.2 Conceptual framework of the study



3.1.2 Strategies of Balanced Scorecard

The objective of the study is to construct the BSC framework of aesthetic medicine that could assist other clinics improve their medical and service qualities. After the introduction and implementation of the BSC, the subject clinic of the study could become the benchmark of aesthetic/ cosmetic medicine. To achieve the above vision, three strategies of financial perspective are formulated— Revenue Growth, Profit Growth and Cost Reduction. According to these strategies, improving public awareness and customer satisfaction are reckoned as strategies of Customer perspective which could increase revenue and profit and reduce cost. Customer satisfaction is divided into two strategies, Effective and Pleasant Treatment Experience and Zero Defect Service.

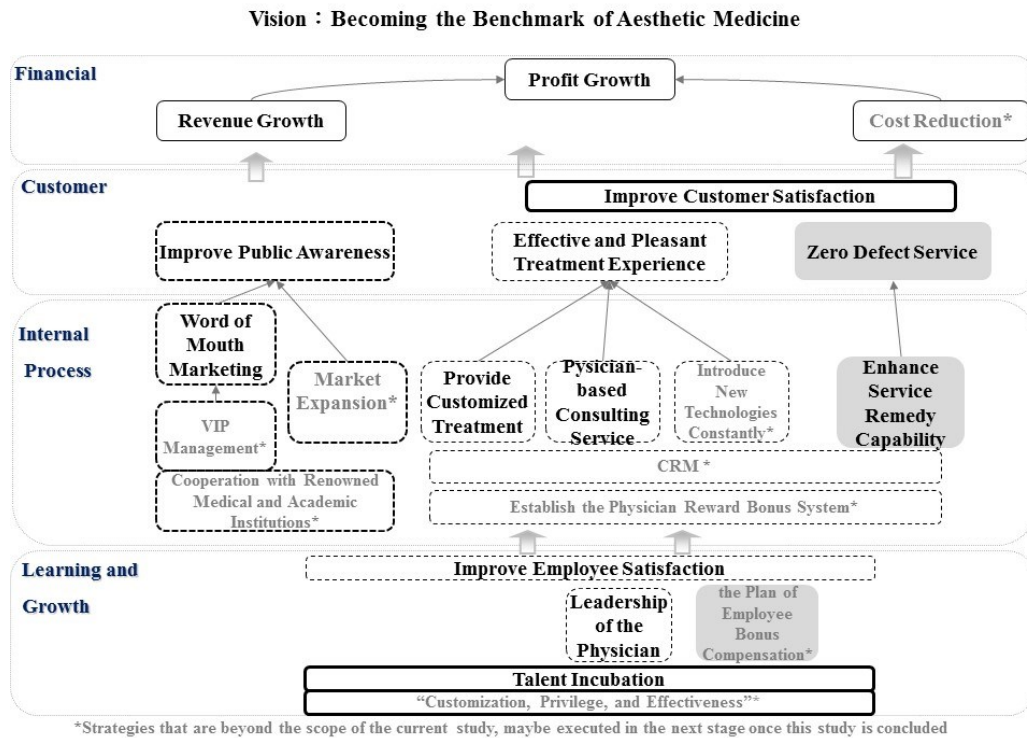
In the last two perspectives, Internal Process and Learning and Growth, the study aims to follow three strategies of Customer perspective. To improving public awareness, word of mouth marketing and market expansion are arranged for raising awareness. Word of mouth marketing can be promoted by setting up Very-Important-Person (VIP) management. As well as Word of mouth marketing, cooperation with renowned medical and academic institutions is expected to improve public awareness.

For Effective and Pleasant Treatment Experience when addressing the Internal

Process perspective, providing custom-designed treatment protocols, physician-based consulting service and constantly introducing new technology can help providing better quality of treatment and services. As of Learning and Growth perspective, by leadership of the physician and by emphasizing talent incubation, the employees can enhance medical knowledge and capability, consequently achieving and improving employee satisfaction.

Items written with gray characters are the ones that are not being done or are being done partially at this time and are considered beyond the scope of this study, and could be considered as future implementation strategies once the study concludes.

Figure3.1.3 Strategy map



3.1.3 Study Design

This study is a case study by applying balanced scorecard to a group of direct chain (regular chain) aesthetic / cosmetic clinics, where the author is the chief executive officer. One clinic will be selected as the test subject to apply the strategies of Balanced Scorecard and another clinic as the control subject (with data collection, but no implementation of strategies).

All the clinics are located in Metro Taipei Area. Both subject clinics provide similar aesthetic procedures, three physicians providing pertinent medical services, and similar staffing. On the test clinic three strategies was applied, including time extension of physician consultation, providing regular training courses for all staff members, and regular book/ journal reading reports for all staff members.

Implementation plan:

1. Increase staff training hours
2. Increase physician consultation time
3. Decrease staff dissatisfaction rate and turn-over rate
4. Decrease dispute or complaint rate by customers and adverse medical reactions
5. Increase customer satisfaction rate

The control clinic is given the opportunity of adopting BSC implementation after the study is completed.

The study will be applied for six months and data will be collected monthly.

All data were collected by staff members of both clinics with the help of the Sun Home Business Consulting Corp., a local accounting firm with expertise on BSC implementation, which then helps transforming original data into BSC score on a monthly basis.

3.2. Study Setting

3.2.1 Definition of Measures

According to the four perspectives of BSC, the measures will be derived from strategies of each perspective, then the data are collected from both the test and control clinics. Those measures are chosen by the author of the study, who is an aesthetic physician with fifteen years of experience, after consulting with four associates of Sun Home Business Consulting Corporation. The measures are described as follows (Table 3.2.1):

3.2.1.1 Financial Perspective

In this perspective, we have two strategies with three measures, including:

Strategy 1 Profit growth, Measure 1: Gross Margin Percentage, with the following definition:

Gross margin percentage (GMP) = (Revenue-Cost of goods sold) / Revenue

It is a measure of how well each dollar of a clinic's revenue is utilized to cover the costs of care provided.

Strategy 1 Profit growth, Measure 2: Return on Investment (ROI), with the following definition:

Return on investment (ROI) = (Gain from investment – Cost of Investment) / (Cost of

Investment)

ROI is an index that shows how much profit or cost saving is realized and sometimes used as a way to grade how well a company is managed. The monthly numerical financial data will be collected from both clinics.

Strategy 2 Revenue growth, Measure 3: Purchase amount per patient per visit, with the following definition:

Purchase amount per patient per visit (PA/P/V) = Monthly revenue from customers /
Monthly patient visits

It is not a conventional financial indicator; it reflects how well the trained or untrained staff can or cannot create value for their organizations.

3.2.1.2 Customer Perspective

There are four strategies with six measures, including:

Strategy 1 Effective and nice experienced treatment, Measure 1: Patient Repeat Rate, with the following definition:

Patient Repeat Rate = (number of total customers - first visit customers) / number of total customers

Both the front counter staff or the Electronic Health Records (EHR) system can calculate the repeat rate at the end of the month.

Strategy 2 Improve customer satisfaction, Measure 2: Customer satisfaction rate, with the following definition:

Customer satisfaction rate = number of satisfied customers / number of total customers

The one major question of customer satisfaction survey is the level of satisfaction that customers felt about the services. The level of satisfaction concerning both medical or non-medical services could be classified into five categories: extremely satisfied, very satisfied, satisfied, dissatisfied, extremely dissatisfied. Customers who select one of the first three categories will be counted as satisfied customers.

To collect this data, customers are selected by cluster sampling for customer satisfaction survey and this data will be generated quarterly.

Strategy 3 Improve public awareness, Measure 3: Patient Referral Rate, with the following definition:

Patient Referral Rate = number of referred customers / number of total customers

On the first visit, customers are requested to fill the form of personal information; one of the questions is about who referred them in. If the blank is filled with some specific name of a specific customer, it will be considered a valid referral count. This measure will be calculated quarterly.

Strategy 3 Improve public awareness, Measure 4: Increase Numbers of New Patients,

with the following definition:

Increase Numbers of New Patients= Number of new patients increased in the clinic
monthly

Strategy 4 Zero defect service, Measure 5: Adverse Medical Reaction Rate, with the

following definition:

Adverse Medical Reaction Rate= number of customers with adverse medical reactions
/ number of total customers

Strategy 4 Zero defect service, Measures 6: Complaint Rate, with the following

definition:

Complaint Rate = number of complaint events / number of total customers

It could be calculated by gathering customers' oral or written feedback. The front counter staffs that are responsible for patient service will take notes and count the number of total customers at the end of the month.

3.2.1.3 Internal Process Perspective

In this perspective, we have three strategies with five measures, including:

Strategy 1 Doctor-based consultation, Measure 1: Time of Physician Consultation,

with the following ways of measurement:

The data could be collected either by the EHR system or by the nurse in the consultation room writing down the time of customer entering and exiting. The length of time can be easily calculated and recorded in a table even if the EHR system is not available.

Strategy 1 Doctor-based consulting service, Measure 2: Rate of Completing the Deal, with the following definition:

Rate of Completing the Deal = number of deal completed / number of total deals

Strategy 2 Provide customized treatment, Measure 3: Time to get an appointment (Days), with the following measurement:

Our customers can book an appointment through phone calls or after the previous treatment session before leaving the clinic. In our experience, the ideal time to get an appointment is within 2 days of the phone call. This data could be collected through the appointment books of the clinics. It could be generated monthly.

Strategy 2 Provide customized treatment, Measure 4: Waiting Room Time, with the following definition:

The time from arrival to the registration counter and that of entering the consultation room can be recorded by hand or by a simply keyed in to the computer. In a clinic with no EHR system, it would be collected by the customer service staff.

Strategy 3 Enhance service quality, Measure 5: Dispute Rate by Customers, with the following definition:

Dispute Rate= number of dispute case / number of total cases

3.2.1.4 Learning and Growth Perspective

In this perspective, there are three strategies and five measures, including:

Strategy 1 Talent incubation, Measure 1: Access to Training, with the following definition:

Access to Training = staff's personal attendance hours of training courses / total hours of training courses

The number of quitted staffs could be found in the human resource records. It will be calculated monthly.

Strategy 1 Talent incubation, Measure 2: Number of Training Courses Completed, with the following measurement:

It is the record of the number of courses the personnel has completed in one month.

Strategy 2 Improve employee satisfaction rate, Measure 3: Employee satisfaction rate, with the following definition:

Employee satisfaction rate= number of satisfied employees / number of total employees

The one major question of employee satisfaction survey is the level of satisfaction that employees feel about their jobs. The level of satisfaction could also be categorized into five categories such as: extremely satisfied, very satisfied, satisfied, dissatisfied, extremely dissatisfied. Employees who select one of the first three options is considered satisfied.

Strategy 2 Improve employee satisfaction rate, Measure 4: Staff Turnover, with the following definition:

Staff Turnover = number of quitted staffs / number of total staffs

The number of quitted staffs could be found in the human resource records. It will be calculated monthly. Only the employees who had passed the probationary period (i.e. 3 month) will be included.

Strategy3 Leadership of physician, Measure 5: Number of Book or Journal Reports, with the following definition:

Number of Book or Journal Reports= number of clinic holding a books or journal reports

Table 3.2.1 Definition of measures of four perspectives

Perspective	Measures	Formula
Financial	Gross Margin Percentage (GMP) (%)	$\frac{\text{Revenue} - \text{Cost of goods sold}}{\text{Revenue}}$
	ROI (%)	$\frac{\text{Gain from investment} - \text{Cost of Investment}}{\text{Cost of Investment}}$
	Purchase Amount per Patient per Visit (NTD)	$\frac{\text{Revenue from customers}}{\text{Patient visit}}$
Customer	Patient Repeat Rate (%)	$\frac{\text{Number of total customers} - \text{first visit customers}}{\text{Number of total customers}}$
	Customer Satisfaction Rate (%)	$\frac{\text{Number of satisfied customers}}{\text{Number of total customers}}$
	Patient Refer Rate (%)	$\frac{\text{Number of referred customers}}{\text{Number of total customers}}$
	Increase Numbers of New Patient (N)	Number of new patient
	Adverse Medical Reaction Rate (%)	$\frac{\text{Number of customers with adverse Medical reaction}}{\text{Number of total customers}}$
	Complain Rate (%)	$\frac{\text{Number of complaining events}}{\text{Number of total customers}}$
Internal Process	Time of Physician Consultation (Minute)	<i>How many minutes a physician spent in consulting a customer</i>
	Rate of Completing the Deal (%)	number of deal completed / number of total deals
	Time to Get an Appointment (Days)	<i>Within how many days can A customer book an appointment through phone calls</i>
	Waiting Time (Minutes)	<i>The amount of time a customer spent waiting from arrival to consultation by a physician</i>
	Dispute Rate by Customers (%)	<i>number of dispute case / number of total cases</i>
Learning and	Access to Training (%)	$\frac{\text{Hours of personnel's attendance of training courses}}{\text{Total hours of training courses}}$
	Number of Training Course Completed (N)	<i>Personnel has completed how many training courses</i>

Growth

Employee Satisfaction Rate (%)

$\frac{\text{Number of satisfied employees}}{\text{Number of total employees}}$

Staff Turnover Rate (%)

$\frac{\text{Number of quitted staffs}}{\text{Number of total staffs}}$

Number of Book Reports
(for clinic and physician) (N)

Number of clinic holding a book report

3.2.2 Data Sources

There are two clinics in the study, one considered as the test group and the other the control group. The main services of both groups are aesthetic and cosmetic procedures, all minimally invasive, excluding plastic surgery operations. They are established and funded by a cosmetic product distribution company. The test group was the volunteer to implement strategies of BSC, and the control group agreed to participate without implementation of BSC strategies.

Table 3.2.2 shows the personnel characteristics of two groups. Those staffs were invited to join the study for 6 months. We planned to measure performances of physician, nurse, cosmetology, advisor, administration and clinic as an organization by BSC on a monthly basis. Both groups have similar structure of staffing with identical amount of physicians, nurses and advisors.

Table 3.2.2 Staffing of the clinics

Numbers	Test clinic	Control clinic
Total	15	17
Physician	3	3
Nurse	3	3
Cosmetologist	5	6
Advisor	3	3
Administration staff	1	2

3.2.3 Sampling of Questionnaire

This study has defined some measures of satisfaction. According to them, we built and designed the customer and employee satisfaction survey questionnaires and collected data to fulfill the requirements of the BSC measures.

3.2.3.1 Customer Satisfaction

Customer satisfaction has been defined as the state of mind that customers have about a company and its products or services when their expectations have been met or exceeded. This is the state that reflects the lifetime of the product or service experience (www.qualtrics.com). The customer satisfaction survey will be applied monthly to 50 customers per clinic. Those important measures such as time of physician consultation, customer complaint rates, and the 3Rs (repeat, retain and refer) rates will be included in the design of the questionnaire. To get a better consistency of distribution of the population, we choose cluster sampling as the sampling method. Cluster sampling is a sampling technique used when "natural" groupings are evident in a statistical population. It is often used in marketing research.

Elements within a cluster should ideally be as heterogeneous as possible, but there should be homogeneity between cluster means. Each cluster should be a small scale representation of the total population. The clusters should be mutually

exclusive and collectively exhaustive. Because the size of clinics and the frequency of customer visits may vary, the details of the sampling will also vary from clinic to clinic.

The rationale of asking the level of customer satisfaction is to get an idea of the overall feeling of services received, and also to ask the customer whether the quality of patient care is highly valued and comparable to other accredited healthcare organizations.

We interviewed customers of the both clinics who have consented to answer the questionnaire for customer satisfaction. The number of interviewees of both groups was equal month by month. There were 520 valid and 13 invalid questionnaires.

Table 3.2.3 Numbers of interviewee of Customer Satisfaction

Numbers	Test clinic	Control group
Total	527	526
October 2014	95	95
November 2014	95	80
December 2014	80	80
January 2015	90	90
February 2015	75	75
March 2015	85	85
Invalid	7	6

3.2.3.2 Employee Satisfaction

Employee satisfaction is the terminology used to describe whether employees are happy, contented and their desires and needs at work fulfilled. Many measures purport that employee satisfaction is a factor in employee motivation, employee goal achievement, and positive employee morale in the workplace (about.com).

Employee satisfaction is often measured by anonymous employee satisfaction surveys (about.com) administered periodically that gauge employee satisfaction in areas such as management, understanding of mission and vision, empowerment, teamwork, communication and ,co-worker interaction.

Our goal to achieve a better employee satisfaction is to help our employees accomplish their self-fulfillment through a meaningful and continuous improvement of the working environment. As mentioned in the section of aims and hypotheses, we assume the implementation of BSC can increase employee motivation, satisfaction, knowledge, skills and abilities. The level of satisfaction will be gauged in the six areas mentioned above by questionnaires, and the results will be evaluated in combination with human resource records monthly.

The questions probing the level of employee satisfaction is aimed to gather information about how happy they are at work; also asking the employees to think about the overall conditions of their career, and ways that can improve them.

Additional questions will help us achieve better employee stewardship.

We collected questionnaires of employee satisfaction monthly as well. All staffs of both clinics consented to participate in the study for 6 months. Ninety valid questionnaires were interviewed in the test clinic for 6 months, and 102 in the control clinic.

3.3. Analytic approach

The collected data will be entered into Microsoft Excel for statistical analysis.

As Braam and Nijssen (2004) implicated, overly technically-oriented with introduction of new unfamiliar software could lead the results that lack involvement of the departments. Using popular software such as Microsoft Excel for data entering and analysis may mitigate the resistance toward the implementation of BSC.

We also will periodically apply a test to check the balance of four perspectives.

3.3.1 Balance of the four perspectives

To check the balance of the four different perspectives, we adopted the formula designed by Braam *et al.* (2004) to accomplish better allocation of attention over the four perspectives. We can periodically perform self-examination by simply counting the balanced scorecards achieving the goals in the dictionary, and find out the proportion of each perspective. Next, the BSC use as a comprehensive measurement tool was calculated utilizing the following formula:

$$\left(100 - \sum_{i=1}^4 |Score(i) - 25|\right)$$

A high score reflects a situation where all four aspects are equally taken into

account (score = +100), suggesting a comprehensive measurement, whereas a low score indicates an extremely unbalanced use with 100 percent focus on a single perspective (score = -50) (Braam *et al.*, 2004). The assumption is therefore an equal allocation of attention over the different perspectives is optimal (Kaplan and Norton, 1996), and the unbalance may remind us to re-allocate our resources. Simply follow the framework of this research, and we should be able to adjust or revise our measures maintaining the desired balanced.

According to the formula designed by Braam *et al.* (2004), we designed the target score and the baseline score for each measure that we could compare by transforming them into the same unity of scale. Table 3.3.1 shows target scores and baseline scores of nineteen measures of all four perspectives. If the data of the measure is higher than the baseline score and the difference is larger than the one observed between the target and baseline scores, the data of that measure will get 100% score.

Table 3.3.1 Target scores and baseline scores among measures

Perspective	Measures	Target	Baseline
Financial	Gross Margin Percentage (GMP) (%)	50.0%	20.0%
	ROI (%)	2.8%	0.0%
	Purchase Amount per Patient per Visit (NTD)	20,000	5,000
	Patient Repeat Rate (%)	50%	0.0%
Customer	Customer Satisfaction Rate (%)	95.0%	80.0%
	Patient Referral Rate (%)	20%	0.0%
	Increase Numbers of New Patients (N)	25	0
	Adverse Medical Reaction Rate (%)	8.5%	10.0%
	Complain Rate (%)	18.0%	20.0%
Internal Process	Time of Physician Consultation (Minutes)	20	5
	Rate of Completing the Deal (%)	35.0%	30.0%
	Time to Get an Appointment (Days)	6	7
	Waiting Time (Minutes)	60	120

	Dispute Rate (%)	17.5%	20.0%
	Access to Training (%)	1	0.7
	Number of Training Course Completed (N)	1	0
Learning and Growth	Employee Satisfaction Rate (%)	75.0%	70.0%
	Staff Turnover (%)	10.0%	20.0%
	Number of Book/ Journal Reports	1	0

Based on the hypotheses of the implementation of BSC, we have weighed the four perspectives in six departments (Table 3.3.2).

Some weighing considerations are listed below:

Nurses and cosmetologists are responsible for customer relationship and their comfort level, so they are not evaluated on the financial KPIs.

Regarding the Customer Perspective, since the cosmetologists, advisors and administration staff do not execute medical procedures, they will not be measured for the adverse medical reaction rate, but yes for patient repeat rate, customer satisfaction rate and complaint rate.

Time of physician consultation is only executed by the physicians so that nurses, cosmetologists, advisors and administration staff are not evaluated.

For the Learning and Growth perspective, the clinic as an organization and physicians are gauged by book reports because they need to learn new technology and enhance their capability. Besides, physicians are requested to meet accreditation requirements set by the Ministry of Health by periodically renewing their licenses.

Most book/ journal reading sessions are conducted by the physicians.

Table 3.3.2 Weight of six departments

Measures (%)	Clinic	Physician	Nurse	Cosmetologist	Advisor	Administration
Financial	15	4.0	0	0	5.3	21.9
Gross Margin Percentage	7.5	×	×	×	×	14.3
ROI	4.0	×	×	×	×	7.6
Purchase Amount per Patient per Visit	3.5	4.0	×	×	5.3	×
Customer	35	39.6	58.4	44.1	48.9	30.5
Patient Repeat Rate	12.0	13.6	20.0	17.6	18.3	×
Customer Satisfaction Rate	6.0	6.8	10.0	8.8	9.2	22.9
Patient Referral Rate	4.0	4.5	6.7	5.9	6.1	×
Numbers of New Patients	6.0	6.8	10.0	×	9.2	×
Adverse Medical Reaction Rate	4.0	4.5	6.7	×	×	×
Complaint Rate	3.0	3.4	5.0	8.8	6.1	7.6
Internal Process	35	39.4	20.0	39.8	26.0	22.8
Time of Physician Consultation	5.0	5.6	×	×	×	×
Rate of Completing the Deal	5.0	5.6	×	7.4	15.3	×
Time to Get an Appointment	8.0	9.0	×	7.4	×	9.5

Waiting Time	10.0	11.3	8.3	14.7	×	×
Dispute Rate	7.0	7.9	11.7	10.3	10.7	13.3
Learning and Growth	15.0	17.1	21.6	19.0	20.0	24.8
Access to Training	6.0	6.8	10.0	8.8	9.2	3.8
Number of Training Courses Completed	3.0	3.4	5.0	4.4	4.6	3.8
Employee Satisfaction Rate	2.0	2.3	3.3	2.9	3.1	11.5
Staff Turnover	2.0	2.3	3.3	2.9	3.1	5.7
Number of Book/ Journal Reports	2.0	2.3	×	×	×	×

3.3.2 Formulas of the BSC Score of Measures

Formula 1 applies for the following thirteen measures when transforming data into BSC, including Gross Margin Percentage (GMP), ROI, Purchase Amount per Patient per Visit, Patient Repeat Rate, Customer Satisfaction Rate, Patient Referral Rate, Number of New Patients, Time of Physician Consultation, Rate of Striking-a-Deal, Access to Training, Number of Training Course Completed, Employee Satisfaction Rate, Number of Book Reports.

Formula 1.

$$\text{BSC Score of measure} = \text{Weight} \times \left[\frac{\text{Data of measure} - \text{Baseline score of measure}}{\text{Target score of measure} - \text{Baseline score of measure}} \times 100\% \right], \left| \frac{\text{Data of measure} - \text{Baseline score of measure}}{\text{Target score of measure} - \text{Baseline score of measure}} \right| \leq 1$$

Formula 2 is used for six measures, including Adverse Medical Reaction Rate, Complaint Rate, Time to Get an Appointment, Waiting Time, Dispute Rate, and Staff Turnover.

Formula 2.

$$\text{BSC Score of measure} = \text{Weight} \times \left[\frac{\text{Baseline score of measure} - \text{Data of measure}}{\text{Baseline score of measure} - \text{Target score of measure}} \times 100\% \right], \left| \frac{\text{Data of measure} - \text{Baseline score of measure}}{\text{Baseline score of measure} - \text{Target score of measure}} \right| \leq 1$$

The final BSC Score of the subject, which encompasses six departments and

their staffs, is summed up by nineteen BSC Scores of the measures. We calculated six BSC scores of both clinics and compared differences after implementing the mentioned strategies of BSC.

Formula 3

BSC Score of department = \sum_{1}^{19} BSC Score of measure

3.3.3 Descriptive Analysis

Descriptive analysis will be used to explain the characteristics of the measures. The definitive measures (variables) of the BSC will be set once the BSC team members have reached consensus about the measures. We wanted to test if the performance is improved with implementing BSC, so we can have our hypotheses simplified in a more common form:

H ij: the implementation of BSC can help improving (some specific measure)

Thus we will be able to compare if there are differences between the test group (with BSC implementation) and the control group (without BSC implementation).

The following are what we will possibly do in data analysis:

- The frequency of each variable will be presented in the tables and charts for both clinics.
- For nominal data, we will construct a bar graph; and a histogram will be prepared for displaying the distribution of scores.
- To indicate the average and variation of the measures, we adopt sample mean (\bar{x}) and standard deviation (S.D.) for the continuous data for both clinics. If the data is ordinal, the median is used to represent the average and the interquartile range to represent variability.
- Contingency tables will be made to see the differences of proportions among the subgroups.
- The hypothesis tests will be performed to show the difference between the test clinic and the control clinic. We can perform the two sample t-test assuming equal variances for all mentioned hypotheses to check if implementing BSC will improve our performance.

$$H_0: (\mu_1 - \mu_2) = 0 \text{ vs. } H_1: (\mu_1 - \mu_2) > 0$$

$$t = \frac{(\bar{x}_1 - \bar{x}_2) - (\mu_1 - \mu_2)}{\sqrt{S_p^2 \left(\frac{1}{n_1} + \frac{1}{n_2} \right)}}$$

3.3.4 Correlative Analysis

To test furthermore the relationship between variables of questionnaires, we will apply χ^2 (Chi-square) test to examine the correlation between categorical variables, and the outcomes. The Chi-squared calculation helps us decide if there is a statistically significant difference between groups.

CHAPTER 4

Results

4.1. Interviewee Characteristics

4.1.1 Employee characteristics

In the study, 15 employees of the test group (or clinic, same below) had participated in the follow-up interview for six months along with 17 employees of the control group. The population of all 5 departments is similar between the two groups. The physicians are all males in the two groups, but in the other four departments they are almost all females. In the control group, there are one advisor and one administration staff.

Physicians in the test group are older than the other departments and their average age is 41.3 year-old. Otherwise, the average age of the other departments is under 30. Similarly, in the control group, the average age of the physicians is 39.3, and the average age of the other departments is under 30 as well.

In the test group, the average length of service of physicians, advisors and administration staff are over two years, among them the physicians' service time are the longest. In the control group, the average length of service of physicians and

advisors are over two years. As of the length of education, cosmetologists have the lowest with both groups averaging 13.2 years. Physicians obviously have the longest with the average of 20.3years in the test group and 19.7 years in the control group (Table 4.1.1).

Table 4.1.1 Employee characteristics between the two groups

Characteristics (N)	Physician	Nurse	Cosmetologist	Advisor	Administration
Test group (N=15)	3	3	5	3	1
Gender					
Male	3	0	0	0	0
Female	0	3	5	3	1
Average age (yrs)	41.3	28.3	27.4	30.7	26.0
Average length of service (yrs)	2.66	1.66	1.4	2.33	2.0
Average education (yrs)	20.3	16.0	13.2	16.0	16.0
Control group (N=17)	3	3	6	3	2
Gender					
Male	3	0	0	1	1
Female	0	3	6	2	1
Average age (yrs)	39.3	28.0	28.2	29.7	28.0
Average length of service (yrs)	2.3	1.3	1.2	2.7	1.5
Average education (yrs)	19.7	16.0	13.2	16.0	16.0

In six months, the research team had interviewed 315 customers of the test group and 290 of the control group. The majority of customers are female, 71.4% in the test group and 75.2% in the control group. Male customers are therefore 28.6% in the test group and 24.8% in the control group. The average age of the customers in the test group is older than that of the control group, which is 38.8 years in the test group and 36.7 years in the control group. The average length of education in the test group is longer than it in the control group, which is 15.1 years compared to 14.7 years in the control group (Table 4.1.2).

4.1.2 Customer characteristics

Customer characteristics were summarized in Table 4.1.2

Table 4.1.2 Customer characteristics between the two groups

Characteristics (N)	Test group	Control group
Total	315	290
Gender		
Male	90(28.6%)	72(24.8%)
Female	225(71.4%)	218(75.2%)
Average age (yrs)	38.8	36.7
Average education (yrs)	15.1	14.7

4.2. BSC Scores between the Two Group by the Four Perspectives

The study has measured both groups with their personnel divided in six departments- Clinic, Physicians, Nurses, Cosmetologists, Advisors, and Administration Staff. The data was collected for six months from October, 2014 to March, 2015. Each department has measured one BSC score per month and we have calculated six BSC scores.

The following tables and their respective result numbers can test the hypotheses stated at the beginning of the study in Chapter 1.

- **Hypothesis 1a (H 1a):** the implementation of BSC for a period of time can help improving lagging indicators such as Gross Margin Percentage.
- **Hypothesis 1b (H 1b):** the implementation of BSC for a period of time can help improving lagging indicators such as Purchase Amount per Patient (per Visit).
- **Hypothesis 1c (H 1c):** the implementation of BSC for a period of time can help improving lagging indicators such as Return on Investment (ROI).
- **Hypothesis 1d (H 1d):** the implementation of BSC for a period of time can help improving performance indicators such as Staff Turnover.
- **Hypothesis 1e (H 1e):** the implementation of BSC for a period of time can

help improving performance indicators such as Access to Training.

- **Hypothesis 1f (H 1f):** the implementation of BSC for a period of time can help improving performance indicators such as Employee Satisfaction.
- **Hypothesis 2a (H 2a):** the implementation of BSC for a period of time can help improving patient care by measures such as decreased Complain Rate.
- **Hypothesis 2b (H 2b):** the implementation of BSC for a period of time can help improving patient care by measures such as increased Patient Repeat Rate.
- **Hypothesis 2c (H 2c):** the implementation of BSC for a period of time can help improving patient care by measures such as increased Patient Referral Rate.
- **Hypothesis 2d (H 2d):** the implementation of BSC for a period of time can help improving patient care by measures such as increased Customer Satisfaction Rate.
- **Hypothesis 2e (H 2e):** the implementation of BSC for a period of time can help improving patient care by measures such as an adequate amount of Time of Physician Consultation.

- **Hypothesis 2f (H 2f):** the implementation of BSC for a period of time can help improving patient care by measures such as decreased Waiting Time in the waiting room.

- **Hypothesis 2g (H 2g):** the implementation of BSC for a period of time can help improving patient care by measures such as an adequate Time to Get an Appointment.

- **Hypothesis 2h (H 2h):** the effort of adopting BSC can improve the quality of medical services, thus be highly valued by customers and also serve as accreditation criteria by health policy regulators.

The BSC scores of the test group increases from October, 2014 to February, 2015, from 76.7 to 92.3 when we measured the clinic as a unit, but drops on March, 2015 to 88.5. The difference of BSC scores between the two groups range from 18.5 on November 2014 to 29.9 on February 2015. Scores of the Customer Perspective and Learning and Growth has the largest difference between the two groups (Table 4.2.1, 4.2.2, 4.2.3).

Table 4.2.1 BSC scores of the clinics as a unit between the two groups on October and November 2014 (all hypotheses applicable)

Measures	October 2014		November 2014	
	Data	BSC Score	Data	BSC Score
Total (Test/ Control)		76.7/54.2		77.4/58.9
Financial		3.3/2.8		5.0/1.0
GMP (%) (H1a)	21.9%/18.7%	0.5/0.0	35.4%/22.7%	3.9/0.7
ROI (%) (H1c)	1.8%/1.9%	2.6/2.8	0.3%/-3.2%	0.4/0.0
Purchase Amount per Patient per Visit (NTD) (H1b)	5,750/3,527	0.2/0.0	7,850/6,308	0.7/0.3
Customer		23.4/15.9		28.4/17.8
Patient Repeat Rate (%) (H2b)	0.0%/0.0%	0.0/0.0	7.0%/3.0%	4.2/1.8
Customer Satisfaction Rate (%) (H2d)	88.0%/84.0%	6.4/3.2	90.0%/85%	8.0/4.0
Patient Referral Rate (%) (H2c)	10.0%/5.0%	6.0/6.0	14.0%/8.0%	6.0/6.0
Number of New Patients (N)	25/23	4.0/3.7	35/32	4.0/4.0
Adverse Medical Reaction Rate (%)	7.0%/8.0%	3.0/3.0	6.0%/8.0%	3.0/2.0
Complaint Rate (%) (H2a)	18.0%/28%	4.0/0.0	16.0%/26.0%	3.2/0.0
Internal Process		35/30.2		35.0/33.4
Time of Physician Consultation (Minutes) (H2e)	10/7	8.0/3.2	18/9	8.0/6.4
Rate of Completing the Deal (%)	57.0%/55.0%	10.0/10.0	65.0%/57.0%	10.0/10.0
Time to Get an Appointment (Days) (H2g)	2.2/2.5	5.0/5.0	2.1/1.7	5.0/5.0
Waiting Time (Minutes) (H2f)	35/45	5.0/5.0	33/40	5.0/5.0

Dispute Rate (%)	10.0%/17.0%	7.0/7.0	10.0%/15.0%	7.0/7.0
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Learning and Growth		15.0/5.4		9.0/6.8
Access to Training (%) (H1e)	100.0%/0.0%	2.0/0.0	0.0%/0.0%	0.0/0.0
Number of Training Courses Completed (N)	1/0	2.0/0.0	0/0	0.0/0.0
Employee Satisfaction Rate (%) (H1f)	79.0%/72%	6.0/2.4	88.0%/75%	6.0/3.8
Staff Turnover (%) (H1d)	0.0%/0.0%	3.0/3.0	0.0%/0.0%	3.0/3.0
Number of Book/ Journal Reports	1/0	2.0/0.0	0/0	0.0/0.0
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Table 4.2.2 BSC scores of the clinics as a unit between the two groups on December 2014 and January 2015 (all hypotheses applicable)

Measures	December 2014		January 2015	
	Data	BSC Score	Data	BSC Score
Total (Test/ Control)		83.7/50		90.7/56
Financial		7.3/0.0		10.2/2.8
GMP (%) (H1a)	40.1%/18.1%	5.0/0.0	45.3%/23.5%	6.3/0.9
ROI (%) (H1c)	1.2%/-0.7%	1.7/0.0	2.1%/1.3%	3.1/1.9
Purchase Amount per Patient per Visit (NTD) (H1b)	7,133/3,892	0.5/0.0	8,345/4,125	0.8/0.0
Customer		29.4/14.4		30.6/17.2
Patient Repeat Rate (%) (H2b)	15.0%/8.0%	4.5/2.4	25.0%/12.0%	5.0/2.4
Customer Satisfaction Rate (%) (H2d)	93.0%/83.0%	10.4/2.4	93.0%/87.0%	10.4/5.6
Patient Referral Rate (%) (H2c)	14.0%/5.0%	6.0/3.8	16.0%/7.0%	6.0/3.5
Number of New Patients (N)	28/20	4.0/3.2	33/21	4.0/3.4
Adverse Medical Reaction Rate (%)	4.0%/6.0%	3.0/2.7	4.0%/6.0%	3.0/2.0
Complaint Rate (%) (H2a)	17.0%/21%	1.5/0.0	14.0%/19.0%	2.2/0.4
Internal Process		35/31.8		35/27.2
Time of Physician Consultation (Minutes) (H2e)	18/11	8.0/4.8	22/8	8.0/1.6
Rate of Completing the Deal (%)	63.0%/51.0%	10.0/10.0	73.0%/59.0%	10.0/10.0
Time to Get an Appointment (Days) (H2g)	1.8/2.1	5.0/5.0	1.7/1.8	5.0/5.0
Waiting Time (Minutes) (H2f)	27/35	5.0/5.0	25/28	5.0/5.0

Dispute Rate (%)	6.0%/11.0%	7.0/7.0	7.0%/12.0%	7.0/5.6
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Learning and Growth		12/3.8		15/8.9
Access to Training (%) (H1e)	100.0%/0.0%	2.0/0.0	100.0%/0.0%	2.0/0.0
Number of Training Courses Completed (N)	1/0	2.0/0.0	3/0	2.0/0.0
Employee Satisfaction Rate (%) (H1f)	86.0%/77.0%	6.0/3.8	85.0%/79.0%	6.0/3.9
Staff Turnover (%) (H1d)	25.0%/33.0%	0.0/0.0	5.0%/8.0%	3.0/3.0
Number of Book/ Journal Reports	1/0	2.0/0.0	1/1	2.0/2.0
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Table 4.2.3 BSC scores of the clinics as a unit between the two groups on February and March 2015 (all hypotheses applicable)

Measures	February 2015		March 2015	
	Data	BSC Score	Data	BSC Score
total (Test/ Control)		92.3/62.4		88.5/55.7
Financial		11.2/3.2		12.4/3.6
GMP (%) (H1a)	45.8%/24.6%	6.5/1.2	47.3%/25.7%	6.8
ROI (%) (H1c)	2.5%/1.4%	3.6/2.0	3.2%/1.5%	4.0
Purchase Amount per Patient per Visit (NTD) (H1b)	9,566/4,539	1.1/0.0	11,667/4,778	1.6
Customer		32.1/19.9		31/19.7
Patient Repeat Rate (%) (H2b)	37.0%/15.0%	5.6/2.3	43.0%/22.0%	5.2/2.6
Customer Satisfaction Rate (%) (H2d)	95.0%/89%	12.0/7.2	96.0%/88.0%	12.0/6.4
Patient Referral Rate (%) (H2c)	18.0%/10.0%	6.0/3.8	17.0%/13.0%	5.1/3.9
Number of New Patients (N)	38/28	4.0/4.0	41/26	4.0/4.0
Adverse Medical Reaction Rate (%)	4.0%/4.0%	2.4/2.4	3.0%/5.0%	2.3/1.7
Complaint Rate (%) (H2a)	13.0%/19.0%	2.2/0.3	11.0%/16.0%	2.4/1.1
Internal Process		34.7/28.4		31.3/23.9
Time of Physician Consultation (Minutes) (H2e)	25/10	8.0/2.0	23/10	5.8/1.6
Rate of Completing the Deal (%)	71.0%/63%	10.0/10.0	69.0%/57%	9.8/6.8
Time to Get an Appointment (Days) (H2g)	1.7/2.3	5.0/4.7	2.3/2.1	4.7/4.9
Waiting Time (Minutes) (H2f)	21/25	5.0/5.0	18/20	5.0/5.0

Dispute Rate (%)	8.0%/8.0%	6.7/6.7	7.0%/8.0%	6.1/5.6
Learning and Growth		14.3/10.9		13.8/8.6
Access to Training (%) (H1e)	100.0%/100.0%	2.0/2.0	100.0%/0.0%	2.0/0/0
Number of Training Courses Completed (N)	2/1	2.0/2.0	1/0	2.0/0.0
Employee Satisfaction Rate (%) (H1f)	85.0%/81.0%	5.3/3.9	86.0%/82%	4.8/3.6
Staff Turnover (%) (H1d)	4.0%/7.0%	3.0/3.0	4.0%/7.0%	3.0/3.0
Number of Book/ Journal Reports	1/0	2.0/0.0	1/1	2.0/2.0

Among physicians, the BSC score of the test group increases from October 2014 to January 2015, from 78.6 to 93.0, but drops to 84.5 on March 2015. The difference of BSC scores between the two groups range from 16.8 on November 2014 to 32.5 on January 2015. Score of the Customer and Learning and Growth Perspectives have the largest difference between the two groups (Table 4.2.4, 4.2.5, 4.2.6).

Table 4.2.4 BSC scores of physicians between the two groups on October and November 2014 (all hypotheses applicable)

Measures	October 2014		November 2014	
	Data	BSC Score	Data	BSC Score
Total (Test/ Control)		78.6/56.7		82.6/65.8
Financial		0.2/0.0		0.8/0.3
Purchase Amount per Patient per Visit (NTD) (H1b)	5,750/3,527	0.2/0.0	7,850/6,308	0.8/0.3
Customer		21.9/17.9		32.2/20.5
Patient Repeat Rate (%) (H2b)	0.0%/0.0%	0.0/0.0	7.0%/3.0%	4.7/2.0
Customer Satisfaction Rate (%) (H2d)	88.0%/84.0%	7.2 /3.6	90.0%/85.0%	9.0/4.5
Patient Referral Rate (%) (H2c)	10.0%/5.0%	6.8/6.8	14.0%/8.0%	6.8/6.8
Number of New Patients (N)	25/23	4.5/4.2	35/32	4.5/4.5
Adverse Medical Reaction Rate (%)	2.4%/2.2%	3.4/3.4	2.2%/2.3%	3.0/2.6
Complaint Rate (%) (H2a)	4.0%/6.3%	0.0/0.0	3.1%/5.4%	4.1/0.0
Internal Process		39.5/34.1		39.5/37.7
Time of Physician Consultation (Minutes) (H2e)	10/7	9.0/3.6	18/9	9.0/7.2
Rate of Completing the Deal (%)	57.0%/55.0%	11.3/11.3	65.0%/57.0%	11.3/11.3
Time to Get an Appointment (Days) (H2g)	2.2/2.5	5.6/5.6	2.1/1.7	5.6/5.6
Waiting Time (Minutes) (H2f)	35/45	5.6/5.6	33/40	5.6/5.6
Dispute Rate (%)	3.1%/3.5%	7.9/7.9	1.9%/2.9%	7.9/7.9

Learning and Growth		16.9/4.6		10.2/7.2
Access to Training (%) (H1e)	100.0%/0.0%	2.3/0.0	0.0%/0.0%	0.0/0.0
Number of Training Courses Completed (N)	1/0	2.3/0.0	0/0	0.0/0.0
Employee Satisfaction Rate (%) (H1f)	78.5%/70.9%	6.8/1.2	86.1%/74.5%	6.8/3.8
Staff Turnover (%) (H1d)	0.0%/0.0%	3.4/3.4	0.0%/0.0%	3.4/3.4
Number of Book/ Journal Reports	1/0	2.3/0.0	0/0	0.0/0.0

Table 4.2.5 BSC scores of physicians between the two groups on December 2014 and January 2015 (all hypotheses applicable)

Measures	December 2014		January 2015	
	Data	BSC Score	Data	BSC Score
Total (Test/ Control)		88.0/56.1		93.0/60.5
Financial		0.6/0.0		0.9/0.0
Purchase Amount per Patient per Visit (NTD) (H1b)	7,133/3,892	0.6/0.0	8,345/4,125	0.9/0.0
Customer		34.4/15.3		35.6/20.7
Patient Repeat Rate (%) (H2b)	15.0%/8.0%	5.1/2.7	25.0%/12.0%	5.6/2.7
Customer Satisfaction Rate (%) (H2d)	93.0%/83.0%	11.8/2.7	93.0%/87.0%	11.8/6.3
Patient Referral Rate (%) (H2c)	14.0%/5.0%	6.8/4.2	16.0%/7.0%	6.8/4.0
Number of New Patients (N)	28/20	4.5/3.6	33/21	4.5/3.8
Adverse Medical Reaction Rate (%)	1.0%/2.4%	3.4/1.5	1.1%/1.7%	3.4/2.4
Complaint Rate (%) (H2a)	3.0%/3.8%	2.8/0.6	2.3%/3.3%	3.5/1.4
Internal Process		39.5/35.9		39.5/29.9
Time of Physician Consultation (Minutes) (H2e)	18/11	9.0/5.4	22/8	9.0/1.8
Rate of Completing the Deal (%)	63.0%/51.0%	11.3/11.3	73.0%/59.0%	11.3/11.3
Time to Get an Appointment (Days) (H2g)	1.8/2.1	5.6/5.6	1.7/1.8	5.6/5.6
Waiting Time (Minutes) (H2f)	27/35	5.6/5.6	25/28	5.6/5.6
Dispute Rate (%)	1.1%/2.1%	7.9/7.9	1.5%/2.6%	7.9/5.5
Learning and Growth		13.6/4.8		16.9/9.9

Access to Training (%) (H1e)	100.0%/0.0%	2.3/0.0	100.0%/0.0%	2.3/0.0
Number of Training Courses Completed (N)	1/0	2.3/0.0	3/0	2.3/0.0
Employee Satisfaction Rate (%) (H1f)	87.3%/77.8%	6.8/4.8	84.4%/78.8%	6.8/4.3
Staff Turnover (%) (H1d)	25.0%/33.0%	0.0/0.0	5.0%/8.0%	3.4/3.4
Number of Book/ Journal Reports	1/0	2.3/0.0	1/1	2.3/2.3

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Table 4.2.6 BSC scores of physicians between the two group on February and March 2015 (all hypotheses applicable)

Measures	February 2015		March 2015	
	Data	BSC	Data	BSC
		Score		Score
Total (Test/ Control)		92.2/68.7		84.5/57.7
Financial		1.2/0.0		1.8/0.0
Purchase Amount per Patient per Visit (NTD) (H1b)	9,566/4,539	1.2/0.0	11,667/4,778	1.8/0.0
Customer		35.8/23.0		34.6/21.8
Patient Repeat Rate (%) (H2b)	37.0%/15.0%	6.3/2.5	43.0%/22.0%	5.8/3.0
Customer Satisfaction Rate (%) (H2d)	95.0%/89.0%	13.6/8.1	96.0%/88.0%	13.6/7.2
Patient Referral Rate (%) (H2c)	18.0%/10.0%	6.8/4.2	17.0%/13.0%	5.8/4.4
Number of New Patients (N)	38/28	4.5/4.5	41/26	4.5/4.5
Adverse Medical Reaction Rate (%)	1.3%/0.5%	2.6/3.4	1.0%/0.9%	2.5/2.6
Complaint Rate (%) (H2a)	2.8%/3.9%	2.1/0.2	2.4%/4.4%	2.4/0.0
Internal Process		39.2/31.5		34.3/26.4
Time of Physician Consultation (Minutes) (H2e)	25/10	9.0/2.3	23/10	6.5/1.8
Rate of Completing the Deal (%)	71.0%/63.0%	11.3/11.3	69.0%/57.0%	11.0/7.6
Time to Get an Appointment (Days) (H2g)	1.7/2.3	5.6/5.3	2.3/2.1	5.3/5.5
Waiting Time (Minutes) (H2f)	21/25	5.6/5.6	18/20	5.6/5.6
Dispute Rate (%)	1.6%/1.8%	7.6/7.0	1.8%/1.8%	5.8/5.8

Learning and Growth		16.0/14.3		13.9/9.5	
Access to Training (%) (H1e)	100.0%/100.0%	2.3/2.3	100.0%/0.0%	2.3/0.0	
Number of Training Courses Completed (N)	2/1	2.3/2.3	1/0	2.3/0.0	
Employee Satisfaction Rate (%) (H1f)	84.6%/85.9%	5.8/6.3	81.0%/81.3%	3.7/3.8	
Staff Turnover (%) (H1d)	4.0%/7.0%	3.4/3.4	4.0%/7.0%	3.4/3.4	
Number of Book/ Journal Reports	1/0	2.3/0.0	1/1	2.3/2.3	

For the nurses of the clinic in the test group, the BSC score increases from October 2014 to February 2015, from 80.7 to 96.3, but drops on March 2015 to 88.8. The difference of BSC scores between the two groups range from 26.4 on October 2014 to 51.0 on December 2014. Scores of the Customer and Learning and Growth Perspectives have the largest difference between the two groups (Table 4.2.7, 4.2.8, 4.2.9).

Table 4.2.7 BSC scores of nurses between the two groups on October and

November 2014 (all hypotheses applicable)

Measures	October 2014		November 2014	
	Data	BSC Score	Data	BSC Score
Total (Test/ Control)		80.7/54.3		83.7/52.8
Customer		39.0/26.4		48.7/29.4
Patient Repeat Rate (%) (H2b)	0.0%/0.0%	0.0/0.0	7.0%/3.0%	7.0/3.0
Customer Satisfaction Rate (%) (H2d)	88.0%/84.0%	10.7/5.3	90.0%/85.0%	13.3/6.7
Patient Referral Rate (%) (H2c)	10.0%/5.0%	10.0/10.0	14.0%/8.0%	10.0/10.0
Number of New Patients (N)	25/23	6.7/6.1	35/32	6.7/6.7
Adverse Medical Reaction Rate (%)	4.6%/5.8%	5.0/5.0	3.8%/5.7%	5.0/3.1
Complaint Rate (%) (H2a)	0.8%/1.3%	6.7/0.0	0.7%/1.4%	6.7/0.0
Internal Process		20.0/20.0		20.0/8.3
Waiting Time (Minutes) (H2f)	35/45	8.3/8.3	33/40	8.3/8.3
Dispute Rate (%)	0.5%/1.0%	11.7/11.7	0.6%/2.2%	11.7/0.0
Learning and Growth		21.7/20.0		15.0/15.0
Access to Training (%) (H1e)	100.0%/0.0%	3.3/0.0	0.0%/0.0%	0.0/0.0
Number of Training Courses Completed (N)	1/0	3.3/0.0	0/0	0.0/0.0
Employee Satisfaction Rate (%) (H1f)	79.3%/71.4%	10.0/2.8	85.8%/79.1%	10.0/10.0
Staff Turnover (%) (H1d)	0.0%/0.0%	5.0/5.0	0.0%/0.0%	5.0/5.0

Table 4.2.8 BSC scores of nurses between the two groups on December 2014 and January 2015 (all hypotheses applicable)

Measures	December 2014		January 2015	
	Data	BSC Score	Data	BSC Score
Total (Test/ Control)		89.8/38.8		92.1/56.5
Customer		53.2/24.6		52.1/27.9
Patient Repeat Rate (%) (H2b)	15.0%/8.0%	7.5/4.0	25.0%/12.0%	8.3/4.0
Customer Satisfaction Rate (%) (H2d)	93.0%/83.0%	17.3/4.0	93.0%/87.0%	17.3/9.3
Patient Referral Rate (%) (H2c)	14.0%/5.0%	10.0/6.3	16.0%/7.0%	10.0/5.8
Number of New Patients (N)	28/20	6.7/5.3	33/21	6.7/5.6
Adverse Medical Reaction Rate (%)	3.0%/3.6%	5.0/5.0	2.9%/4.3%	4.9/3.2
Complaint Rate (%) (H2a)	0.5%/2.2%	6.7/0.0	0.6%/2.3%	4.8/0.0
Internal Process		8.3/8.0		18.3/16.7
Waiting Time (Minutes) (H2f)	27/35	8.3/8.0	25/28	8.3/8.3
Dispute Rate (%)	0.3%/1.7%	11.7/0.0	0.8%/0.9%	10.0/8.3
Learning and Growth		16.7/5.9		21.7/11.9
Access to Training (%) (H1e)	100.0%/0.0%	3.3/0.0	100.0%/0.0%	3.3/0.0
Number of Training Courses Completed (N)	1/0	3.3/0.0	3/0	3.3/0.0
Employee Satisfaction Rate (%) (H1f)	86.1%/76.5%	10.0/5.9	85.1%/79.6%	10.0/6.9
Staff Turnover (%) (H1d)	25.0%/33.0%	0.0/0.0	5.0%/8.0%	5.0/5.0

Table 4.2.9 BSC scores of nurses between the two group on February and March 2015 (all hypotheses applicable)

Measures	February 2015		March 2015	
	Data	BSC	Data	BSC
		Score		Score
Total (Test/ Control)		96.3/65.4		88.8/60.0
Customer		55.1/32.0		47.7/31.4
Patient Repeat Rate (%) (H2b)	37.0%/15.0%	9.3/3.8	43.0%/22.0%	8.6/4.4
Customer Satisfaction Rate (%) (H2d)	95.0%/89.0%	20.0/12.0	96.0%/88.0%	20.0/10.7
Patient Referral Rate (%) (H2c)	18.0%/10.0%	10.0/6.3	17.0%/13.0%	8.5/6.5
Number of New Patients (N)	38/28	6.7/6.7	41/26	6.7/6.7
Adverse Medical Reaction Rate (%)	2.7%/3.5%	4.1/3.3	2.0%/4.1%	4.0/2.3
Complaint Rate (%) (H2a)	0.5%/2.4%	5.1/0.0	1.2%/0.9%	0.0/0.9
Internal Process		20.0/16.3		19.4/17.2
Waiting Time (Minutes) (H2f)	21/25	8.3/8.3	18/20	8.3/8.3
Dispute Rate (%)	0.2%/0.8%	11.7/8.0	0.4%/0.6%	11.1/8.9
Learning and Growth		21.1/17.1		21.7/11.4
Access to Training (%) (H1e)	100.0%/100.0%	3.3/3.3	100.0%/0.0%	3.3/0.0
Number of Training Courses Completed (N)	2/1	3.3/3.3	1/0	3.3/0.0
Employee Satisfaction Rate (%) (H1f)	86.1%/79.2%	9.5/5.4	90.3%/82.8%	10.0/6.4
Staff Turnover (%) (H1d)	4.0%/7.0%	5.0/5.0	4.0%/7.0%	5.0/5.0

For the cosmetologists in the test group, the BSC score increases from October 2014 to March 2015, from 77.1 to 93.0. The difference of BSC scores between the two groups range from 10.7 on October 2014 to 33.9 on March 2015. Scores of Customer Perspective has the largest difference between the two groups (Table 4.2.10, 4.2.11, 4.2.12).

Table 4.2.10 BSC scores of cosmetologists between the two groups on October and November 2014 (all hypotheses applicable)

Measures	October 2014		November 2014	
	Data	BSC Score	Data	BSC Score
Total (Test/ Control)		77.1/64.4		85.6/66.8
Customer		18.2/13.5		32.6/17.4
Patient Repeat Rate (%) (H2b)	0.0%/0.0%	0.0/0.0	7.0%/3.0%	6.2/2.6
Customer Satisfaction Rate (%) (H2d)	88.0%/84.0%	9.4/4.7	90.0%/85%	11.8/5.9
Patient Referral Rate (%) (H2c)	10.0%/5.0%	8.8/8.8	14.0%/8.0%	8.8/8.8
Complaint Rate (%) (H2a)	4.1%/5.0%	0.0/0.0	2.5%/5.4%	5.9/0.0
Internal Process		39.7/39.7		39.7/39.7
Rate of Completing the Deal (%)	57.0%/55.0%	14.7/14.7	65.0%/57.0%	14.7/14.7
Time to Get an Appointment (Days) (H2g)	2.2/2.5	7.4/7.4	2.1/1.7	7.4/7.4
Waiting Time (Minutes) (H2f)	35/45	7.4/7.4	33/40	7.4/7.4
Dispute Rate (%)	1.3%/3.4%	10.3/10.3	2.0%/2.8%	10.3/10.3
Learning and Growth		19.1/11.1		13.2/9.7
Access to Training (%) (H1e)	100.0%/0.0%	2.9/0.0	0.0%/0.0%	0.0/0.0
Number of Training Courses Completed (N)	1/0	2.9/0.0	0/0	0.0/0.0
Employee Satisfaction Rate (%) (H1f)	80.1%/73.8%	8.8/6.7	88.9%/74.8%	8.8/5.3
Staff Turnover (%) (H1d)	0.0%/0.0%	4.4/4.4	0.0%/0.0%	4.4/4.4

Table 4.2.11 BSC scores of cosmetologists between the two groups on December, 2014 and January, 2015 (all hypotheses applicable)

Measures	December 2014		January 2015	
	Data	BSC Score	Data	BSC Score
Total (Test/ Control)		85.1/58.8		92.4/63.1
Customer		30.7/12.6		33.6/19.3
Patient Repeat Rate (%) (H2b)	15.0%/8.0%	6.6/3.5	25.0%/12.0%	7.4/3.5
Customer Satisfaction Rate (%) (H2d)	93.0%/83.0%	15.3/3.5	93.0%/87.0%	15.3/8.2
Patient Referral Rate (%) (H2c)	14.0%/5.0%	8.8/5.5	16.0%/7.0%	8.8/5.1
Complaint Rate (%) (H2a)	4.0%/4.0%	0.0/0.0	3.2%/3.1%	2.1/2.4
Internal Process		39.7/39.7		39.7/34.0
Rate of Completing the Deal (%)	63.0%/51.0%	14.7/14.7	73.0%/59.0%	14.7/14.7
Time to Get an Appointment (Days) (H2g)	1.8/2.1	7.4/7.4	1.7/1.8	7.4/7.4
Waiting Time (Minutes) (H2f)	27/35	7.4/7.4	25/28	7.4/7.4
Dispute Rate (%)	1.5%/2.1%	10.3/10.3	1.2%/3.1%	10.3/4.6
Learning and Growth		14.7/6.5		19.1/9.8
Access to Training (%) (H1e)	100.0%/0.0%	2.9/0.0	100.0%/0.0%	2.9/0.0
Number of Training Courses Completed (N)	1/0	2.9/0.0	3/0	2.9/0.0
Employee Satisfaction Rate (%) (H1f)	87.7%/78.1%	8.8/6.5	86.2%/78.5%	8.8/5.4
Staff Turnover (%) (H1d)	25.0%/33.0%	0.0/0.0	5.0%/8.0%	4.4/4.4

Table 4.2.12 BSC scores of cosmetologists between the two groups on February and March 2015 (all hypotheses applicable)

Measures	February 2014		March 2015	
	Data	BSC Score	Data	BSC Score
Total (Test/ Control)		91.0/76.1		93.0/59.1
Customer		36.7/20.1		37.0/21.0
Patient Repeat Rate (%) (H2b)	37.0%/15.0%	8.2/3.3	43.0%/22.0%	7.6/3.9
Customer Satisfaction Rate (%) (H2d)	95.0%/89.0%	17.6/10.6	96.0%/88.0%	17.6/9.4
Patient Referral Rate (%) (H2c)	18.0%/10.0%	8.8/5.5	17.0%/13.0%	7.5/5.7
Complaint Rate (%) (H2a)	3.1%/3.7%	2.0/0.7	1.8%/3.0%	4.3/2.0
Internal Process		35.6/39.3		37.2/27.6
Rate of Completing the Deal (%)	71.0%/63.0%	14.7/14.7	69.0%/57.0%	14.3/9.9
Time to Get an Appointment (Days) (H2g)	1.7/2.3	7.4/6.9	2.3/2.1	6.9/7.2
Waiting Time (Minutes) (H2f)	21/25	7.4/7.4	18/20	7.4/7.4
Dispute Rate (%)	2.5%/1.2%	6.2/10.3	1.5%/3.1%	8.6/3.1
Learning and Growth		18.8/16.8		18.7/10.5
Access to Training (%) (H1e)	100.0%/100.0%	2.9/2.9	100.0%/0.0%	2.9/0.0
Number of Training Courses Completed (N)	2/1	2.9/2.9	1/0	2.9/0.0
Employee Satisfaction Rate (%) (H1f)	86.3%/82.5%	8.5/6.5	89.1%/83.9%	8.4/6.1
Staff Turnover (%) (H1d)	4.0%/7.0%	4.4/4.4	4.0%/7.0%	4.4/4.4

For the advisors in the test group, the BSC score increases from October 2014 to February 2015, from 77.2 to 93.3, but drops on March, 2015 to 87.5. The difference of BSC scores between the two groups range from 21.1 on November 2014 to 33.4 on January 2015. Scores of the Financial and Learning and Growth Perspectives have the largest differences between the two groups (Table 4.1.13, 4.1.14, 4.1.15).

Table 4.2.13 BSC scores of advisors between the two groups on October and

November 2014 (all hypotheses applicable)

Measures	October 2014		November 2014	
	Data	BSC Score	Data	BSC Score
Total (Test/ Control)		77.2/54.6		76.8/55.7
Financial		0.3/0.0		1.0/0.5
Purchase Amount per Patient per Visit (NTD) (H1b)	5750/3,527	0.3/0.0	7850/6,308	1.0/0.5
Customer		31.1/19.7		36.1/24.1
Patient Repeat Rate (%)	0.0%/0.0%	0.0/0.0	7.0%/3.0%	6.4/2.7
Customer Satisfaction Rate (%)	88.0%/84.0%	9.8/4.9	90.0%/85.0%	12.2/6.1
Patient Referral Rate (%)	10.0%/5.0%	9.2/9.2	14.0%/8.0%	9.2/9.2
Increase Numbers of New Patient (N)	25/23	6.1/5.6	35/32	6.1/6.1
Complaint Rate (%)	8.3%/13.9%	6.1/0.0	9.1%/12.2%	2.2/0.0
Internal Process		26.0/26.0		26.0/26.0
Rate of Completing the Deal (%)	57.0%/55.0%	15.3/15.3	65.0%/57.0%	15.3/15.3
Dispute Rate (%)	4.8%/8.2%	10.7/10.7	4.7%/6.1%	10.7/10.7
Learning and Growth		19.8/9.0		13.7/5.2
Access to Training (%)	100.0%/0.0%	3.1/0.0	0.0%/0.0%	0.0/0.0
Number of Training Courses Completed (N)	1/0	3.1/0.0	0/0	0.0/0.0
Employee Satisfaction Rate (%)	80.4%/72.4%	9.2/4.4	90.1%/70.5%	9.2/0.6
Staff Turnover (%)	0.0%/0.0%	4.6/4.6	0.0%/0.0%	4.6/4.6

Table 4.2.14 BSC scores of advisors between the two group on December 2014 and January 2015 (all hypotheses applicable)

Measures	December 2014		January 2015	
	Data	BSC Score	Data	BSC Score
Total (Test/ Control)		82.4/50.6		89.1/55.7
Financial		0.8/0.0		1.2/0.0
Purchase Amount per Patient per Visit (NTD)	7,133/3,892	0.8/0.0	8,345/4,125	1.2/0.0
Customer		40.5/18.7		42.1/23.6
Patient Repeat Rate (%) (H2b)	15.0%/8.0%	6.9/3.7	25.0%/12.0%	7.6/3.7
Customer Satisfaction Rate (%) (H2d)	93.0%/83.0%	15.9/3.7	93.0%/87.0%	15.9/8.5
Patient Referral Rate (%) (H2c)	14.0%/5.0%	9.2/5.7	16.0%/7.0%	9.2/5.3
Number of New Patients (N)	28/20	6.1/4.9	33/21	6.1/5.1
Complaint Rate (%) (H2a)	8.4%/9.5%	2.4/0.8	7.0%/9.2%	3.3/0.9
Internal Process		26.0/26.0		26.0/25.7
Rate of Completing the Deal (%)	63.0%/51.0%	15.3/15.3	73.0%/59.0%	15.3/15.3
Dispute Rate (%)	3.0%/4.0%	10.7/10.7	3.0%/5.1%	10.7/10.7
Learning and Growth		15.3/5.9		19.8/9.6
Access to Training (%) (H1e)	100.0%/0.0%	3.1/0.0	100.0%/0.0%	3.1/0.0
Number of Training Courses Completed (N)	1/0	3.1/0.0	3/0	3.1/0.0
Employee Satisfaction Rate (%) (H1f)	84.4%/77.1%	9.2/5.9	84.5%/77.7%	9.2/5.0
Staff Turnover (%) (H1d)	25.0%/33.0%	4.6/0.0	5.0%/8.0%	4.6/4.6

Table 4.2.15 BSC scores of advisors between the two groups on February and March 2015 (all hypotheses applicable)

Measures	February 2015		March 2015	
	Data	BSC	Data	BSC
		Score		Score
Total (Test/ Control)		93.3/65.3		87.5/58.5
Financial		1.6/0.0		2.4/0.0
Purchase Amount per Patient per Visit (NTD)	9,566/4,539	1.6/0.0	11,667/4,778	2.4/0.0
Customer		46.6/28.6		44.6/28.5
Patient Repeat Rate (%) (H2b)	37.0%/15%	8.5/3.4	43.0%/22.0%	7.9/1.0
Customer Satisfaction Rate (%) (H2d)	95.0%/89.0%	18.3/11.0	96.0%/88.0%	18.3/9.8
Patient Referral Rate (%) (H2c)	18.0%/10.0%	9.2/5.7	17.0%/13.0%	7.8/6.0
Number of New Patients (N)	38/28	6.1/6.1	41/26	6.1/6.1
Complaint Rate (%) (H2a)	5.2%/7.5%	4.5/2.3	4.5%/6.8%	4.5/2.6
Internal Process		26.0/26.0		25.3/21.0
Rate of Completing the Deal (%)	71.0%/63.0%	15.3/15.3	69.0%/57.0%	14.9/10.3
Dispute Rate (%)	3.0%/3.3%	10.7/10.7	2.7%/2.3%	10.4/10.7
Learning and Growth		18.2/10.7		15.2/9.1
Access to Training (%) (H1e)	100.0%/100.0%	3.1/3.1	100.0%/0.0%	3.1/0.0
Number of Training Courses Completed (N)	2/1	3.1/3.1	1/0	3.1/0.0
Employee Satisfaction Rate (%) (H1f)	83.9%/70.1%	7.5/0.1	79.9%/79.8%	4.5/4.5
Staff Turnover (%) (H1d)	4.0%/3.3%	4.6/4.6	4.0%/7.0%	4.6/4.6

For the administration staff, the difference of BSC scores between the two groups range from 11.7 on March 2015 to 38.7 on December 2014. Scores of Financial and Learning and Growth Perspectives have the largest differences between the two groups (Table 4.1.16, 4.1.17, 4.1.18).

Table 4.2.16 BSC scores of the administration staff between the two groups on

October and November 2014 (all hypotheses applicable)

Measures	October 2014		November 2014	
	Data	BSC Score	Data	BSC Score
Total (Test/ Control)		61.1/23.9		42.5/21.2
Financial		5.9/5.3		8.2/1.3
GMP (%) (H1a)	21.9%/18.7%	0.9/0.0	35.4%/22.7%	7.3/1.3
ROI (%) (H1c)	1.8%/1.9%	5.0/5.3	0.3%/-3.2%	0.8/0.0
Customer		7.6/0.0		7.6/0.0
Complaint Rate (%) (H2a)	0.8%/1.5%	7.6/0.0	0.6%/1.6%	7.6/0.0
Internal Process		22.9/9.5		9.5/9.5
Time to Get an Appointment (Days) (H2g)	2.2/2.5	9.5/9.5	2.1/1.7	9.5/9.5
Dispute Rate (%)	0.3%/0.9%	13.3/0.0	0.8%/1.0%	0.0/0.0
Learning and Growth		24.8/9.1		17.1/10.4
Access to Training (%) (H1e)	100.0%/0.0%	3.8/0.0	0.0%/0.0%	0.0/0.0
Number of Training Courses Completed (N)	1/0	3.8/0.0	0/0	0.0/0.0
Employee Satisfaction Rate (%) (H1f)	78.9%/71.5%	11.4/3.4	87.3%/73.3%	11.4/4.7
Staff Turnover (%) (H1d)	0.0%/0.0%	5.7/5.7	0.0%/0.0%	5.7/5.7

Table 4.2.17 BSC scores of the administration staff between the two groups on

December 2014 and January 2015 (all hypotheses applicable)

Measures	December 2014		January 2015	
	Data	BSC Score	Data	BSC Score
Total (Test/Control)		54.8/16.1		58.0/42.1
Financial		12.9/0.0		17.9/5.3
GMP (%) (H1a)	40.1%/18.1%	9.6/0.0	45.3%/23.5%	12.0/1.7
ROI (%) (H1c)	1.2%/-0.7%	3.3/0.0	2.1%/1.3%	5.8/3.6
Customer		0.0/0.0		1.4/0.0
Complaint Rate (%) (H2a)	1.1%/1.5%	0.0/0.0	0.9%/1.1%	1.4/0.0
Internal Process		22.9/9.5		14.0/22.9
Time to Get an Appointment (Days) (H2g)	1.8/2.1	9.5/9.5	1.7/1.8	9.5/9.5
Dispute Rate (%)	0.1%/1.1%	13.3/0.0	0.5%/0.3%	4.4/13.3
Learning and Growth		19.0/6.5		24.8/14.0
Access to Training (%) (H1e)	100.0%/0.0%	3.8/0.0	100.0%/0.0%	3.8/0.0
Number of Training Courses Completed (N)	1/0	3.8/0.0	3/0	3.8/0.0
Employee Satisfaction Rate (%) (H1f)	85.9%/76.3%	11.4/6.5	88.0%/80.1%	11.4/8.2
Staff Turnover (%) (H1d)	25.0%/33.0%	0.0/0.0	5.0%/8.0%	5.7/5.7

Table 4.2.18 BSC scores of the administration staff between the two groups on

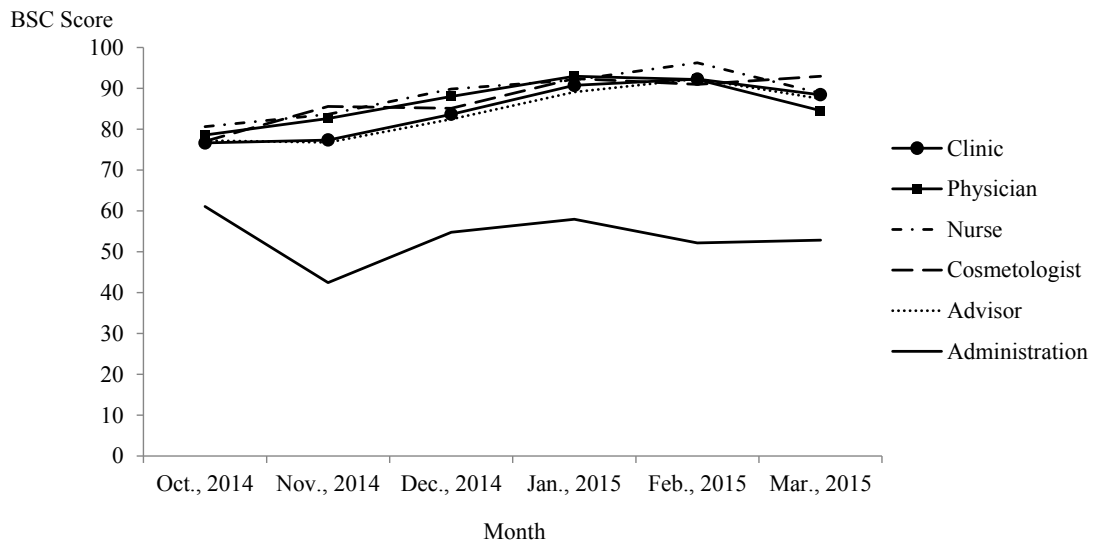
February and March 2015 (all hypotheses applicable)

Measures	February 2015		March 2015	
	Data	BSC Score	Data	BSC Score
Total (Test/Control)		52.2/36.5		52.8/41.1
Financial		19.2/6.1		20.6/6.9
GMP (%) (H1a)	45.8%/24.6%	12.3/2.2	47.3%/25.7%	13.0/2.7
ROI (%) (H1c)	2.5%/1.4%	6.9/3.9	3.2%/1.5%	7.6/4.2
Customer		0.0/0.0		0.0/1.0
Complaint Rate (%) (H2a)	1.4%/1.5%	0.0/0.0	1.1%/0.9%	0.0/1.0
Internal Process		9.5/9.0		9.0/21.2
Time to Get an Appointment (Days) (H2g)	1.7/2.3	9.5/9.0	2.3/2.1	9.0/9.3
Dispute Rate (%)	0.7%/0.9%	0.0/0.0	0.6%/0.2%	0.0/11.9
Learning and Growth		23.4/21.5		23.3/12.1
Access to Training (%) (H1e)	100.0%/100.0%	3.8/3.8	100.0%/0.0%	3.8/0.0
Number of Training Courses Completed (N)	2/1	3.8/3.8	1/0	3.8/0.0
Employee Satisfaction Rate (%) (H1f)	85.0%/82.1%	10.1/8.1	87.4%/81.1%	9.9/6.3
Staff Turnover (%) (H1d)	4.0%/7.0%	5.7/5.7	4.0%/7.0%	5.7/5.7

4.3. BSC Scores between the Two Groups

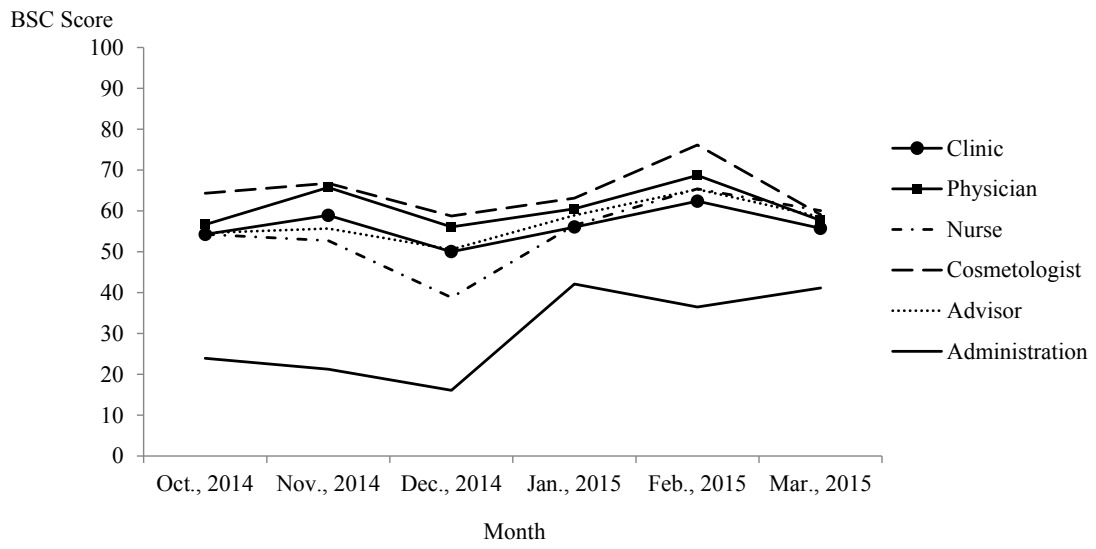
Except for the administration staff, in the test group, the BSC scores of the clinic, physicians, etc. are of increasing trend, even if it drops slightly on March 2015. The administration staff has not only the lowest score among the six departments, we also noticed that its score was unable to improve after implementing the strategies. The scores of the other five departments have been gauged closely, especially for the clinic and advisors, and we were able to see that their scores are nearly the same and have similar trending patterns (Figure 4.3.1).

Figure 4.3.1 BSC scores in the test group by departments



Compared with the test group, scores among the control group are lower on average. The scores of the administration staff is not only the lowest among all six departments, it also maintains consistently low from Dec. 2014 to Feb. 2015 (Figure 4.3.2).

Figure 4.3.2 BSC scores in the control group by departments



To compare all six departments between the two groups, we added two linear trends assuming that the scores would change with time. Scores of all six departments in the test group are higher than those of the control group. Between the two groups, the average difference is between 20 and 30. However, the largest difference can be found on the nurses on Dec. 2014 which is 51. The most prominent slope can be seen on the clinic with R^2 of 0.77, the cosmetologists and the advisors, with R^2 of 0.82 and 0.75 respectively.

The slope of the physicians' curve in the test group is the smallest compared with other departments in the test group. Besides, in the control group, scores are barely changing with time. Furthermore, the administration staff cannot be analyzed if a trending pattern is to be pointed out. We also could not analyze all six departments in the control group with a clear trending pattern (Figure 4.3.3-4.3.8).

Figure 4.3.3 BSC scores of the clinics between the two groups

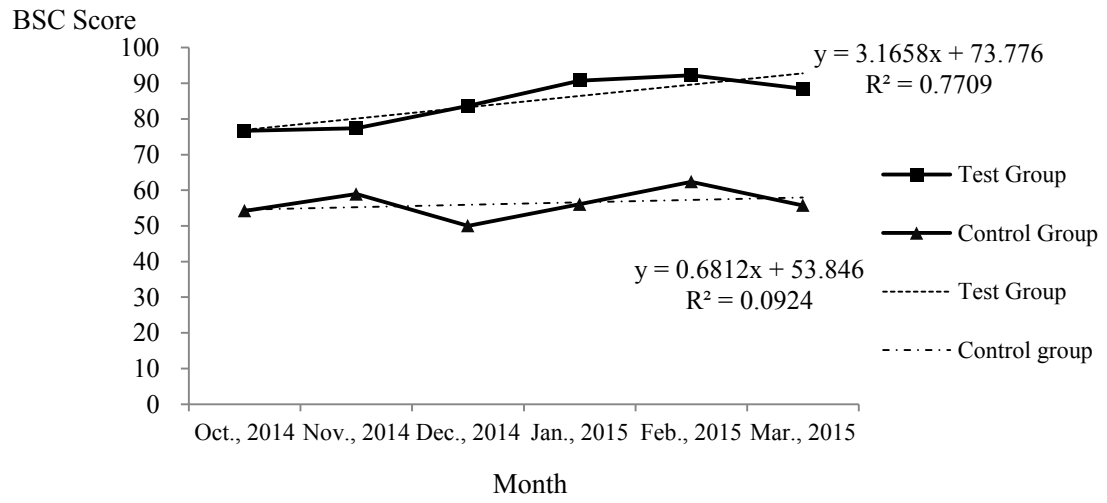


Figure 4.3.4 BSC scores of the physicians between the two groups

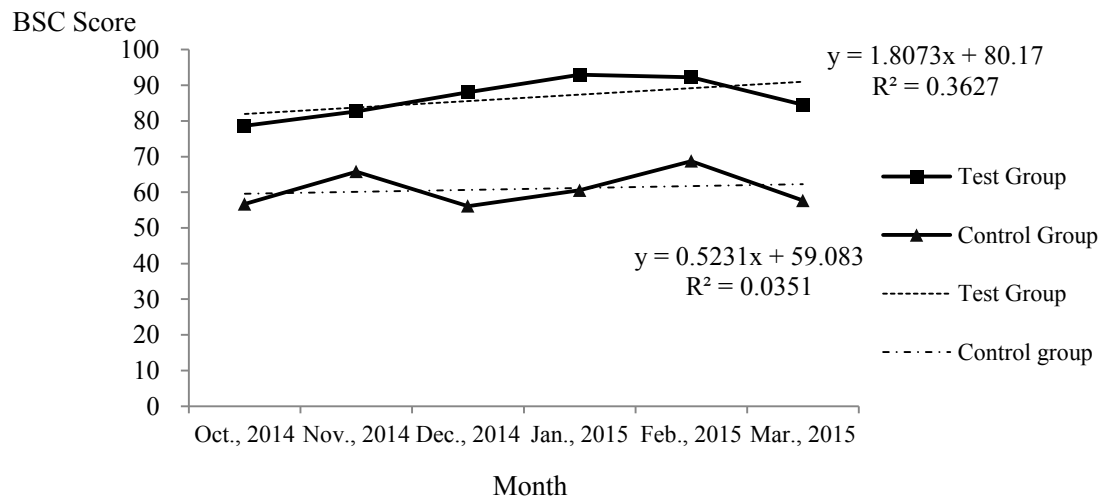


Figure 4.3.5 BSC scores of the nurses between the two groups

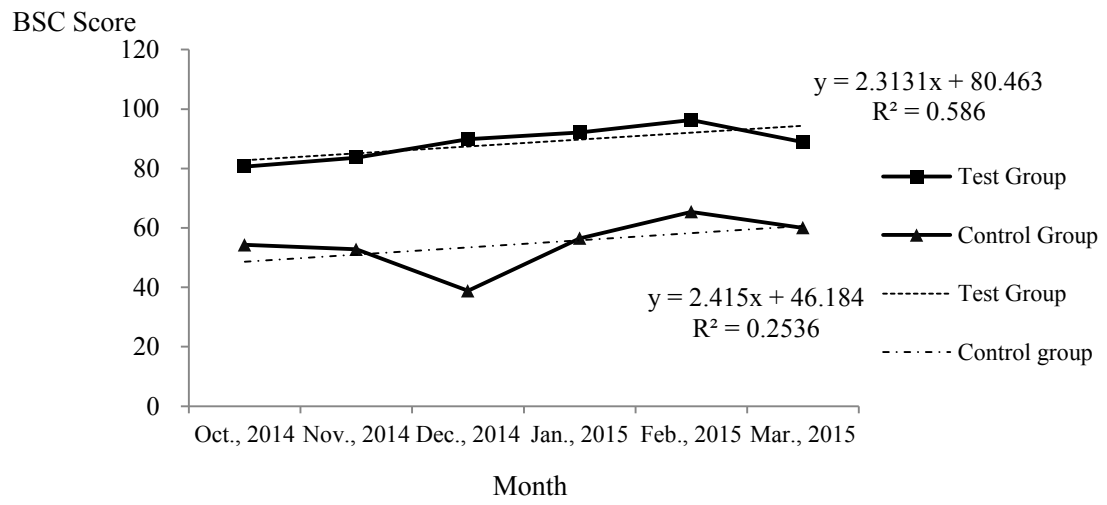


Figure 4.3.6 BSC scores of the cosmetologists between the two groups

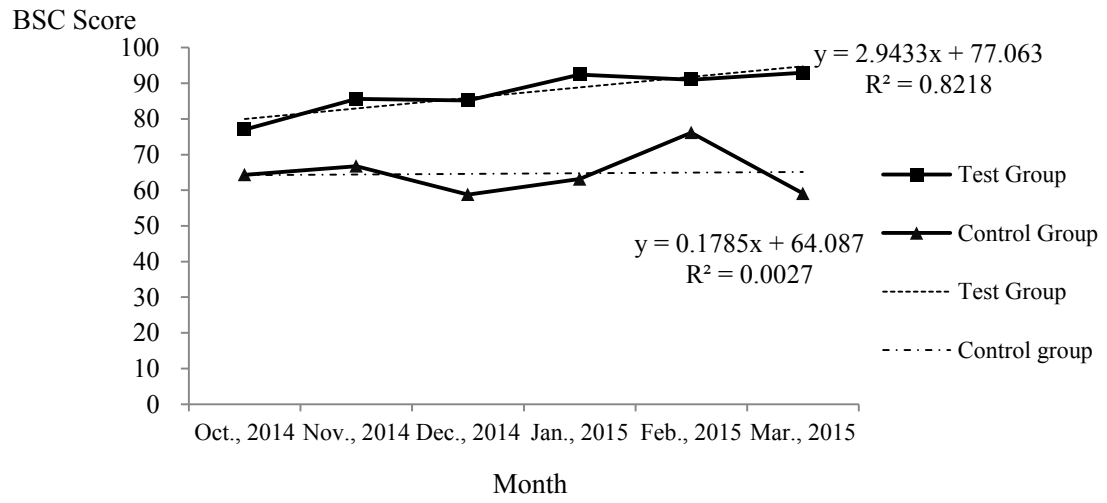


Figure 4.3.7 BSC scores of the advisors between the two groups

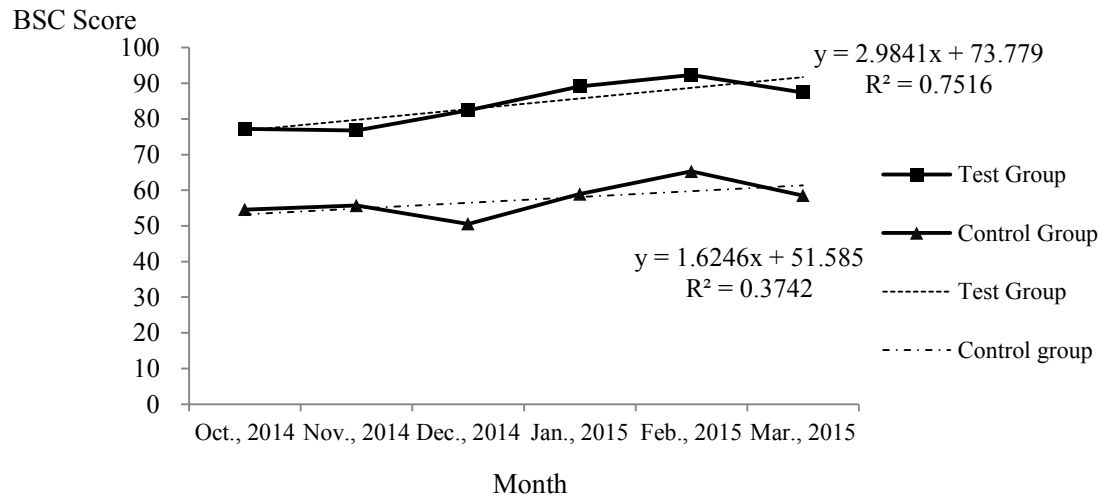
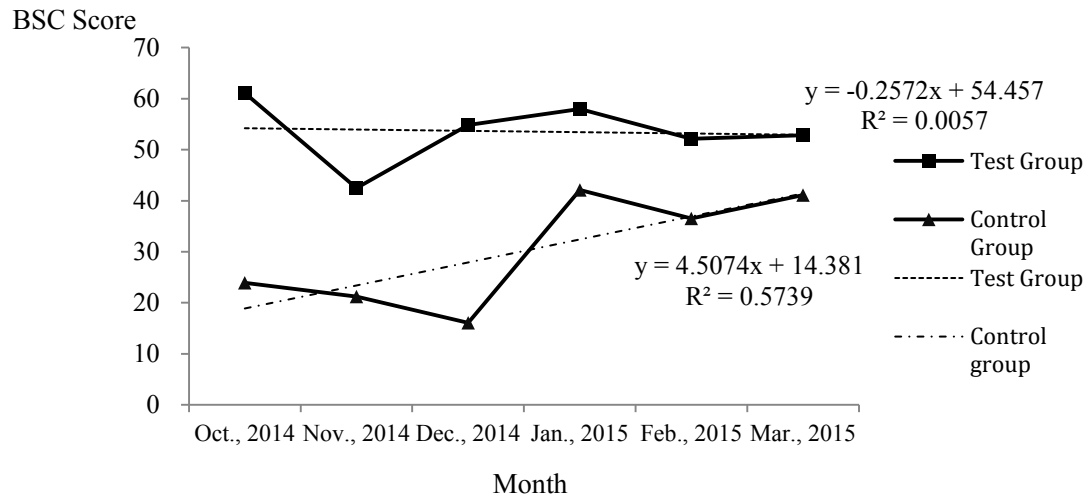


Figure 4.3.8 BSC scores of the administration staff between the two groups



4.4. Perspectives among all six departments

When comparing the four perspectives between the two groups, the clinic department in the control group has the lowest scores. Except for Internal Process, BSC scores of the other perspectives have prominent differences between the two groups in the clinic department. However, only the differences in the Financial Perspective have a gradually increasing trend (Figure 4.4.1 & 4.4.2).

Figure 4.4.1 Perspectives of the clinic in the test group

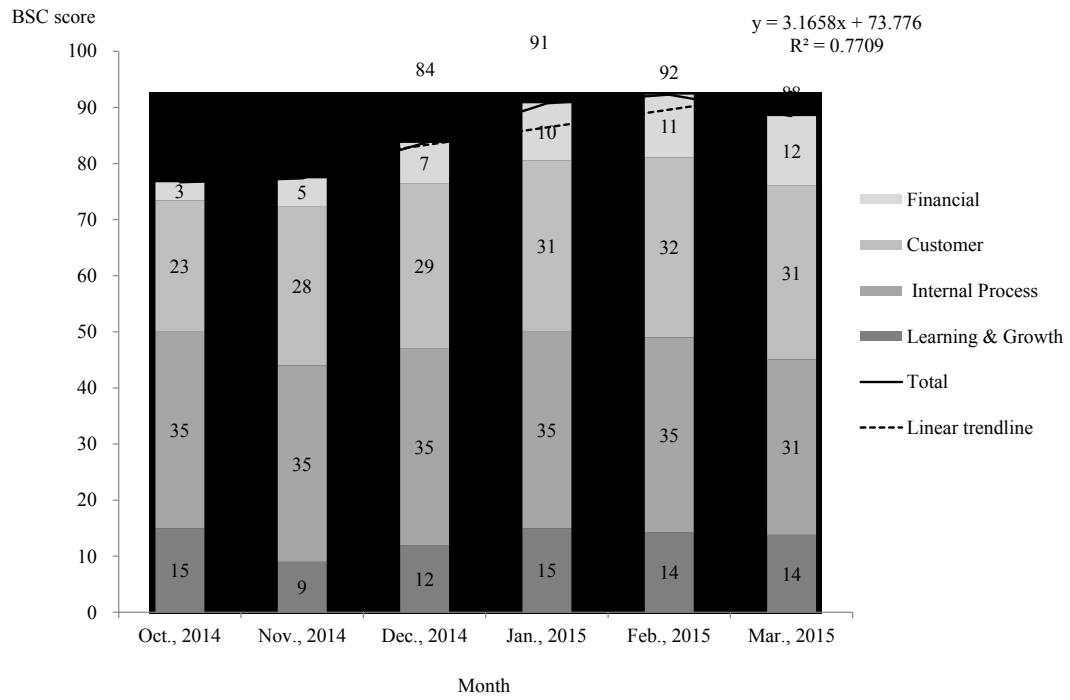
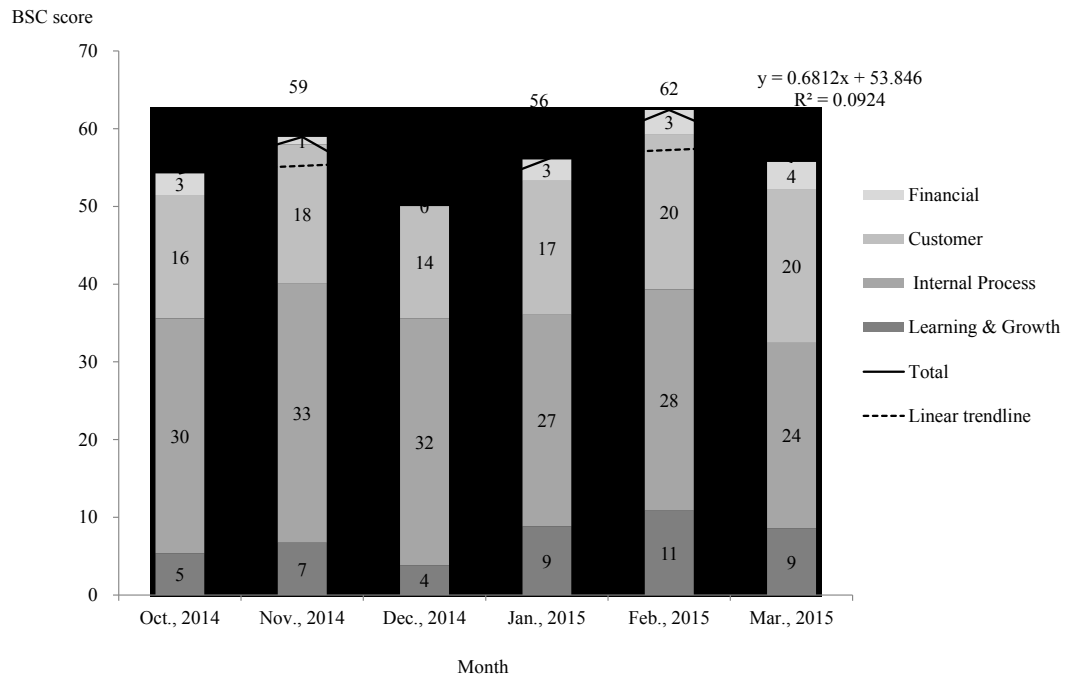


Figure 4.4.2 Perspectives of the clinic in the control group



In the physician department, all four perspectives of the test group get higher

scores than the control group, especially those of Customer and Learning and Growth.

For example, from Oct. 2014 to Dec. 2014, the scores of Learning and Growth in the

test group are 17, 10, 14 and 5, 7, 5 in the control group. The difference percentages

are 70.6%, 30% and 64.3% in favor of the test group (Figure 4.4.3 &4.4.4).

Figure 4.4.3 Perspectives of the physician in the test group

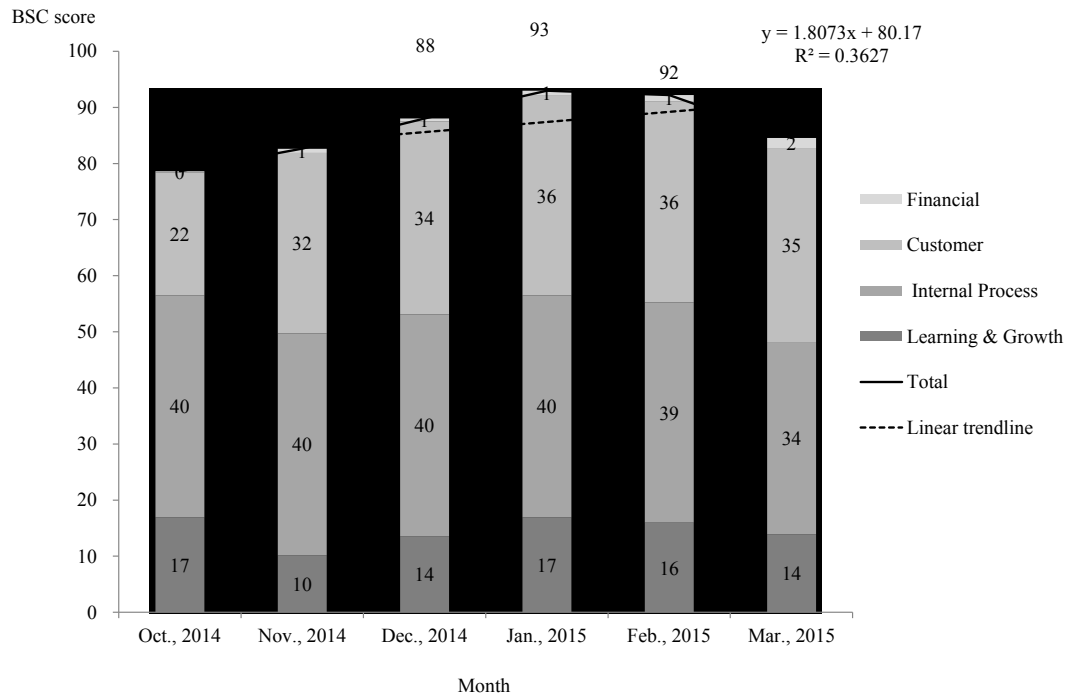
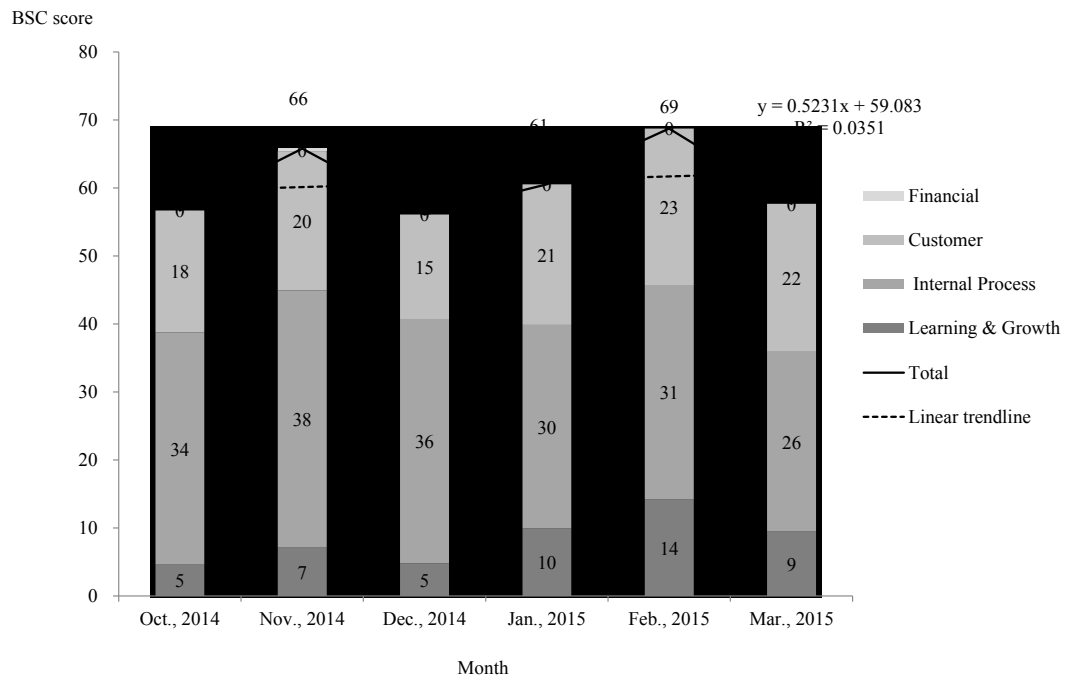


Figure 4.4.4 Perspectives of the physician in the control group



Between the two groups, the nurse department of the control group had a steadier performance than the control group. Especially, differences of the Customer perspective are larger than those of Internal Process and Learning and Growth for almost all six months. On Dec. 2014, differences of Internal Process and Learning and Growth in the test group are the largest, which are 60% and 64.7% respectively. In Internal Process, differences become less notorious from Jan., 2015 to Mar. 2015 than from Nov., 2014 to Dec. 2014 (Figure 4.4.5 & 4.4.6).

Figure 4.4.5 Perspectives of the nurses in the test group

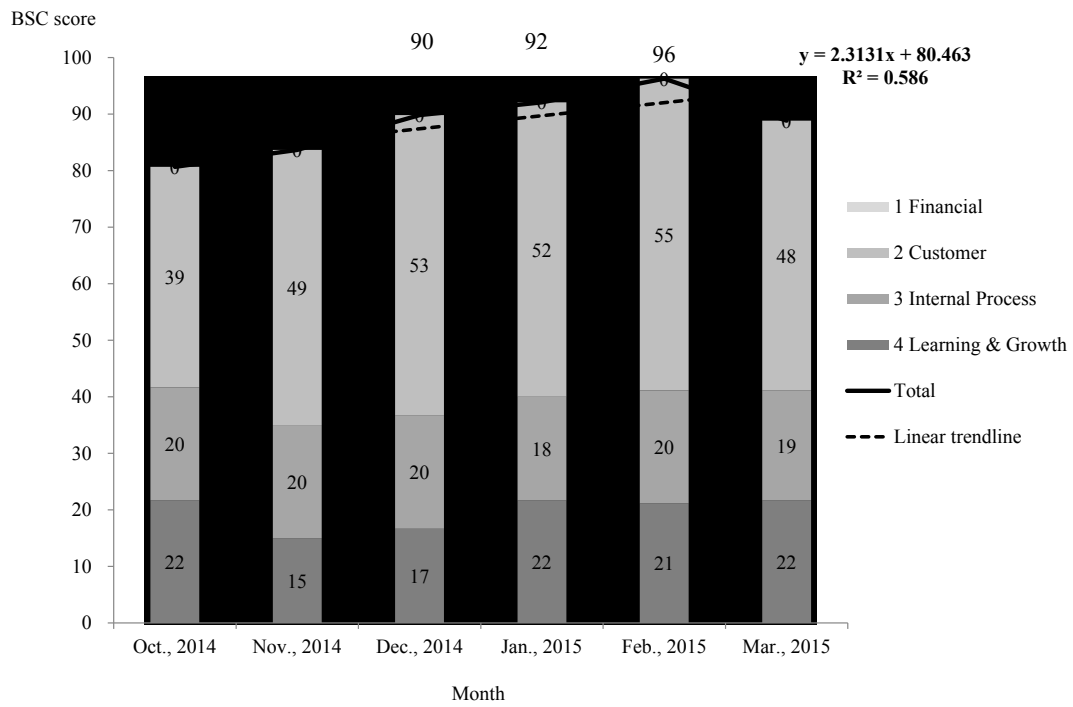
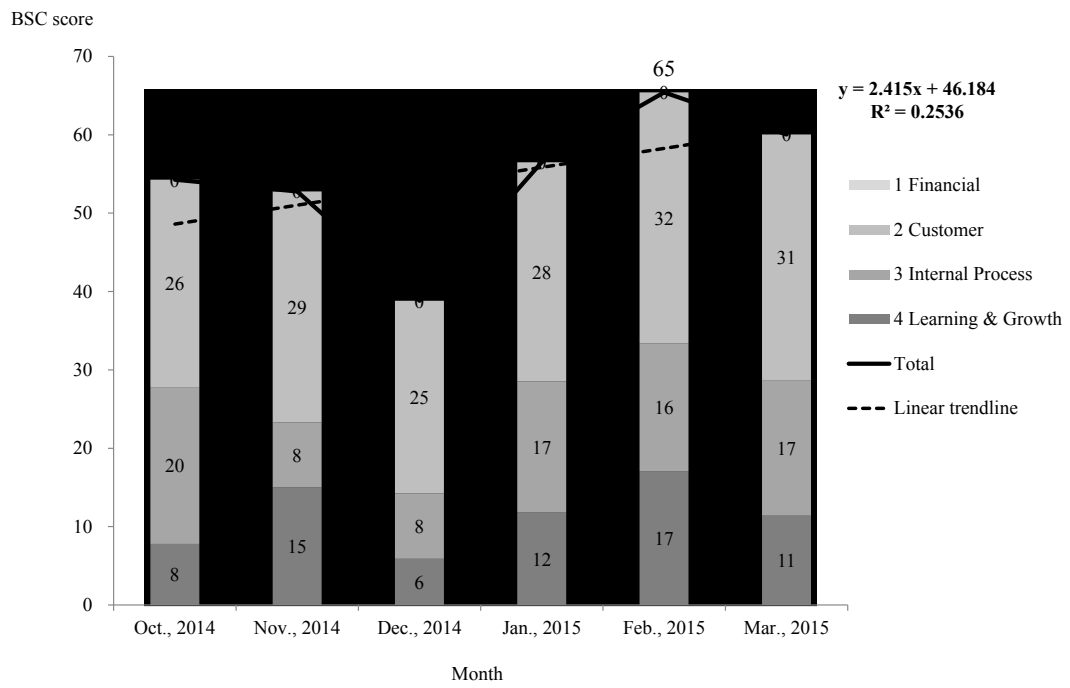


Figure 4.4.6 Perspectives of the nurses in the control group



For the cosmetologists, differences of Customer and Learning and Growth between the two groups are larger than that of Internal Process except that in Mar. 2015 the score was 37 to 28, a difference of 24.3% in favor of the test group. For the Customer perspective, the largest difference is observed in Dec. 2014 with 58.1% advantage of the performance over the control group (Figure 4.4.7 & 4.4.8).

Figure 4.4.7 Perspectives of cosmetologist in the test group

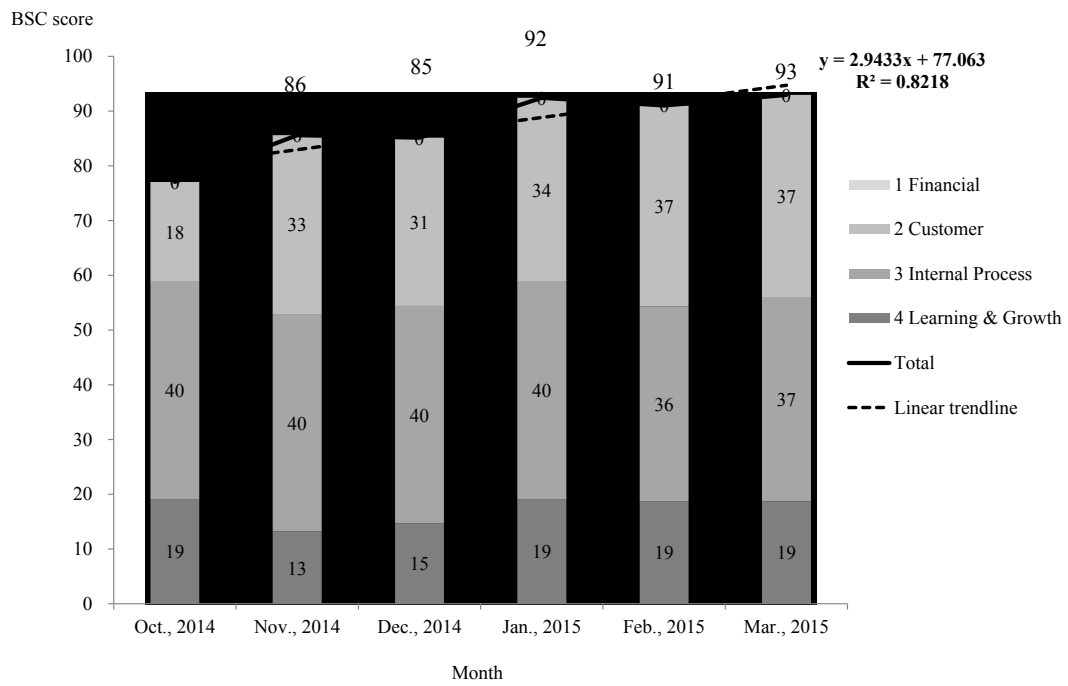
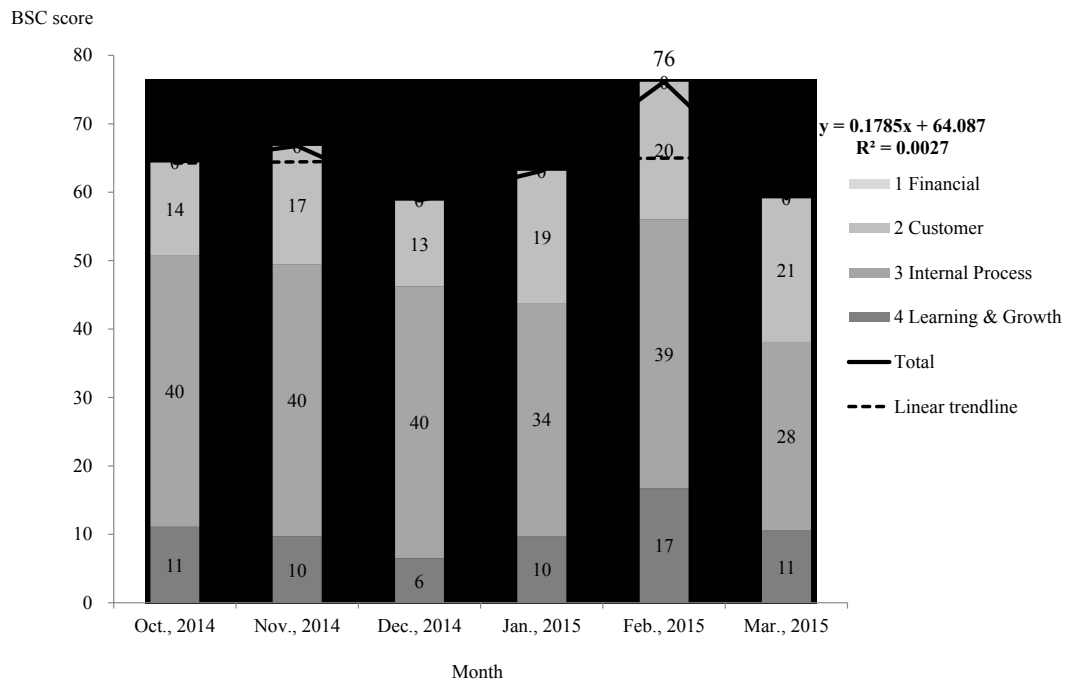


Figure 4.4.8 Perspectives of cosmetologist in the control group



In the advisor department, differences are more evident on the Customer and Learning and Growth perspectives. However, differences of the Customer perspective do not increase with the time of the study (Figure 4.4.9 & 4.4.10).

Figure 4.4.9 Perspectives of the advisors in the test group

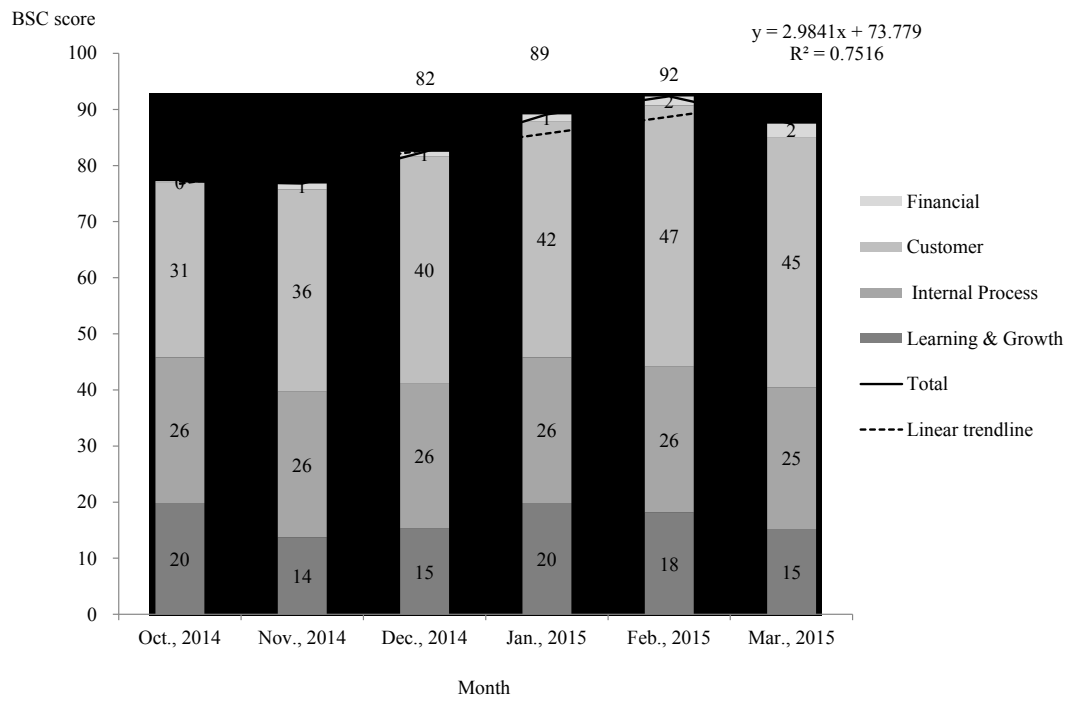
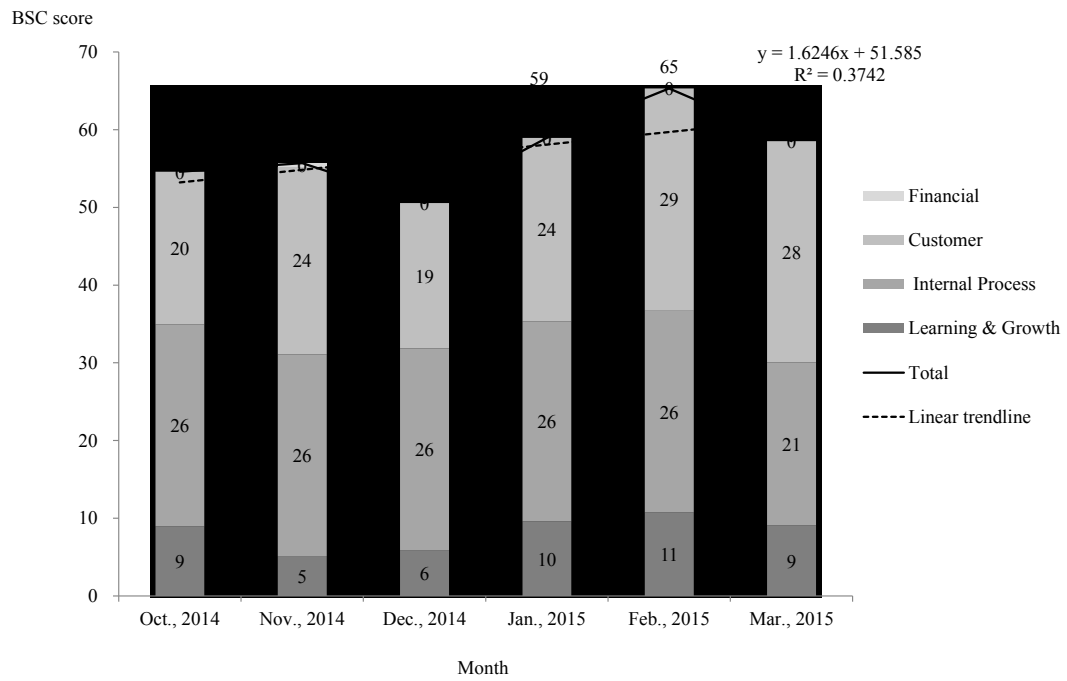


Figure 4.4.10 Perspectives of the advisors in the control group



The results of the Financial perspective of the administration staff in the test group showed score improvement over time. Both groups barely get scores in the Customer perspective. Large variations in performance in the Internal Process perspective can be seen without being able to draw clear conclusions (Figure 4.4.11 & 4.4.12).

Figure 4.4.11 Perspectives of administration in the test group

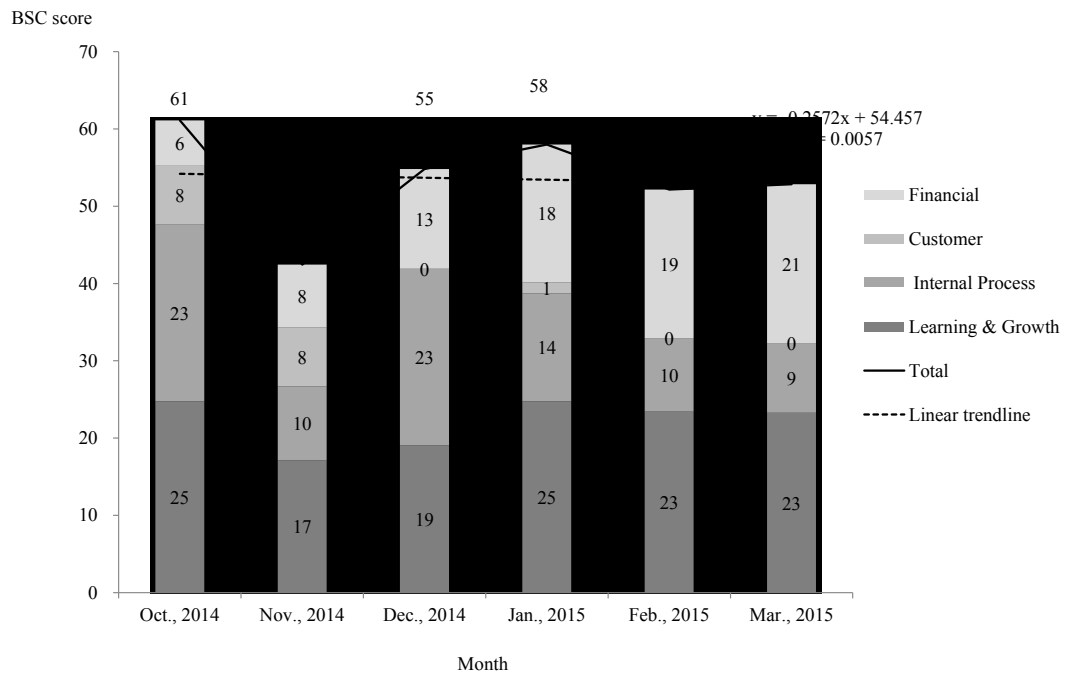
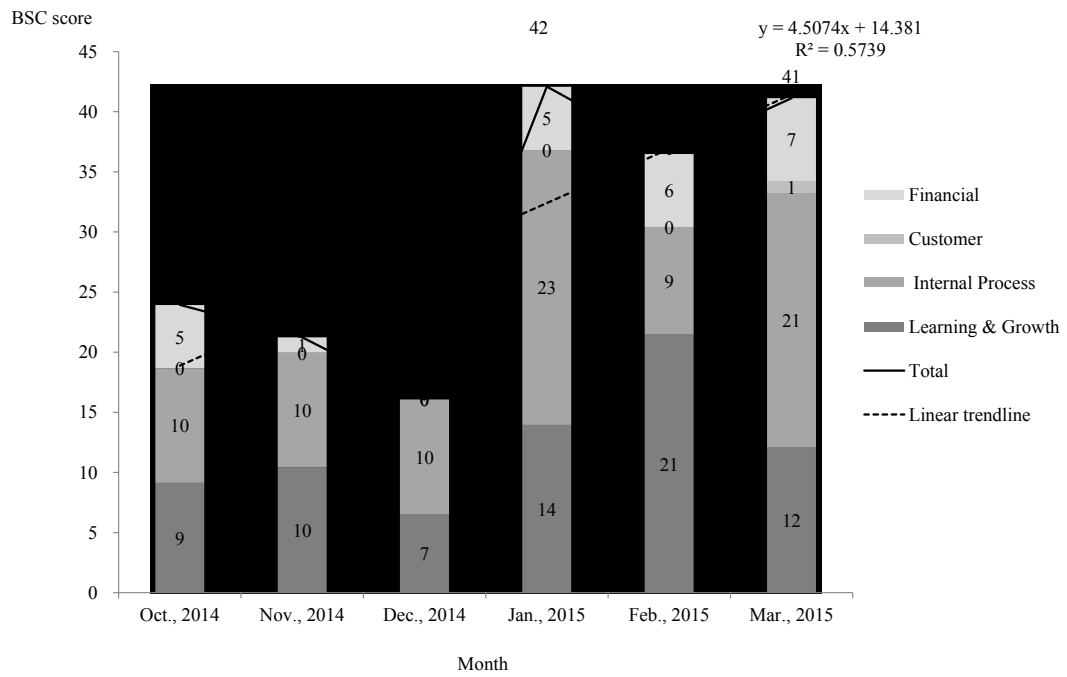


Figure 4.4.12 Perspectives of administration in the control group



CHAPTER 5

Discussions

5.1. Foreword

The major objective of this research is to demonstrate whether the implementation of BSC over a period of time can help the management team to improve the quality of care and services in aesthetic / cosmetic clinics. To express the main research interest of this study, we have two major arms to examine the impact of BSC on organizational performance and patient care. The first arm is intended to answer the question whether the implementation of BSC can improve the performance of organization. The second arm is aimed to respond whether the patient care could be better as well. This chapter starts with the discussions of results of these two arms and the arguments of the quality improvement of medical services in aesthetic/ cosmetic clinics, followed by the debates of threats to internal and external validity, as well as strengths and limitations, then ends with the presentations of policy implication, future study plans and human subject considerations.

5.2. Financial Perspective

The BSC is a tool for strategic management and communicating performance.

The purpose of implementing BSC in an organization is to assist in presenting priorities in management. To accomplish the goal of financial success is the main objective of many for profit or even non-profit organizations (Wu and Chang, 2012: pp. 474-485). Therefore, the financial perspective is on the top of the BSC strategies map in that financial measures appear as a traditional method of evaluating success (Kaplan and Norton, 2000: pp. 9-15). The financial perspective pursues growth strategy and risk analyzed in terms of the shareholder and is recognized for the importance of short-term financial results obtained from the analysis of financial targets for institutions in the competitive environment (Kaplan and Norton, 2000: pp. 9-15). Successful financial measures include massive cost reductions, small deviations from the budget, performance changes in a short period of time and increased return on investment (Farooq and Hussain, 2011: pp. 754-768).

In our study, the key performance indicators for the financial perspective are Gross Margin Percentage (GMP) , which measures how well the revenue is used to cover the costs; Purchase Amount per Patient per Visit (PAPV), which measures revenue growth from each patient's visit; and Return on Investment (ROI), which measures the management and investment strategy for profit and cost. Business

volume should be increased with the implementation of BSC over a period of time, which would lead to a return to profitability in sales turnover and a high return on investment (Baroma et al., 2013: pp. 239-251).

Our study results showed that from Oct. 2014 to Mar. 2015, score of the BSC for the financial key performance indicators like Gross Margin Percentage (GMP), Purchase Amount per Patient per Visit (PAPV), and Return on Investment (ROI) of the clinic increased from 3.3 to 12.4 in the test group and from 2.8 to 3.6 in the control group (Table 4.2.1, Table 4.2.2, Table 4.2.3). These findings confirmed the answer of our research questions about whether the implementation of BSC for a period of time can improve financial indicators of the clinic or not to be true.

According to the study conducted by Chitu A et al who employed a multiple regression model to analyze the impact of various financial key performance indicators and found that, of all the indicators that with the highest influence on financial outcome is the volume of sales activity. It is considered as the first priority to impress the general public's concern about the image of an organization in terms of management (Chitu A and Opris ME, 2014 pp 59-86). In our research, the increase of the sales volume and activity contribute to all our financial key performance indicators like Gross Margin Percentage (GMP), Purchase Amount per Patient per Visit (PAPV), and Return on Investment (ROI). We therefore concluded from our

study results that the implementation of BSC leads to a better management of aesthetic or cosmetic clinics, in terms of the financial perspective.

On the other hand, our results also demonstrated that from Oct. 2014 to Mar. 2015, the BSC score of the financial key performance indicator, Purchase Amount per Patient per Visit (PAPV), of the physicians also increased from 0.2 to 12.4 in the test group and for the control group the change was from 0.0 to 0.0 (Table 4.2.4, Table 4.2.5, Table 4.2.6). This finding also confirmed the answer of our research question about whether the implementation of BSC for a period of time can improve financial indicator of the physicians or not to be real. Since the increase of PAPV also resulted from the augment of the volume of sales activity, we therefore concluded that the implementation of BSC leads to a better financial management of aesthetic or cosmetic physicians by accepting our hypothesis 1a, 1b and 1c.

5.3. Customer Perspective

In addition to the financial perspective, the customer perspective of the BSC is arguably the most important part of the approach. No matter how outstanding the internal process of your business and how much your employees learn and grow, without customers the organization is unable to make profits and will never have a chance to achieve the goal of financial excellence. The Customer perspective describes the value recommendations that the organization will carry out with a view to satisfy customers and create more sales volume as well as activities to the targeted customers. The leading measures which are selected for the customer perspective should measure the value that is delivered to the customer with adequate services and reasonable cost. These value references include the quality of product, the timing of delivery, the state-of-the-art performance, and the consequences that come as a result of these value references.

In our study, the indicators chosen for the evaluation of customer dimension include customer complain rate, patient repeat rate, patient referral rate and customer satisfaction rate. We hypothesized that with positive consumption experiences, customers will be less likely to complain, more likely to return and refer other new customers, and more likely to be satisfied. Positive customer feedbacks reflect the excellence of the internal process of the organization, even the learning and growth of

the organization staff, and will certainly contribute a lot to the financial performance.

From our Table 4.2.1 to Table 4.2.12, our study results revealed that a significant increased BSC scores of the key performance indicators of customer perspective like customer complain rate, patient repeat rate, patient referral rate and customer satisfaction rate for the clinic, physicians, nurses, and cosmetologists in the test group as compared to the control group from Oct. 2014 to Mar. 2015. These findings confirm our study hypothesis 2a, 2b, 2c and 2d about whether the implementation of BSC for a period of time can help improving patient care by measures such as decreased Complain Rate, increased Patient Repeat Rate, increased Patient Referral Rate and increased Customer Satisfaction Rate to be true. We therefore concluded that the implementation of BSC leads to a better customer management of aesthetic or cosmetic clinics.

5.4. Internal Process Perspective

To master the internal processes of an organization in generating high quality, trustworthy and consistent products as well as services is the key to success in any organization. Based on the missions, visions and core values of the organization, the management of internal process perspective of BSC concentrates on all the activities and processes required for the organization to excel at providing the value expected by the customers. A successful internal processes management will lead to an excellent intervention that aims to impress customers, increase sales volume and activities, hence improving financial outcomes. It is therefore important to find the right process indicators for measurement and to set the proper standards for performance levels of each of the process indicators to guarantee the production and delivery of high-quality products and services with reasonable costs. In other words, achieving good performance levels on appropriate process measures leads to high-quality products and services, which in turn, lead to satisfied, loyal and delighted customers who then produce an increased sales volume and activities. Consequently, and eventually, the increased financial performance promotes a long-term survival and success of an organization.

In our research, we selected the following key performance indicators such as time of physician consultation, rate of completing the deal, time to get an

appointment, waiting time and dispute rate for the clinics and physicians; rate of completing the deal, time to get an appointment, waiting time, and dispute rate for cosmetologists; waiting time and dispute rate for nurses; rate of completing the deal and dispute rate for advisors, to evaluate the internal process. Our study results indicated that for the clinics and physicians, the internal process improved in terms of the increase in time of physician consultation, decrease in time to get an appointment, waiting time, and a lower dispute rate, and increase in rate of completing the deal (Table 4.2.1~6). Meanwhile, the internal process improved in terms of the decrease in waiting time and dispute rate for nurses and advisors (Table 4.2.7~9 and Table 4.2.12~15). Likewise, for cosmetologists, the internal process improved in terms of the decrease in time to get an appointment, waiting time, and dispute rate, and an increase in rate of completing the deal (Table 4.2.10~12). However, the time to get an appointment improved and the dispute rate increased in the test group of administration staff and decreased in the control group (Table 4.2.16~18). The implementation of BSC increased somewhat the work load of the administration staff without proportionately increasing their incentives might be the explanation of these negative results. With mostly positive findings, we are still confident to conclude that the implementation of BSC over a period of time can help improve the management of internal process by supporting the hypothesis 2e, 2f, and 2g.

5.5. Learning and Growth Perspective

The fundamental objective of learning and growth perspective in BSC is that these actions aim to accomplish the missions, visions and core values of an organization. In other words, what the employees should learn and grow ought to be connected to how to satisfy the customer's needs, how to improve business processes, and how to reach the financial goals of the organization.

To achieve these objectives, the key performance indicators in our research for evaluating learning and growth perspective are rate of accessing to training, number of training courses completed, employee satisfaction rate, staff turnover rate, and number of book/journal reports. Our research results showed that more employee satisfaction rate and less staff turnover were noted in the test group as compared to the control group at the clinics, nurses, cosmetologists and administration staff level from Oct. 2014 to Mar. 2015 (Table 4.2.1~3, Table 4.2.7~12 and Table 4.2.16~18). On the other hand, at the level of physicians and advisors, only less staff turnover was noted in test group compared to the control group in this study period (Table 4.2.4~6 and Table 4.2.13~15).

These results from our research implied that only employee satisfaction and retention make sense in the implementation of BSC in terms of learning and growth perspective in our research. Employee satisfaction and employee retention are two

major measurements for evaluating the impact of implementation of BSC on the employee perspective. Employee satisfaction recognizes the importance of employee morale for improving productivity, product quality, time of delivery, and customer satisfaction. Employee retention acknowledges that employees develop organization-specific intellectual capital and provide a valuable non-financial asset to the organization. Furthermore, employee retention is known to be cost saving because the organization will spend a lot more money when they are forced to find and hire talented and experienced people to replace the already well-trained employees who leave.

The following are possible reasons of the other three measurements of learning and growth perspective, rate of accessing to training, number of training courses completed, and number of book/journal reports, failed to show a significant change after the implementation of BSC. The explanations for these negative findings may be related to the heavy clinical workload of cosmetic procedures. Under these circumstances, even with the implementation of **Balanced Scorecard**, employees in the test group did not have enough time to access more training courses and complete more book or journal reports. Despite these negative results, we still conclude that the implementation of **Balanced Scorecard** over a period of time helped improving part of the learning and growth perspective by approving our hypothesis 1f.

5.6. Quality Improvement

The hypothesis 2h of our research refers to the effort of adopting BSC can improve the quality of medical services, by which can be highly valued by customers and possibly served as accreditation criteria by health policy regulators. To examine the impact of implementation of BSC on the quality of medical services of the cosmetic clinics, we employed Donabedian model (Donabedian, 1966) in our research. Donabedian model is a framework that gives a concept for studying quality of medical services. Based on this model, there are three domains that the information about quality of medical services can be concluded from: “structure,” “process,” and “outcomes.” Since the location characteristics, facilities and equipment are similar for both test and control clinics, the “structure” domain in our research referred to the learning and growth perspective of our staff since better knowledge and skills provide better quality of medical care. The financial perspective of the clinics also serve as part of the structure domain for evaluating medical quality since a strong financial structure is the basis of better medical services. The “process” domain in our research was indicated by the internal process perspective which gives the managements from providers to customers throughout the delivery of healthcare. Customer perspective is certainly responsible for the “outcomes” domain in our research for all the positive results from customer satisfaction, repeat visiting, and

new referral come from good outcomes of medical service delivery on the cosmetic effects of customers.

Our research results showed that with the implementation of BSC, there were significant improvements of all four perspectives in the test clinic compared to the control one. We therefore concluded that the quality of medical services improved and the hypothesis 2h was thereby confirmed.

5.7. Balanced Scorecard and Malcolm Baldrige National Quality Award

(MBNQA)

To develop a strategic framework for the excellence of an organization not merely based on financial performance, BSC is the first choice among many management tools in our study. The BSC reflects the overall assessment of an organization based on performance excellence criteria as laid out by the Malcolm Baldrige National Quality Award (MBNQA) (Asplund J., 2016)

The MBNQA is a comprehensive instrument for understanding and managing organizational performance in all its dimensions. It covers all aspects of management, including leadership; strategic planning; customers, or patients in health care organization; measurement, analysis, and knowledge management; workforce; operations; and results. It also provides a systemic inspection for the alignment and integration across an organization. The individual criterion of MBNQA is essential for organizational management and leadership, how the Baldrige criteria link to one another determines the success of the organization.

The comparison between BSC and MBNQA was studied by Shuki Dror (Dror 2008). BSC has several limitations, for example, there is no basic guidelines for selecting performance measures, and there is complex feedback from the financial perspective to the customer and internal process perspectives. However, BSC has

important advantages such as sequential objectives, capability of directing long-term programs, possibility of selecting relevant performance measures, and measurement based on actual data and two levels of feedback, as compared to other quality award models like MBNQA. In this article, a structured methodological approach based on the Quality Function Deployment (QFD) was described to improve implementation of the BSC method in an individual organization. The QFD method identifies customer desires and the importance of those desires, it also identifies characteristics which may be relevant to those desires, correlates the two, verifies those correlations, and then assigns objectives and priorities for the system improvement. Therefore, a QFD assisted BSC program potentially ensures that every financial performance defined by the enterprise strategy is linked to a set of performance measures in the relevant domains that may eventually strengthen and complete the BCS use for individual facilities.

5.8. Conclusions

By looking at the four perspectives of the BSC, we were able to show significant improvements of the performance by the physicians and staff of the test clinic over the control clinic with exception of the administration department (Fig. 4.3.8)

There are some drawbacks with the implementation of BSC. Opportunity cost and costs for consultants and implementation might be high and even higher when the strategy or structure of an organization is changed. The fact that the employees have taken and completed training courses does not necessarily mean that they have fully understood the teaching materials. At least six months, better more than one year, are required to see the effect of BSC. However, some organizations may have significantly changed or even closed within that period. While we concluded with several useful and interesting findings through the comparisons of performances in terms of financial, customer, internal process and learning and growth perspective of our test group or clinic, and control group or clinic, in this research, we were able to demonstrate that by implementing a set of strategies, the BSC scores obtained by the test group or clinic as a whole or divided by its six departments are significantly higher than those of the control group or clinic. One of the fundamental reasons of the success in implementing Balanced Scorecard is that BSC is deemed as a value added to the test group or clinic. This value creates more clarity in objectives, more

useful objective partitioning and more organized action plans. Moreover, the implementation of BSC also brings more realistic and relevant objectives for the employees. With the implementation of BSC, the clinic is helped in enhancing the financial aspects such as increasing profitability, economic value, sales growth, cash flow generation, and return on capital employed; the customer aspect like customer satisfaction, customer retention, customer acquisition, and market share increments; the internal process aspect by providing management level with a comprehensive picture of business operations; the learning and growth aspect such as employee satisfaction, alignment of employee incentives with overall clinic success factors and employee morale. Accordingly, gross margin percentage, purchase amount per patient, return on investment, patient repeat rate, customer satisfaction rate, patient referral rate, number of new patients, time of physician consultation, rate of completing the deal, employee satisfaction rate, and staff turnover increased; whereas adverse medical reaction rate, complaint rate, time to get an appointment, waiting time, and dispute rate decreased.

In summary, it is safe to conclude that the implementation of BSC for a period of time was able to help improving the overall performances of aesthetic/ cosmetic clinics in this setting.

5.9. Threats to Validity

5.9.1 Threats to Internal Validity

The cause-effect relationship of experimental variables has been partly clarified by drawing a proper strategy map to avoid misleading or misunderstanding. In our study, one of the potential threats of internal validity is the influences of instrumentation. We have carefully designed the satisfaction survey questionnaires to avoid affecting the results or conclusions.

Another threat to the internal validity is attrition that could happen when the employee quit his/her job during the period of data collection. If the dropping out leads to relevant biases between groups, a whole class of alternative explanations is possible that account for the observed differences.

5.9.2 Threats to External Validity

While implementing the BSC, one of the discussed threats toward external validity is the Hawthorne effect (McCarney R 2007). With this effect, Leonard KL et al. had demonstrated that, quality of care be improved by repeated measurement (Leonard KL, 2017). The threats of Hawthorne effect toward external validity may reduce gradually since this effect decreases with time. Since there was only a six-

month study period in our research, the Hawthorne effect may not be a problem to the external validity of our research.

Another possible threat to the external validity of our research is that the results of implementation of Balanced Scorecard can be varied due to its flexibility. Von Bergen *et al.* (2004) and Wicks *et al.* (2007) have pointed out several factors that can justify the failure of the implementation of the BSC framework. First of all is the inconsistent or half-hearted application of the BSC and unwillingness to consider the BSC a dynamic process of self-improvement. As David Norton (one of the creators of BSC) pointed out, the biggest mistake that organizations may make is thinking that the scorecard is just about measures. Second, measures that do not focus on strategy. Organizations tend to insert some new non-financial measures, but fail to align them adequately with strategy. Third, organizations do not have a balanced emphasis in each of the four perspectives. Fourth, the BSC assumes employee commitment but does not emphasize the employee perspective. Fifth, the BSC is founded on a management philosophy that is based on control rather than commitment. Sixth, the BSC assumes that trade-offs are necessary to solve problems, rather than emphasizing win-win solutions. Seventh, the BSC is developed at the executive level, but not communicates or cascades down through an organization. Without effective communication throughout the organization, a BSC will not spur lasting change and

performance improvement.

5.10. Strengths and Limitations

5.10.1 Strengths

BSC is fundamentally a customized performance measurement system that looks beyond traditional financial measures and is based on organizational strategy. There are several strengths in our research. The first is that it is so far the first implementation of BSC in the field of aesthetic/ cosmetic medicine. The second is the design of the study which is dedicated to pursue the better quality of aesthetic medicine under generally acknowledged blurring regulations. The third is that both test clinic and control clinic are owned by the same chief executive officer, thus the organization culture would be uniform. With this setting, the organization culture as a confounder will be eliminated.

5.10.2 Limitations

As Aidemark *et al.* (2009) implicated that, even if the positive strains have continued during recent years, some articles have been presented with a more critical intonation and authors have underlined problems connected with the implementation of the BSC. The criticism refers to both the theoretical model and to the practical uses of the Balanced Scorecard. Nørreklit (2003), for example, criticized that the

model on a principle level and claimed that BSC was a persuasive but not a convincing concept. This, she claimed, will result in that the readers read their own intentionality into the theory and that every reader will form his own theory rather than that of Kaplan and Norton. Several authors have also questioned whether the BSC that has been identified in real-world settings really is the same instrument as introduced by Kaplan and Norton or the idea of the implementers (Bukh & Malmi, 2006; Johanson *et al.*, 2006).

One limitation of this research could also at the same time be an advantage of BSC, the flexibility. Since there are no two identical organizations with exactly the same size, culture, and other aspects, the process of implementation could not simply follow a standardized set of procedures. This might cause the varied results of BSC implementation and sometimes involuntary failure.

The implementation of BSC for only six months in our study is another limitation for the access of training, number of training courses completed, and number of book/ journal reports produced by the employees. Some of the professional associations offer only annual training courses. For example, if a professional association offers training courses in the summer while our study period is from Oct. to Mar., there will not be a chance for the employee to access training and complete the training courses. Meanwhile, the production of a book or journal

report is not easy to accomplish within only 6 months. If the study period could be lengthened to one or two years, the difference of these KPIs between the test group and control group could be much more obvious.

5.11. Policy Implication

In our research, we tested the hypothesis 2h that described the effort of adopting BSC can improve the quality of medical services, and that our customers will feel satisfied at the same level of accreditation by official regulators. Since our research results support the statement, we may say that the implementation of BSC is beneficial in helping healthcare authorities add or modify items to their criteria for future accreditation of aesthetic medical organizations.

As demonstrated by Tan (2007), aesthetic medicine should be regulated because every procedure in aesthetic medicine is meant to alter some part(s) of the body to achieve a more pleasant appearance and would carry a certain risk of harm. Furthermore, aesthetic medicine may distort the traditional doctor-patient relationship, raise patients' expectations and increase the risk of medical malpractice (Cullen, 2002). An unregulated aesthetic medicine industry may also have an adverse impact on professional and ethical standards, as medical professionals may be more likely to sacrifice ethical and moral principles to achieve profit-driven goals, and this would be a great concern for customers and potential customers.

Due to the marginally regulated aesthetic industry in many countries (Tan, 2007), the voluntary self-regulation should be an alternative guarantee of procedures' quality

for customers. Nevertheless, as demonstrated by Tan (2007), the voluntary self-regulation may not work. One of the most important factors is that the voluntary self-regulation often involves quality improvement activities where medical practitioners participate in peer reviews and learn from observed practice deficiencies, but the aesthetic industry is an exception where practitioners are unlikely to reveal or acknowledge their own shortcoming.

In our research, BSC is demonstrated to be one of the solutions to improve quality of medical and non-medical services through the improvement of structure, represented by the improvement of learning and growth; process, represented by the improvement of internal process even with undisclosed formulas and procedures, and outcomes, represented by the improvement of financial and customer perspectives. These results indicated that, the activities of quality improvement such as BSC implementation should be encouraged to achieve a win-win situation with the reduction of regulation expenditure and the better care provider reputation with customer trust on the quality of aesthetic medicine.

5.12. Future Research Plans

With the success of implementation of BSC in our study, the same conceptual framework could be applied to other business as well. For example, the principle investigator of this research and the author of this doctoral dissertation opened a series of Argentinian Barbecue Beef Restaurants in Taipei city. The hypothesis will be that whether the implementation of BSC also leads to the improvement in management of restaurants as well.

To overcome one of the limitations in our current research, we can plan to extend the study period to more than one year. With this setting, the access of training, number of training courses completed, and number of book/ journal reports produced by the employees could possibly be increased and thus leads to an improvement of learning and growth perspective of BSC.

The head to head comparison of BSC with other management tools such as strategic Planning, Customer Relationship Management, Employee Engagement Surveys and Benchmarking could also be done in the future in our already established system with test and control cosmetic clinics.

Since there is no basic guideline for selecting KPI for the four perspectives of BSC, we could use more KPIs for evaluating the success of an organization in

the future study. In our study, we use only three KPIs for financial perspective, namely, Gross Margin Percentage (GMP), Purchase Amount per Patient per Visit (PAPV), and Return on Investment (ROI). As a matter of fact, there are a lot of KPIs for the financial perspective to be used, such as Total assets holdings, Profitability of assets, Profitability of net assets, Ratio of equity capital to total assets holdings, Capital productivity ratio, Efficiency of assets, Market price per share and Sales volumes for new products/services (Rahimi H., 2017; BSC Designer). We believe that, there are different financial KPIs for different businesses. Whereas further studies are needed to decide what KPIs are better suited for which business.

5.13. Human Subjects Considerations

This research includes the collection of individual information from the customer and employee satisfaction survey. For the sake of private information safety, the critical and sensitive personal information have been protected by the application of a series of encrypted code on each questionnaire.

The questionnaires are composed of two parts, each are marked with the same encrypted code. One part consists of critical personal information and the other part contains the major issues of the questionnaire. These two parts are separately by different BSC implementation team members, and the original questionnaires are carefully preserved from unauthorized contact and are going to be destroyed from stem to stern after finishing the final analysis.

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Curriculum Vitae

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Summary of Personal History

- ◆ Born in Kaohsiung, a southern city in Taiwan (October 1965).
- ◆ Emigrated to Argentina at the age of 12 (October 1977).
- ◆ Arrived in the USA after graduating from medical school in Buenos Aires (October 1991).
- ◆ Returned to Taiwan (November 1997).

Education

- ◆ MD., School of Medicine, National University of Buenos Aires, Buenos Aires, Argentina (June 1992).

- ◆ Dr. PH candidate, Department of Health Policy and Management,
Bloomberg School of Public Health, Johns Hopkins University.

License & Certification

- ◆ Board of Surgery, Republic of China (December 2002).
- ◆ Medical License, Republic of China (September 1999).
- ◆ United States Medical Licensing Examinations" (USMLE) Certificate
(November 1995).
- ◆ Medical License, Republic of Argentina (March 1993).

Working Experience

- ◆ CEO, Meso Group, Co. Ltd. (from July 2006 to present)
- ◆ Director, Meso Clinic, Taipei, Taiwan (from July 2006 to present).
- ◆ Attending Staff, Surgical Intensive Care Unit (SICU), Cardinal Tien
Hospital, Taipei, Taiwan (from July 2003 to 2006).
- ◆ Surgery Resident and Chief of Residents, Department of General Surgery,
Mackay Memorial Hospital, Taipei, Taiwan (from September 1999 to June
2003).

- ◆ Surgery Resident, Min Sheng General Hospital, Taoyuan, Taiwan (from April 1999 to September 1999).
- ◆ Surgery Resident, Tainan Municipal Hospital, Tainan, Taiwan (from December 1997 to March 1999).
- ◆ Clinical Research Fellow, Department of Neurological Surgery, Wayne State University, Detroit, Michigan (from May 1996 to November 1997).
- ◆ Research Fellow, Department of Neurological Surgery, University of Illinois at Chicago (from May 1996 to April 1997).

Publication

- ◆ Transverse Colon Duplication Mimicking Megacolon-Report of a Case (Journal of Society of Colon and Rectal Surgeon, Taiwan, 2003; 14: 114-118).
- ◆ Abdominal Cocoon Associated with Intestinal Malrotation and Small Intestine Obstruction – A Case Report (Formosan Journal of Surgery, 2006; 39: 160-3).
- ◆ Intestinal Perforations in Behçet’s Disease (Journal of Gastrointestinal Surgery, 2007; 11: 508-14).

Awards & Honors

- ◆ Admitted to the medical school with the 45th highest entrance examination score among over 10,000 applicants (March 1984).
- ◆ Recipient of scholarship for outstanding academic performance (from April 1984 to December 1985).

Special Skills

- ◆ Fluent in writing and speaking in several languages, including Mandarin Chinese, Taiwanese, Spanish, and English.
- ◆ Skillful player of various music instruments, including bass guitar, saxophone, trumpet and drums. Leader of the “Grade 5 Band”, a gospel rock band, and the co-producer of “G-5 I & G-5 II” album CDs (September 2004 and September 2006 respectively).
- ◆ Table tennis champion, medium high ranking category, US Open (November 1993).

Personal Characteristics

- ◆ Perseverant, easy to work with, able to release tension through humor, eager in academic learning, and humble when being taught.

- ◆ Expert in brain storming, English teaching, entrepreneurial ventures, public speaking.
- ◆ Sharp analytical thinking ability when facing controversial issues.
- ◆ Rich in international experiences, approaching things from refreshing perspectives.