EVALUATING THE STRATEGIC ROLES OF
REVERSE LOGISTICS IN PRIVATE HOSPITALS:
Case studies in Thailand

A Thesis Submitted
in Fulfilment of the Requirements for the Degree of
Doctor of Philosophy

SORASAK THEPSATIDSILPH
MEng: Integrated Logistics Management (RMIT University), Melbourne, AUSTRALIA
GraDip: Business (Melbourne University), Melbourne, AUSTRALIA
BBA (Chulalongkorn University), Bangkok, THAILAND

School of Business IT and Logistics
RMIT Business

RMIT UNIVERSITY

APRIL 2015
Declaration

I, Sorasak Thepsatidsilph, certify that the work completed is mine alone, that this work has not been submitted previously to qualify for an academic award, that the content of this thesis is the result of work which has been carried out since the official commencement date of the approved research program, that any editorial work undertaken by a third party is acknowledged, and relevant ethics procedures and guidelines have been followed.

Sorasak Thepsatidsilph
April 2015
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Sorasak Thepsatidsilph

April 2015
Dedication

This thesis is sincerely dedicated to my parents for their love, encouragement, and kind support.
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<td>Asian Economic Community</td>
<td>AEC</td>
</tr>
<tr>
<td>Bangkok Dusit Medical Services Public Company Limited</td>
<td>BDMS</td>
</tr>
<tr>
<td>Bangkok Pattaya Hospital</td>
<td>BPH</td>
</tr>
<tr>
<td>Biochemical Oxygen Demand</td>
<td>BOD</td>
</tr>
<tr>
<td>Bumrungrad Hospital</td>
<td>BH</td>
</tr>
<tr>
<td>Chemical Oxygen Demand</td>
<td>COD</td>
</tr>
<tr>
<td>Chief Executive Officer</td>
<td>CEO</td>
</tr>
<tr>
<td>Chief Finance Officer</td>
<td>CFO</td>
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<tr>
<td>Chief People Officer</td>
<td>CPO</td>
</tr>
<tr>
<td>Clinical Staff</td>
<td>C</td>
</tr>
<tr>
<td>Corporate Social Responsibility</td>
<td>CSR</td>
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<tr>
<td>Information Technology</td>
<td>IT</td>
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<tr>
<td>In-Patient Department</td>
<td>IPD</td>
</tr>
<tr>
<td>International Organisation for Standardisation</td>
<td>ISO</td>
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<tr>
<td>Joint Commission International</td>
<td>JCI</td>
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<tr>
<td>Non-Clinical Staff</td>
<td>NC</td>
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<td>Out-Patient Department</td>
<td>OPD</td>
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<td>Pharmacy Department</td>
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<td>Purchasing Order</td>
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<td>Reverse Logistics</td>
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<td>Supply Chain Management</td>
<td>SCM</td>
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<tr>
<td>Top Management</td>
<td>TM</td>
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<tr>
<td>Vejthani Hospital</td>
<td>VH</td>
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<td>Waste Management Department</td>
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Abstract

This thesis is a study of reverse logistics structures, processes and their characteristics in Thai private hospitals. The research evaluates the strategic importance and role of reverse logistics operations in creating business value in hospitals. The research literature suggests that the adoption of reverse logistics, specifically reverse logistics activities, can result, through the adoption of an RL strategy, in added business value. The intent in this research is to use the activities of Reverse Logistics (re-use, re-sale, re-distribution, repair, refurbishing, remanufacturing, retrieval, recycling and incineration) to examine how these activities are used strategically in hospitals in Thailand to create business value for these organisations. The research addresses the question: “What strategic roles does the implementation of reverse logistics activities play in private hospitals in Thailand?” The research is grounded in a theoretical model that argues that an overall, front-stage, strategy drives organisations business goals and that this is supported by a ‘back-stage or hidden strategy that focuses on the operations of that organisation and that both are necessary for strategic success and the attainment of competitive advantage. In this research part of that back-stage strategy is the operationalization of reverse logistics activities and that these both support the overall company strategy and themselves create business value. The overall context of the research is an interpretivist multiple-case study based on interviews with key stakeholders and a focus group with relevant industry experience. The population and sample for this research includes three significant private hospitals in Bangkok (Bangkok Pattaya Hospital, Vejthani Hospital and Bumrungrad Hospital) as case studies.

The research shows that reverse logistics activities in each of 4 similar departments in the three Thai private hospitals results in the creation of business value for each hospital. The research shows that the strategy of Bumrungrad, Vejthani, and Bangkok Pattaya Hospitals are relevant to their vision and mission focusing on customer satisfaction and the customer as the core business. This strategy, it is argued in the thesis, can be seen as a ‘front strategy’ or ‘obvious strategy’ resulting from the hospitals wanting to provide excellent medical services to people who will then be return customers. The front stage relates to the development of an image as a high quality provider of medical services. The research also argues there is a ‘back stage’ used to support the creation of that image, a strategy built on implementation of a supply chain strategy that becomes an integral part of hospital policy. The research shows that whilst much existing research literature supports a view that adopting reverse logistics, specifically reverse logistics activities in hospitals, can result in added business value, this research confirms that view but it questions the simplicity of the relationship proposed in the extant literature. This research demonstrates the complexity of the RL activities used in each hospital and the associated complexity of types of business value created. These complex relationships (between RL and business value) are all happening simultaneously. The strategy is not a simple one, but the research confirms the importance of strategy in healthcare operations. The research also shows that the back stage strategy of operations, the adoption of supply chain strategy and subsequent adoption of reverse logistics activities, re-enforces the intent and direction of the front stage focus of each hospital in terms of their ‘image’. The research shows that reverse logistics strategy in the Thai hospitals was driven by the need to save costs, use resources efficiently and maintain business plans that delivered high quality health services at high prices. The high level of competition in the Thai hospitals, however, is based on their image and reputations but the research also shows that where these hospitals get their competitive advantage is by focusing heavily on customers’ wants and needs through operational efficiency and cost management, delivered through effective supply chain operations, specifically, through their adoption and use of reverse logistics.
1 CHAPTER ONE: Introduction

This thesis is a study of reverse logistics structures, processes and their characteristics in Thai private hospitals. The research evaluates the strategic importance and role of reverse logistics operations in creating business value in hospitals. Logistics management in hospitals, or Healthcare Logistics, has become a significant issue for enhancing hospitals’ performance in terms of efficiency and quality (Ritchie et al. 2005; Porter & Teisberg 2006; Teisberg 2010). Costs and efficiency are major problems in hospitals and solutions to better understand how logistics and reverse logistics can help to solve those problems are important (Porter and Teisberg 2006). This is especially important for Thailand where the healthcare budget occupies a large proportion of public finance: 4.1% of the Thailand’s GDP, but 14.2% of all government expenditure and 74% of that is spent in public health\(^1\).

Total health expenditure in Thailand grew continuously from 56.15% in 2000 to 75.85% in 2010. In 2010 the percentage of total health expenditure in Thailand had increased by about 25% since 2000 (Fig. 1.1).

![Figure 1.1: Public health expenditure (% of total health expenditure) in Thailand](http://www.tradingeconomics.com/thailand/health-expenditure-public-percent-of-total-health-expenditure-wb-data.html)

According to the Royal Thai Government (RTG) Bureau of the Budget, for the fiscal year 2011 expenditure in the Ministry of Public Health was 4.2% of total government expenditure. (Figure 1.2) This statistic represented an increase of 21.3% from the 2010 fiscal year.

![Expenditures by Ministries](image)

**Figure 1.2: Expenditures by Thailand’s Ministries**  
*Source: Bureau of the Budget: Thailand’s Budget in brief fiscal year 2011*

Figure 1.3 below summarises the growing expenditure in Thailand’s health budget (2010-2011). Expenditure increased from 178,432.4 million baht in 2010 to 208,093.4 million baht in 2011.
The health budget in Thailand had increased, as in Figure 1.3, from 2010 to 2011 above. It most probably will increase continuously in the future. However, in order to deal with this problem the use of reverse logistics as a strategy becomes one of the solutions adopted by the Thai hospital system.

The adoption of reverse logistics strategies has the potential to improve efficiency and decrease costs. For example, Ritchie et al. (2000) showed, in the case of the Manchester Royal Infirmary (MRI) in the United Kingdom, that recycling pharmaceutical products can lead to better financial performance and operations. This is an important consideration for the Royal Thai Government (RTG) as it deals with escalating healthcare costs, an aging population and the need to service a growing population.

The other main reason for studying reverse logistics in hospitals in Thailand is a micro-economic one related to the cost of waste management in hospitals. The amount of waste generated in US hospitals is approximately 6.670 tons per day, or about 1% of the 158 million tons of municipal solid waste produced annually (Rutala & Mayhall 1992). There are...
no specific figures for Thailand, however, the amount of waste would also be significant. Manowan (2010) shows that cost reduction is important in waste management from hospitals, but a logistics-based solution or use of reverse logistics is not part of that work over the past 20 years. For the coming years 2015 onward in order for Thailand to compete with 10 countries that constitute the new Asian Economic Community (AEC) as a single market and representing a growing trend in ‘medical tourism’, the Thai-medical hub of Asia has become a significant issue for the government (Banomyong et al. 2010). Part of their considerations are that effective supply chain management, logistics and reverse logistics should be considered as a business tool, or strategy, for enhancing efficiency in the medical industry in Thailand in order to maintain its competitiveness in the AEC.²

Given the importance of reverse logistics, there is a need to ascertain how reverse logistics plays a strategic role within organisations, particularly in the healthcare industry. The business value that reverses logistics creates for healthcare organisations in an Asian country is inadequately understood and poorly theorised. It is therefore vital to explore the strategic role of reverse logistics both across the hospital and in different departments in hospitals.

1.1 Background

a) Reverse Logistics

This research is grounded in the existing literature in the areas of Supply Chain Management, Logistics, Reverse Logistics, and Strategic Management. These are explained in more detail below.

Supply Chain Management (SCM) can be defined as a process-oriented, integrated approach to procuring, producing, and delivering products and services to customers and has a broad scope that includes sub-suppliers, suppliers, internal operations, trade customers, retail customers, and end users (Metz 1998; Zeng & Pathak 2003; Cooper et al. 1997). Morgan (1997) also defines Supply Chain Management (SCM) as “the alignment of buyers, suppliers, and customers and their processes to achieve an advanced form of competitive advantage” pp. 170-185. Furthermore Supply Chain Management is a major future trend that is important for purchasing and supply management professionals in the 21st century (Carter &

Narasimhan 1996). Hospitals have significant supply chains and so managing those resources is and will become more important.

Reverse logistics is an integral part of Supply Chain Management differentiated from the linear logistics process as shown in Figure 1.4.

![Figure 1.4: Reverse Logistics and Closed-Loop Supply Chains](source: Dekker, Fleischmann, Inderfurth, & Wassenhove (2004))

Direct logistics or supply is the general distribution of products from the beginning of a supply chain (manufacturers) flowing continuously to the end of the marketing channel (users). Conversely, the reverse logistics and closed-loop supply chains flow backwards from the users towards but not always to the manufacturers. After products are used or damaged (reaching the end of their life as trash, junk, etc.), they are returned for the process of recovery. The reverse logistics process begins with the used products being sorted into two types. The first type consists of used products which can be recycled and resold and if that cannot be done, there is a disposal process. On the other hand, the types of used products called hazardous materials must be processed in using specially designed processes either for
human safety and/or maintaining the environment in as pristine a state as possible. Definitions of reverse logistics vary and are summarised in Table 1.1 below.

<table>
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<td>Kopicky et al (1993), Stock (1992), Pohlen &amp; Farris (1992)</td>
<td>Reverse Logistics is a broad term referring to the Logistics Management and disposing of hazardous or non-hazardous waste from packaging and products. It includes reverse distribution …which causes goods and information to flow in the opposite direction of normal logistics activities</td>
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<td>James (1998)</td>
<td>Reverse Logistics refers to the role of logistics in product return, source reduction, recycling, material substation, reuse of materials, waste disposal, and refurbishing, repair and remanufacturing</td>
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<td>The Council of Supply Chain Management Professionals (CSCMP) Roger &amp; Tibben-Lembke (2001)</td>
<td>The process of planning, implementing, and controlling the efficient, cost effective flow of raw materials, in-process inventory, finished goods and related information from the point of origin to the point of consumption for the purpose of conforming to customer requirements.</td>
</tr>
<tr>
<td>Schatteman (2003)</td>
<td>Reverse logistics moves product from the point of consumption to the point of origin to recapture value or ensure proper disposal.</td>
</tr>
<tr>
<td>Fen (2010)</td>
<td>Reverse logistics, the process of returning finished products for replacement, repair, or credit, often is viewed as a necessary but costly part of maintaining an efficient supply chain</td>
</tr>
</tbody>
</table>
Kopicky et al. (1993), Stock (1992), and Pohlen and Farris (1992) maintained that reverse logistics is a broad term referring to the re-management of supplies used and disposing of hazardous or non-hazardous waste from packaging and products. It includes reverse distribution, which causes goods and information to flow in the opposite direction of normal logistics activities. Stock (1992) contended that reverse logistics refers to the role of logistics in product return, source reduction, recycling, material substation, reuse of materials, waste disposal, and refurbishing, repair and remanufacturing.

The Council of Supply Chain Management Professionals (CSCMP) states that reverse logistics is the process of planning, implementing, and controlling the efficient, cost effective flow of raw materials, in-process inventory, finished goods and related information from the point of origin to the point of consumption for the purpose of conforming to customer requirements. Schatteman (2003) defines reverse logistics as a process that moves products from the point of consumption to the point of origin to recapture value or ensure proper disposal. Fen (2010) states that reverse logistics, the process of returning finished products for replacement, repair, or credit, is often viewed as a necessary but costly part of maintaining an efficient supply chain.

Each of these definitions substantially says the same thing. Some definitions refer to the effects of RL on cost reduction, or to the recapture of value, or to maintain customer satisfaction and sometime just disposal. Each of these processes is essentially there to create business value. What is unclear from these definitions is the strategic intent of companies/organisations in creating that business value. Therefore it can be argued that, for the purposes of this research, reverse logistics is the process of moving goods from their typical final destination for the purpose of capturing value, or achieving proper disposal to the satisfaction of the customer or consumer. Remanufacturing and refurbishment activities may be part of the procedure. Reverse logistics includes processing returned merchandise due to damage, seasonal inventory, restock, salvage, recalls, and excess inventory. It also includes recycling programs, hazardous material programs, obsolete equipment disposition, and asset recovery.

In this research the focus is on reverse logistics in hospitals. The intent here is to use the activities of Reverse Logistics (re-use, re-sale, re-distribution, repair, refurbishing,
remanufacturing, retrieval, recycling and incineration) to examine how these activities are used strategically in hospitals in Thailand to create business value for these organisations. Beltran (2002) states that reverse logistics activities can be classified into two larger categories (products and packaging). Skinner, Bryant and Richey (2008), Chan and Chan (2008) and Norek (2003) noted that any organisation commonly adopts at least five reverse logistics activities relating as disposition strategies. The cyclical process of activities involved in RL is shown in Figure 1.5.

![Figure 1.5: Overview of reverse logistics and closed loop supply chain models
Source: Adapted from Dekker, Fleischmann, Inderfurth & Wassenhove (2004, p. 15)](image)

What is not evident in Figure 1.5 and many similar diagrams about reverse logistics is the role that strategy plays and the business value that is created as a result of strategic decisions to adopt various specific RL activities.

Blumberg (1999) states that reverse logistics should play an important role within a company in order for meeting its market needs. That study showed that the two critical factors a company should be most concerned with in the contemporary business world to meet the
needs of the market are reverse logistics and repair services. Specifically other research shows that reverse logistics is implemented to:

- Improve customer satisfaction and loyalty (Pollock 2007; Richey et al. 2005; Daugherty et al. 2002; Meade et al. 2002; Daugherty et al. 2005);
- Reduce repair / replacement unit costs (Jahre 1995; Meade et al. 2002);
- Reduce replacement turnaround times;
- Obtain feedback on hardware design and ease of use (Ravi et al. 2005);
- Obtain feedback on end consumer education and first level customer support;
- Improve understanding of the real reasons for hardware returns;
- Reduce overall level of returns (Ritchie et al. 2000);
- Standardise returns processes across enterprise where possible/desired (Ritchie et al. 2005);
- Utilise common systems throughout the enterprise and automate the returns process to the extent possible/desired;
- Handle increased volumes of returns due to new products, programs, business partners;
- Enable demand-driven supply chain concepts for returned products; and
- Differentiate company services from the competition (Dowlatshahi 2000; Efendigil et al. 2008).

To achieve these intentions for implementing reverse logistics requires companies to continually improve what they do. Improving the reverse logistics process starts with making strategic decisions about what needs to be improved. Commonly, companies adopt overall strategies to do this by making the point for returned product as close to the customer as possible, or by minimising shipping costs, and/or by minimising refurbishment/repair costs, and/or by reducing costs and the overall cycle time.

Reverse logistics then can play a role as a form of business tool leading to competitive advantage (Torre et al. 2006; Prahinski & Kocabasoglu 2006; Krumwiede & Sheu 2002; Beltran 2002). Reverse logistics can also provide business opportunities resulting from obtaining benefits in terms of profits through cost reduction (Torre et al. 2006). Both of these elements are derived from strategic goals. On this theme Tiwari (2009) argues that the value of reverse logistics is strategic and shows how to apply reverse logistics efficiently focusing
on the Consumer Packaged Goods (CPG) industry. The outcomes can appear in the following ways: revenue maximisation, complying with regulations, recycling and environmental consciousness, economics benefits, profit maximisation, customer relations management and assets recovery and utilisation through reverse logistics strategy.

Reverse logistics can also build competitive advantage through a reverse logistics strategy or business strategy (McNeil 2004; Pollock 2007; Jayaraman & Luo 2007; Fassoula 2005). McNeil (2004) argues further that a reverse logistics strategy can help a company create value, for example, through profits maximisation, productivity enhancement and increased competitiveness, improving concerns about environmental issues and conforming to regulations. According to Pollock (2007), a company in the business world can increase effectiveness of customer performance and competitive advantage by applying a reverse logistics strategy. Jayaraman and Luo (2007) also note that a redefined value chain strategy and reverse logistics activities (reuse, repair, refurbishing, recycling remanufacturing, or redesign of returned products) should be recognised as a business strategy for companies that enables competitive advantage. Additionally, Fassoula (2005) states that reverse logistics can be recognised as a process which affects the cost of quality leading to competitive advantage by reducing company costs. Therefore, reverse logistics can bring about competitive advantage to the company adding business value.

Reverse logistics can also lead to profit maximisation (Andel 1997; McNeil 2004; Tiwari 2009) through refurbishment or recycling as a priority leading to increasing profits in the company. Strategic value can also be realised in improved resource efficiency, according to Das (2012), who used a mixed-integer programming (MIP) model for the strategic production and distribution planning of a supply chain (SC) integrating a reverse logistics system. Dolatshahi (2005) notes that reverse logistics is also a strategic framework for the design and implementation in RL activities: recycling, remanufacturing, or disposal leading company to enhancing RL efficiency.

The literature then suggests that the adoption of reverse logistics, specifically reverse logistics activities, can result, through the adoption of an RL strategy, in added business value. The cycle of RL activities adopted as part of a strategic plan involves adoption of activities, leading to the attainment of strategic value in various forms, which if successful it
can be argued, promotes continuity in the cycle (Figure 1.6). This cycle provides the research framework in which this research will be conducted built on the strategic intentions of business management, using Porter’s Strategy Theory and through the role of costs as resources in an organisation (Conner 1991: Conner & Prahalad 1996; Wernerfelt 1984; Barney 1986a, 1986b, 2001), which argues that the basis for competitive advantage results from the extent and application of the resources the firm can use.

Figure 1.6: Cycle of Strategic Value Creation and Reverse Logistics

The intent in this research is to differentiate both sets of elements, as shown in Figure 1.7, and map the specific effects of all RL activities on specific business value outcomes, using three Thai hospitals as case study examples.
b) Hospital Logistics

Poulin (2007) states that Hospital logistics can be seen in terms of a goal setting process leading the company to efficiently deliver medical supplies and pharmaceutical products to the final consumer: the patient. This study has exposed the outstanding amount of hospital expenses or budget of 30% to 46% costs occupied by logistics activities. He argues that the adoption of best practices can reduce more than half of the supply chain and logistics costs in hospitals (Poulin 2007). Typical processes used in hospital logistics are shown in Fig. 1.8.
These processes may be different depending on each hospital management system but typically the hospital management displays the processes and departments that are responsible as shown above. The two types of flow can be seen in terms of materials flows and information flows. However, this study does not differentiate the various elements, materials or information, of reverse logistics activities nor does it illustrate their impact on business value specifically in this hospital study.

c) Thai Hospital Logistics

This present study of logistics management in Thailand’s hospitals focuses on the Royal Thai Government policy of a medical hub with the aim of increasing patient safety and developing a standardised coded system (Digest 2011). The research on medical hubs and healthcare
logistics is led by the Centre of Logistics Management (CLM), Faculty of Engineering, Mahidol University with a focus on 6 projects:

- Logistics Management for Enhancing Competitive Advantage of Health Care Service in Thailand;
- E-Health Logistics management for enhancing healthcare Supply Chain in Thailand
- A Standardisation of coded system for medicines;
- The Study and Development of Logistics and Supply Chain Management in pharmaceuticals in hospitals;
- Healthcare Reliability and Facility Management; and
- The Development of E-Logistics for resolving Medication Errors.


However, these projects focus on the mechanics of logistics and reverse logistics and do not include a detailed evaluation of the role or usefulness of reverse logistics, nor of the various reverse logistics activities that can be used in the hospital system. The focus is on logistics management and purchasing rather than on re-use, re-engineering, re-manufacturing, etc. In Thailand “Reverse Logistics” is not mentioned widely among various Thai entrepreneurs because the first priority are areas of development of supply chain or logistics management to meet the growing needs of an export-driven economy. Reverse logistics is considered an element in improving cost efficiency, time accuracy, getting the right information and ensuring customer satisfaction (Logistics Digest 2011).

Importantly, however, reverse logistics in Thailand is considered important for improving organisation’s ability to initiate customer satisfaction, cost reduction and profitability (Banomyong et al. 2010). It is argued that reverse logistics should be developed as a business strategic tool in order to differentiate organisations and to create better customer satisfaction. (Logistics Digest 2011). Reverse logistics in Thailand is seen in areas of product life cycle management (Tibben-Lembke 2002), information support (Daugherty et al. 2002), total cost of ownership (Tibben-Lembke 1998) and legality (Banomyong et al. 2010) and in terms of return of products (Brito & Dekker 2003). None of these papers has addressed about how reverse logistics plays a role in hospitals. Neither have they addressed the relationships between types of reverse logistics applications and business value created. This research aims to understand that relationship in Thailand and therefore frames the research questions.
According to Kritchanchai and Suwandechochai (2010), Reverse Logistics (RL) as a part of Supply Chain and Logistics can be recognised as playing an important role in service industries especially in hospitals in Thailand. The benefit of this can be seen in terms of business value through creation of competitive advantage. The results include new inventory systems (eg. Tops supermarkets); software development for connecting the internal supply chain among medicine storerooms in each ward, with both a central warehouse and hospital purchasing departments in Chulalongkorn and Mahodol University Hospitals; the recycling of pharmaceutical products within hospitals in Thailand; logistics IT platforms for FedEx Thailand; IT systems for managing car hire e.g. Budget; and integrated supply chain distribution systems in the large food producers such as Charoen Pokphand Group (CP; Thai).

1.2 Research Aim and Research Questions

The overarching aim of this thesis is to develop a better understanding of reverse logistics structures and processes to evaluate their strategic importance in creating business value in hospitals’ supply chain both across the hospital and in different departments within them. The following research questions are set out to address this aim.

Main Research Question
- “What strategic roles does the implementation of reverse logistics activities play in private hospitals in Thailand?”

Sub questions
- “RQ1: What are the different components of reverse logistics in hospitals?”
- “RQ2: What is the nature, patterns and characteristics of interactions between reverse logistics activities and business value creation?”
- “RQ3: What are the strategically critical reverse logistics activities that create business value in hospitals?”

1.3 Research Methodology

It is appropriate here to adopt a qualitative approach as the research is exploring how each activity specifically adds value. A qualitative method applies words or images for exploring
and understanding the social phenomena of interest. Bouma and Ling (2004) state that a qualitative method is an approach for answering the questions in specific areas or given situations. It provides answers in more detail such as what is happening in a conversation, the meaning of the message, feelings, and outcomes. It is only through interviews and getting rich information there that this can be done. In this research the qualitative approach will be applied through three case studies.

An interpretative research methods approach looks for multiple interpretations and a deep understanding of the often conflicting rationalities of the actors involved in information systems innovation (McGrath 2005). Interpretive research assumes that “our knowledge of reality is gained only through social constructions such as language, consciousness, shared meanings, documents, tools and other artefacts” (Kline & Myers 1999, p. 69). Using an interpretivist approach requires data to be analysed based around themes in the existing literature, and looking for new themes. In this research the adoption of a hermeneutics cycle of interpretation, evaluation, meaning creating, interpretation and theorising is used.

The overall context of the research will be a multiple case study to obtain a high level of confidence in the robustness of the method (Campbell 1975; Yin 1994; Stake 1985). The multiple case study enables a comparison in order for more in-depth understanding of different exemplars. By definition cross-case analysis relates to comparisons being made across different places, or of the same place across different times (a longitudinal analysis such as that by Gu and Ryan (2008, 2011) in their studies of Shi Chi Hai Hutong in Beijing, or indeed of different places at different times. Nonetheless they are related to each other by the commonality of a theme identified by the researcher. The sample for this research includes three significant private hospitals in Bangkok (Bangkok Pattaya Hospital, Vejthani Hospital and Bumrungrad Hospital). The reason of these hospitals being selected is that they are considered as the top private Thai hospitals, (http://hospitals.webometrics.info/en/Asia/Thailand?sort=asc&order=World%20Rank) and because access was available to those in the hospitals responsible for reverse logistics.
This research consists of two stages.

1. The first stage was research of documents such as texts, hospital records, government publications, policy documents, and annual reports in order to better understand the role and extent of adoption of reverse logistics.

2. The second stage consisted of interviews relating to the use of reverse logistics in each hospital, evaluated and cross-referenced using a single focus group.

1.4 Thesis Outline

Chapter 2 is a review of the literature related to fundamental principles and theories that contribute to an understanding of a supply chain management, logistics and reverse logistics (RL). The review includes business strategy, supply chain management, reverse logistics (RL), a strategic view of reverse logistics (RL), and strategy, hospitals and business value in developing a research framework that addresses the research problem and provides a base on which to build the empirical research.

Chapter 3 describes the research methodology and research design applied in this study for achieving the research objective of evaluating the strategic role of reverse logistics in hospitals: case studies in Thailand. This chapter deals with issues relating to the research methodology and design of the study and argues their justification. And provides details about each of the three hospitals in Bangkok studied: Bumrungrad Hospital, Vejthani Hospital, and Bangkok Pattaya Hospital. This is important because, as the analysis in this chapter and the next will show, the strategic role of reverse logistics provides an economic justified set of strategies supporting the overall hospital strategies. As the research continued it became clear that what was apparent for the hospital overall was clearly different strategically from what the intent was in applying reverse logistics processes throughout the hospitals.

Chapter 4 is an analysis of the data collected from the interviews and document analysis described in Chapter 3. The intent here is to provide an analysis of the types of reverse
logistics across the hospitals and understand the intent of these choices. In each department studied the types of reverse logistics used are mapped against the strategic intent using the model proposed.

Chapter 5 describes an application of relevant theories proposed in Chapter 2: Porter’s Generic Strategic Management (1979, 1980, 1985, 1987, 1991) and his Five Forces analysis (Porter 2008, p. 42); Porter’s Healthcare Competition Analysis (Porter & Teisberg 2006) and the costs through a resource-based view of the firm theory (Bharadwaj 2000; Grant 1991, 1995; Huang et al. 2006; Khatri et al. 2006). These theories are used here to evaluate and explain the forms of business value creation resulting from the adoption of reverse logistics in the case study hospitals. This chapter analyses the strategic role of reverse logistics in all three case studies (Bumrungrad, Vejthani, and Bangkok Pattaya Hospitals), and evaluates the nature, patterns and characteristics of interactions between reverse logistics activities and business value creation.

Chapter 6 is the discussion and conclusion chapter. This chapter revisits the objectives and research questions and evaluates the impact of reverse logistics in each of the hospitals, using common themes to suggest ways of looking at the impact of reverse logistics in hospitals conceptually and then uses that to theorise that impact. This chapter highlights the effects of RL activities on the creation of business value. Finally, this chapter includes a discussion of the contribution of this research to both theory and practice, considers the limitations of the study, makes recommendations for future research, and then offers a conclusion.
2 CHAPTER TWO: Literature Review

2.1 Introduction

This chapter presents a review of the existing literature, both appropriate empirical research and relevant theory, to address the research problem: how can reverse logistics create business value in the context of private hospital case studies. The review will cover supply chain management, reverse logistics (RL), a strategic view of reverse logistics (RL), and business strategy, hospitals and business value in developing a research framework that addresses the research problem and provides a base on which to build the empirical research.

2.2 Supply Chain Management

Supply Chain Management has been defined as a primary future trend important for purchasing and supply management professionals in the 21st century (Carter & Narasimhan 1996). Hospitals have significant supply chains and so managing those resources is and will become more important. Supply Chain Management (SCM) can be defined as a process-oriented, integrated approach to procuring, producing, and delivering products and services to customers and has a broad scope that includes sub-suppliers, suppliers, internal operations, trade customers, retail customers, and end users (Metz 1998; Zeng & Pathak 2003; Cooper et al. 1997). Monczka and Morgan (1997) also define Supply Chain Management (SCM) as “the alignment of buyers, suppliers, and customers and their processes to achieve an advanced form of competitive advantage” (pp. 170-185).

Supply Chain Management (SCM) plays a connective role among various companies through the distribution channels regarding their physical, financial and information flows. Some researchers argue that Supply Chain Management (SCM) is a system that contains multiple entities, processes and activities from suppliers to customers. On the one hand, Supply Chain Management (SCM) is an activity that links companies’ internal processes with the respective ones at suppliers’ and customers’ organisations (Frohlich & Westbrook 2001; Lorentz 2008). However, the objective of supply chain management is the same for meeting customers’
satisfaction, implementing strategies regarding customers’ loyalty, and generating efficiency (Slack et al. 1995). SCM then is integral to strategy development in most companies.

According to Barratt and Oliveira (2001) collaborative Supply Chain Management became a new focal strategy in the 1990s and works well together with just-in-time (JIT), electronic data interchange (EDI) and quick response (QR). These can enhance the capability of information sharing and exchanging (Chandra & Kumar 2001). The business value or benefits created can include:

- Improving customer service;
- Reducing costs;
- Better resource efficiency; and
- Improving business process.

These benefits align with the expectations of the Porter Strategy Model (1979, 1980, 1985, 1987, 1991, 2008) and indicate that the creation of business value in organisations derives from the explicit intent of the organisation’s objectives. Therefore it can imply that SCM would help a company create the business value. The table below (Table 2.1) summarises a number of research case studies illustrative of the benefits of effective supply chain management for creating business value.
Table 2-1: Cases showing supply chains creating business value

<table>
<thead>
<tr>
<th>Benefits of Supply Chain</th>
<th>Operation Examples</th>
<th>Outcomes</th>
<th>Case Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improving customer service</td>
<td>Supply Chain Management applied to inventory management in electronic industry.</td>
<td>Increases stock availability and reduces order cycle time</td>
<td>Ou et al., 2010; Cooper and Ellram, 1993; Mentzer et al., 2011</td>
</tr>
<tr>
<td>Reducing cost</td>
<td>Value Stream Mapping (VSM considered as a lean process) is a tool for eliminating waste adopted at Ford Motor Company in Taiwan</td>
<td>Provides a complete visual flow (material and information) to support decision making Demonstrates the close linkage between information and material flow Develops a plan to eliminate waste and to achieve continuous improvement.</td>
<td>Wee et al., 2009 Rother and Shook, 1999; Womack et al., 1991; Mentzer et al., 2011</td>
</tr>
<tr>
<td>Using of resource efficiency</td>
<td>Application of supply chain management for cooperation with business partners for sharing resources such as materials in food industry and timber industry.</td>
<td>There is an increase in the potential in using materials more efficiently.</td>
<td>Schiephake, 2009; Hammer, 2001</td>
</tr>
<tr>
<td>Improving business process</td>
<td>Applies a supply chain managing for creating the relationships among supply chain partners. (impacts on firm financial and non-financial performance)</td>
<td>Improves not only operational performance, but also enhances customer satisfaction and financial performance</td>
<td>Ou et al., 2010; Mentzer et al., 2011</td>
</tr>
</tbody>
</table>

This research is concerned with the use of reverse logistics in hospitals as part of both their supply chain management and business strategies.
The definition of Supply Chain Management (SCM) has been attempted by many researchers. It is generally regarded as incorporating the following:

- The management philosophy
- The target group
- The objective
- Achieving these objectives

Supply Chain Management (SCM) can be defined as “the network of organization that is involved, through upstream and downstream linkages, in the different processes and activities that produce value in the form of products and services in the hands of the ultimate customer” (Christopher 2005, p. 17) According to Stadtler (2015) the definition of Supply Chain Management (SCM) is represented in the figure above showing the complex network relating to divergent and convergent flows that result from many different customer orders to be handled in parallel. This also shows that the logistics is considered as a part of the network related to good cooperation between various company departments such as marketing.
procurement, logistics and finance. Finally it can help the company to increase the competitiveness of its products and services especially for the customers. In a narrow sense the terms logistics and reverse logistics can be seen simply as a reverse direction of normal logistics and this is explained in more detail in the next section.

Logistics and reverse logistics then are that part of SCM that plans, implements and controls the efficient, effective forward and reverse flow and storage of goods and services and related information between the point of origin and the point of consumption in order to meet customer or business operational requirements.

2.3 Reverse Logistics (RL)

There are many definitions of Reverse logistics in the research literature and these are summarised in Table 2.2 below.

<table>
<thead>
<tr>
<th>AUTHORS</th>
<th>DEFINITION</th>
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</thead>
<tbody>
<tr>
<td>Murphy (1986)</td>
<td></td>
</tr>
<tr>
<td>Murphy and Poist (1989)</td>
<td></td>
</tr>
<tr>
<td>Kroon and Vrijens (1995)</td>
<td>Reverse logistics operations include the collection, recycling, and reusing of products and materials and this is driven by environmental concerns, laws and regulations of the government.</td>
</tr>
<tr>
<td>Murphy et al. (2003)</td>
<td>Reverse logistics is considered as a part of green logistics. Dealing with government regulations, changing customer demands, and the development of international certification standards are enablers for companies to adopt reverse logistics as a company strategy.</td>
</tr>
<tr>
<td>Kumar, Veloz and Rasjidin (2011)</td>
<td>Reverse logistics is considered as a sustainable operation of industry in Ecuador relating to political issues, environment constraints and social pressure.</td>
</tr>
</tbody>
</table>

The meaning generally refer to reverse logistics being the movement of goods back to the point of origin and it is also relevant to ‘green’ concepts and political issues. Interestingly, reverse logistics includes specially activities such as recycling, reuse, refurbishing and waste
disposal, etc. Therefore, the topic of this research focuses heavily on the definition of reverse logistics as mentioned by Kroon and Vrijens (1995) and Stock (1998) in various reverse logistics activities such as Reduce, Reuse, Recycle and examines how business value creation is achieved. These variations taken together provide a comprehensive understanding of what is involved in reverse logistics and the extent and value of its application. According to Kroon and Vrijens (1995), reverse logistics operations include the collection, recycling, and reusing of products and materials and this is driven by environmental concerns, laws and government regulations. Reverse logistics is also considered to be an integral part of green logistics. Dealing with government regulations, changing customer demands, and the development of international certification standards are enablers for companies to adopt reverse logistics as a company strategy (Murphy et al. 2000).

Beltran and Linda (2002) stated that the reverse logistics activities can be classified into two larger categories (products and packaging) and there is not a big difference between them. Skinner, Bryant and Richey (2008) and Norek (2003) noted that organisations commonly adopt at least five reverse logistics activities relating to disposition strategies. Chan and Chan (2008) also described activities in reverse logistics explicitly with reference to reusing and remanufacturing in a company. Their study focused on reverse logistics systems in the mobile phone industry using a survey approach that looked at practices in given areas.

Some definitions (Kumar, Veloz & Rasjidin 2011) look at the effects of RL on cost reduction, or to the recapture of value, or to maintain customer satisfaction and sometimes just disposal. Each of these processes is the expected outcome of a strategy as defined in business strategy models. Each of these processes is also essentially there to create business value. What is unclear from these definitions is the strategic intent of companies/organisations in creating that business value. Therefore, it can be argued that for the purpose of this research, reverse logistics is the process of moving goods from their typical final destination for the purpose of capturing value, or achieving proper disposal to the satisfaction of the customer or consumer. Re-manufacturing and refurbishment activities may be part of the procedure. Reverse logistics includes processing returned merchandise due to damage, seasonal inventory, restock, salvage, recalls, and excess inventory. It also includes recycling programs, hazardous material programs, obsolete equipment disposition, and asset recovery.
Reverse Logistics is an integral part of Supply Chain Management differentiated from the linear logistics process as shown in Figure 1.4 in chapter 1, page 5.

Direct logistics or supply is the general distribution of products from the beginning of a supply chain (manufacturers) flowing continuously to the end of the marketing channel (users). In contrast, the reverse logistics and closed-loop supply chains flow backwards from the users towards but not always to the manufacturers. After products are used or damaged (reached end of their life as trash, junk, etc.), they are returned for recovery. The reverse logistics process begins with the used products being sorted into two types. The first type is the used products which can be recycled and resold and if that cannot be done, there is a disposal process to consider. On the other hand, the types of used products called hazardous materials must be processed in using specially designed processes either for human safety and/or environmental considerations.

Rahman and Subramanian (2012) stated that in order for designing and implementing reverse supply chain systems several models have been developed. According to Carter and Ellram (1998) the models can be classified into two categories: internal and external. The two external factors are government regulations and customer demands while the internal factor is policy entrepreneur as the main driver of reverse logistics systems. The others factors driving an implementation of reverse logistics and supply chain system can be seen as follows: the support given by top management, stakeholder commitment, incentive systems, quality of inputs and vertical integration (Rahman & Subramanian 2012).

Rahman and Subramanian (2012) argued that there are 8 factors for designing and implementing reverse logistics systems relating to factors of EOL computers and a balanced scorecard approach. These factors are:

- Legislation: Legislation is a main driver for a firm’s environmental protection efforts. Legislation can be defined in terms of regulations or statutes to ensure the responsibility of firms to take back and reuse products. The main objective of this is to protect the environment, avoid landfill and prevent contamination of water (Rahman and Subramanian 2012).
• Customer demand: Customer demand is another main driver of a firm’s environmental protection efforts. Customer demand is increasing with reference to green issues and the firm must engage in environmentally friendly supply chain practices (New et al. 2000).

• Strategic cost/benefit: Strategic costs are non-recurring costs incurred for the design and implementation of a reverse supply chain system. Ravi et al. (2005) also stated that strategic cost/benefit is considered as an economic factor for the driving force of reverse supply chains.

• Environmental concerns: Mason (2002) stated that environmental concerns and green issues are drivers of reverse supply chains. Most recent research shows that reverse supply chains can help firms to become more competitive.

• Volume and quality: Guide and Van Wassenhove (2009) stated that the volume of returns and quality of products are major drivers for reverse supply chains.

• Incentive: According to Ferguson and Toktay (2006) the right incentives would enhance return rates and the behaviour of the reseller.

• Resources: The overall success of reverse supply chain systems depends on the effective use of available resources (Dowlatshahi 2005).

• Integration and coordination: Most researchers agreed that integration and coordination are important roles for designing and implementing reverse logistics systems (Rahman and Subramanian 2012).

According to Tan et al. (2003), the US-based computer maker Xeptron: Asia Pacific improved its performance through adopting reverse logistics operations. This company focused on improving the cost and efficiency of the return inventory and on overstocks in the reverse logistics pipeline. In order to implement a better business process, Xeptron established a business strategy based on reverse logistics by applying a standardisation of
returning processes of spare parts to the Asia-Pacific region and the USA via recycling or simply scrapping the parts locally. The expected benefits were:

- Shorter turnaround time;
- Better utilising of assets;
- Cutting transportation costs; and
- Reducing administration costs as a result of economies of scale.

Rahman and Ong (2009) in another study, argued that reverse logistics could be a possible way to minimise hazardous e-waste in the computer industry in Australia, using three case studies. Their results show that there are 4 significant factors (strategic focus, level of experience, operations procedure, and financial arrangements) affecting the impact of reverse logistics operations. It can be implied then that the particular reverse logistics activity (recycling) can become the company’s strategy in order to improve business processes. Finally it is argued that adopting a RL strategy can create a ‘green image’ for the company, complying with the laws and regulations of the government.

In a case study of the electronics industry in China, Lau et al. (2009) showed that external factors such as laws and regulations are the main motivating factors for the company to implement reverse logistics. Moreover, tax policies were another factor which was used in the electronics companies in China to reduce the costs of implementing reverse logistics. The paper suggests that companies should establish reverse logistics as a policy or strategy through the support of the government and through direct investment in order to achieve the best performance from reverse logistics.

In a case study of the garment industry in India, Abraham (2011) showed how the adoption of reverse logistics in the apparel aftermarket helped companies improve business performance (logistics, businesses predictability, margins). This improvement came about from the collaboration between stakeholders in the companies and supply chains. The outcome of this paper reveals that the adoption and implementation of reverse logistics was a good business strategy in the Indian aftermarket and provided better business performance, depending on how well the company can manage collaboration between stakeholders. Finally, Abraham shows that the implementation of reverse logistics can lead to efficiency in the supply chain.
with more predictability and more opportunity to optimise value created by having the right product in the market. The reverse logistics activities which the company implemented were:

- Reusing used clothes:
- Reconditioning used clothes; and
- Re-distributing used clothes in the Indian market.

Janse et al. (2010) used case study research to investigate reverse logistics in the electronics industry to find a diagnostic tool for assessing reverse logistics practices of a consumer electronics (CE) company. The tool, they argued, can provide a self-assessment for a company’s reverse logistics management in order to determine the reverse logistics maturity state. This means that the company should apply reverse logistics as a business strategy but the important thing is that it should first undertake a self-assessment. The key finding of this paper was that the expected benefit of reverse logistics management is creating a competitive advantage (environmental and economic win-win situation).

Paquette (2009) studied how to create reverse logistics flow in the mobile phone industry. The aim was to explain the role of reverse logistics in connections in the mobile phone industry, then analyse the characteristics of reverse logistics in the industry and finally provide a model of analysis for implementing a reverse logistics strategy. It was argued that doing this will enable a company to gain a competitive advantage in the marketplace through the adoption of a reverse logistics strategy.

In another case study of reverse logistics operations (repairing) in relation to service management, Amini et al. (2005) showed how a company can design a reverse logistics operation for short cycle time repair services. The objective was to examine how the company applied reverse logistics through repairs, to improve service delivery to customers by reducing the repair service cycle time of a medical diagnostic manufacturer. The benefit of adopting this strategy in relation to RL was more customer loyalty due to meeting the customers’ satisfaction in terms of total cost of ownership.

According to Murphy et al. (2003) green logistics should be considered as a business strategy for competing in contemporary business. The business strategies mentioned in this paper included reverse logistics strategies, for example, reducing consumption, reusing and
recycling materials. This research paper provides a comparative logistics study by comparing US and non-US firms. Pohlen et al. (1992) stated that reverse logistics can become one of the ways for generating a profit in the recycled plastics industry. The objective of their research was to examine the reverse logistics flows of recyclable materials and provide an overview structure of the reverse logistics channels. The findings show the possible benefits are improved channel efficiency and a possible new market for recycled products.

Hu et al. (2002) stated that reverse logistics should be considered as a company strategy. This research provides a reverse logistics model for minimising the cost of hazardous wastes in the company. The result also shows the benefits of a reverse logistics strategy resulting in a model that could help the company reduce reverse logistics costs by more than 49%. Tan and Kumar (2006) demonstrated how to create a decision-making model for reverse logistics in the computer industry in order for examining and investigating what the effects are, resulting from changing laws and regulations. The benefit of this model, they argued, lies in helping the company forecast possible operating results.

Kneemeyer et al. (2002) described the factors which affect the implementation of reverse logistics systems in EOL computers. These factors are internal environmental factors: strategic costs, overall quality, customer service, environmental concerns, and legislative concerns. The objective of this research was to examine the feasibility of designing a reverse logistics system, economic, legislative and social engagement incentives. According to Cruz-Rivera and Ertel (2009) economic, legislative and social engagement incentives are the main factors affecting reverse logistics implementation. The research aimed to create a closed-loop supply chain for the collection of End-Of-Life Vehicles in Mexico. The result shows that the cost factor is considered to be the main one that directly affects establishing a reverse logistics network for the collection of such vehicles in Mexico.

In summary, this research defines RL as a cyclical process using a variety of operations and activities. The cyclical process of activities involved in RL is shown in Figure 2.3.
What is not evident in Figure 2.3 and many similar diagrams about reverse logistics is the role that strategy plays and the value that is created as a result of strategic decisions to adopt various specific RL activities. That is the intent of this research. In this research the focus is on reverse logistics in hospitals. The intent in this study is to use the activities of reverse logistics (re-use, re-sale, re-distribution, repair, refurbishing, remanufacturing, retrieval, recycling and incineration) to examine how they are used strategically in hospitals in Thailand to create value for the organisation.

2.4 Strategy

Strategy is important because it is the direction that companies take to establish and create business value. According to Campbell et al. (1995) and Gilmour (1999) companies need to implement strategy in order for providing guidelines for management and, specifically for the supply chain, to measure how well the supply chain processes of the organisation are delivering value to customers. Sadler and Hines (2002) also state that it is necessary for companies to connect their operations and logistics (reverse logistics can be considered as
apart of logistics) functions with strategies in a supply chain in order for gaining better business quality performance and gain improved business value.

Strategic management concerns the identification and description of strategies that company owners, boards, CEOs, and managers can make to achieve better performance and a competitive advantage for their organisation. The intention of businesses is to adopt strategies that will enable them to achieve sustainable competitive advantage (Porter 2008). One of the major roles of strategic management is to incorporate various functional areas of the organisation and ensure the various functional areas harmonise and align. Strategic management is an ongoing process. Therefore, it must be realised that each component interacts with the other components and that this interaction often happens simultaneously. Porter’s theory proposes a five forces model for industry analysis focusing on strategy. He argues that there are five forces which impact the business. These include, the bargaining power of customers, bargaining power of suppliers, threat of substitute products and threat from new entrants (Porter 1979, 2008) (see Fig. 2.3).

![Five Forces Model](image)

**Figure 2.3: The five forces that shape industry competition**
*Source: Porter (2008, p. 42).*
According to Porter (1979, 1980, 1985, 1987, 1991, 2008) and based on applications of his theorising, three main strategic options can be adopted as a strategy leading firms to obtain sustainable competitive advantage. Each of the three options is considered within the context of two aspects of the competitive environment. The figure below (Fig. 2.4) shows three generic strategies: Cost leadership, Differentiation, and Focus.

However, Porter is also criticised as his model does not take account of innovation and the model can vary between industries and is therefore not as universal as proposed. However, the intent here is not the application of the Porter model *per se*, but to understand what strategy is and why it is important in terms of the relationships of competitive scope and competitive advantage as a basis for hospitals in Thailand to make decisions about what methods of Reverse Logistics will support strategic decisions to adopt reverse logistics as their strategy.

According to Porter (1980, p. 37) differentiation is “ideally, firm differentiates itself along several dimensions”. Mintzberg (1988) and Wirtz et al. (2007) argue that companies can differentiate themselves from their competitors in various ways, by product, by process, by brand, etc. According to Naidoo (2010) a company can obtain a sustained competitive advantage through adopting marketing innovation (differentiate and cost leadership). The four categories of differentiation generally recognised are: communication differentiation.
(Boulding et al. 1994; Hill 1990), price differentiation (Hooley & Greenley 2005),
distribution differentiation (Costanzo et al. 2003), and brand differentiation (Chaudhuri &
Holbrook 2001; Smith & Park 1992; Wirtz et al. 2007). Price differentiation can be defined in
terms of using a premium price for the product with added extra value and focusing on one or
more target group in marketing, for example, developing a green image. Therefore, the
company can gain business value from that strategy. A differentiated strategy can create
another business value (customer satisfaction) because differentiated goods and services fulfil
the needs of customers through a sustainable competitive advantage (Porter 1980).

A cost leadership strategy can be defined in terms of how a company can undertake actions to
achieve a minimised cost target leading to lower/lowest price of product. The intent is to
increase market share. According to Miller (2006), cost leadership is a strategy where
companies focus on the price of their products or services that must be cheaper than those of
their competitors. Interestingly, researchers also suggest that companies should combine two
strategies (mostly found in a mix of a differentiation and cost leadership strategy) into their
business strategy to obtain competitive advantage (Porter 1980; Naidoo 2010; Miller, 2006).

A focus or niche strategy is defined in terms of focusing on a specific or small target market
group, known as a niche market, fulfilling the specific needs of usually specific customers.
There is such a clear differentiation in products among the competitors in a market. A niche
strategy is often used by smaller firms. Porter (1980) states that a focus or niche can even
focus on a specific type of customer. However, it is found in research that this strategy has no
unique implementation requirements such as human resources, or organisational structure
(Valos et al. 2010). Ehmke (2012) argues that a niche market strategy can increase profits
and provide a long-term sustainable competitive advantage. However, this is not a complete
depiction of strategy. The efficient use of resources is also important in strategy and in the
creation of business value in companies and organisations. For this reason the Resource
Based View of the Firm theory is important to understand in the context of aligning the
creation and implementation of strategy with decisions such as the adoption of reverse
logistics in terms of the impact on resources.

Strategic management, in all of its variations, tries to understand the enablers for business to
Cousins 2005; Fahy 2000; Fahy, Farrelly & Quester 2004; Flint & Van Fleet 2005; King 2007; Liao & Hu 2007; Lin 2003; Ma 1999a, 1999b, 2000, 2004; Peteraf 1993; Porter 1985, 1991; Porter & Kramer 2006). Porter (1981, 1985, 1991, 1993) and others argued that the external positioning of a firm is the critical factor for achieving and sustaining competitive advantage. A resources-based view of strategic management presents an argument that competitive advantages for a firm derives also from their internal resources and the efficient allocation of those resources to the business processes, either reducing costs or rents to facilitate better pricing and improve profitability (Barney 1991, 2001a, 2001b; Fahy 2000; Mills, Platts & Bourne 2003; Peteraf & Bergen 2003). In this study that difference is important to understand as the decisions to adopt various methods of reverse logistics within different departments in the hospitals are internally focused decisions. They are fundamentally resource-based.

In this research private hospitals in Thailand are used as case studies because the hospital CEOs there believe that the adoption of reverse logistics can create business value (Resource Efficiency: Waste Management) for the hospital leading to competitive advantage, accepting that the intent, in this case of hospitals, is to operate profitably. Essentially they see the need to better manage their resources and supply chains that use those resources, support the operations of the hospitals and create business value.

Using in-depth case studies and delving into what is happening in specific departments within the case study hospitals, as this research does, go beyond the macro perspective of the Porter models. More recent perspectives argue that this close intrusion into how particular parts of organisations adopt, use and evaluate strategy is best seen in a ‘strategy as practice’ perspective. According to Jarzabkowski (2007), Jarzabkowski and Spee (2009) and Whittington (2003), strategy as practice can be defined as an approach attempting to understand strategy by examining what people do. The concentration of strategy as practice is shown as a comprehension of the human agency in the construction and enactment of strategy (Jarzabkowski et al. 2004; Jarzabkowski & Spee 2009; Whittington 2003; Tsoukas & Knudsen 2003). “Strategy as practice, they argued, can help improve practice by providing explanations about what happens when strategy is put into action, i.e. what activities take place and what are the outcomes of those activities” (Dejsakulrit 2013, p. 14). Jarzabkowski et al. (2008, p. 283) argued that “strategy as practice examines the actual doing of strategy:
the material artefacts to hand, the language that is used, the physical positioning in strategy episodes, the laughter, anger, excitement, anticipation, boredom, repetition and political manoeuvring that are bought together in strategy work”.

This argument about what people do and the effects of understanding the context in which they work as doers of strategy, is part of the need to comprehend the wider context in which the strategy occurs. A key element in researching ‘strategy as practice’ is to identify and describe the activities or practices happening in the strategy process. These practices are not static nor immutable (Jarzabkowski et al. 2007), but are diverse and variable, often combined, altered (Orlikowski 1996; Seidl 2007), or iterated (Corbitt 1997, 2000). Jarzabkowski et al. (2007) proposed a structured view of the strategy process (strategizing) as shown in Fig. 2.6 below.

![Figure 2.5: A conceptual framework for analysing strategy-as-practice](source: Jarzabkowski et al. (2007, p. 11)).

Dejsakulrit (2013) noted that strategy can be iterative and/or evolutionary, and that there is also a view that it is also episodic and sometimes ritualistic. It is important to enable
researchers to realise the possibilities of this view of strategy as it relates to changes which are inclusive of evolutionary, iterative and dynamic. This research uses both the macro approach to strategy, exemplified in Porter’s modelling, and also employs the detailed explicit descriptions evident in ‘strategy as practice’ to extract what was happening and what the impact was in case studies of private hospitals in Thailand and four departments within each hospital. The intent was to examine their reverse logistics practices from a strategic perspective.

2.5 A Strategic view of Reverse Logistics

The decision to adopt reverse logistics in any organisation is inevitably a strategic one. Blumberg (1999) stated that reverse logistics should play an important role within a company in order to meet its market needs. That study showed that the two critical factors that a company should be most concerned with in the contemporary business world are reverse logistics and repair services. Specifically the existing research shows that reverse logistics are adopted by business and other organisations to:

- Improve customer satisfaction and loyalty (Pollock 2007; Richey et al. 2005; Daugherty et al. 2002; Meade et al. 2002; Daugherty et al. 2005)
- Reduce repair / replacement unit costs (Jahre 1995; Meade et al. 2002)
- Reduce replacement turnaround times (Tan et al. 2003)
- Obtain feedback on hardware design and ease of use (Ravi et al. 2005)
- Obtain feedback on end consumer education and first level customer support (Jayaraman et al. 2007)
- Improve understanding of real reasons for hardware returns (Brito et al. 2003)
- Reduce overall level of returns (Ritchie et al. 2000)
- Standardise returns processes across enterprise where possible/desired (Ritchie et al. 2005; Ronald et al. 2002)
- Utilise common systems across enterprise and automate the returns process to the extent possible/desired (Min et al. 2006; Krumwiede et al. 2002)
- Handle increased volumes of returns due to new products, programs, business partners (Min et al. 2006; Krumwiede et al. 2002)
- Enable demand-driven supply chain concepts for returned products (Blackburn et al. 2004); and
• Differentiate company services from the competition (Dowlatshahi 2000; Efendigil et al. 2008).

This literature supports the position that the adoption of reverse logistics, specifically reverse logistics activities, can result - through the adoption of an RL strategy - in added business value.

In hospitals the existing reverse logistics activities used include return, remanufacturing, recycling, repair, and incineration (Alshamrani et al. 2007; Dowlatshahi 2010; Shi et al. 2009; Xie et al. 2010; Souza et al. 2006; Gibson 2008; Cottrill 2003; Breen 2006; Ritchie et al. 2000; Pereira et al. 2012; Pappu 2004). Most typically return activities are implemented (Alshamrani et al. 2007; Breen 2006; Ritchie et al. 2000; Pappu 2004; Dowlatshahi 2010; Gibson 2008; Cottrill 2003). Alshamrani et al. (2007) examine why the American Red Cross applied the return process as a reverse logistics strategy for resolving the problem of blood distribution in each hospital. The strategy that worked well together with this is the pick-up strategy. Hospitals can then gain the following benefits: improved customer service performance, enhanced environmental management, and increased reverse logistics efficiency.

The other reason why hospitals use the return process is to send expired medicines back to the original sources. Pappu (2004) argued that out-of-date medicines should be returned to the suppliers. RFID is also mentioned as a technology which the company should consider in order for implementing a supply chain strategy, and then the hospitals can benefit through real-time data and item visibility. Ritchie et al. (2000) argued further that the return process brings about competitive advantage to the hospitals in both finance and operations. Cottrill (2003) argued that in order for remedying hospitals’ returns processes, outsourcing Reverse Logistics is a better choice for keeping track of products and payments. The benefits that the company can gain are apparently reduced error rates when drugs are dispensed, and giving caregivers a better system for identifying the medicines they administer.

Breen (2006) stated that more than one reverse logistics activity can play a strategic role in a company simultaneously. Multiple activities in reverse logistics, he argues, are common, adding to complexity and enabling multiple ways of creating business value within a single
organisation. Sometimes even single units within an organisation use multiple RL activities. Hospitals face the same problem: a lack of customer compliance in returning to the source. It causes late delivery in returning expired medicines to the place of origin and may lead to financial losses for the company. In addition, Ritchie et al. (2000) showed in the case of the Manchester Royal Infirmary (MRI) that recycling pharmaceutical products can lead to better financial performance and operations.

According to Amini et al. (2005) and Gibson (2008) repair service is another element of Reverse Logistics activities that a hospital uses to meet the goal of sustainable competitive advantage. Amini et al. (2005) explained the importance of repair services work in a medical diagnostic manufacturer (MDM). The customers in this case study are varied medical diagnostic laboratories such as hospitals, research centres, and medical clinics. The research concluded that a strategy of reducing repair cycle times improves customers' satisfaction. Interestingly, Gibson (2008) also argued that repairing is an important element of reverse logistics in hospitals to create improved customer service, reduce inventory risk, extend equipment lifecycles, and obtain lower costs and therefore gain competitive advantage.

Importantly, waste management has become a significant issue for every hospital in complying with laws and regulations. According to Souza et al. (2006) waste management in hospitals can be defined as the residues of health services proceeding from hospitals, medical clinics and other great generators. In hospitals the residues may come from pharmacies, dental and veterinarians clinics, domiciliary assistance, morgues, asylums, and blood centres. However, in order to prevent hazardous and harmful chemicals affecting humans, the laws and regulations in each country must control strictly hospitals’ waste management. Souza et al. (2006) argued that hospital solid waste (HSW) management is a significant issue and that reverse logistics can be applied effectively to HSW management.

Incineration is also considered a tool for better waste management in hospitals (Pereira et al. 2012; Shi et al. 2009; Souza et al. 2006). Pereira et al. (2012) showed how the Brazilian public hospitals operate their waste management together with the Healthcare Waste (HCW) management practices. Strategically it is intended to decrease both cost and risk. Shi et al. (2009) maintained that medical waste management has become such a critical issue to: firstly,
comply with the laws and regulations regarding environmental concerns; and secondly, reduce the total costs via a reverse logistics strategy.

The cycle of RL activities which emerged from this empirical research about RL and adopted as part of a strategic plan involves adoption of activities, leading to the attainment of strategic value in various forms, which if successful it can be argued, promotes continuity in the cycle (Fig. 1.6, page 11). This cycle provides the research framework in which this study will be conducted based on the strategic intentions of business management, using Porter’s Strategy Theory and through the role of costs as resources in organisations via the Resource-based theory of the firm (Conner 1991; Conner & Prahalad 1996; Wernerfelt 1984). The theory argued that the basis for competitive advantage results from the extent and application of the resources the firm can use. This model proposes that the adoption of reverse logistics is done to create some form of business value, defined by the elements of value identified in the literature: competitive advantage, profit maximisation, customer satisfaction, cost reduction and resources use efficiency. These have emerged from both traditional strategic management models and from the resource-based theory of the firm.

As mentioned previously, reverse logistics can enable a company to achieve competitive advantage and build business value. In Chapter 1, Fig. 1.6, page 11 shows a composite example of a proposed reverse logistics model and a possible projection of reverse logistics activities, i.e. Reduce, Reuse, Recycle and Refurbish, which can produce business value through a strategic direction: competitive advantage, profit maximisation, customer satisfaction, cost reduction and resource efficiency to the company. For example, the adoption of the ‘reduce’ activity may bring business value to the company in terms of competitive advantage and profit maximisation. The ‘reuse’ activity may also lead to two business values: competitive advantage and resource efficiency. However, the proposed reverse logistics model varies depending on the different reverse logistics activities applying in different organisations. In this research the intent is to understand how institutions, specifically hospitals, create value, through the explicit adoption of the various forms of reverse logistics activities. In essence the intention is to map the activities to the forms of business value created for the organisation to better understand the nature of the value created (Fig. 1.7, page 12).
In this research the application of the above model will be done with this model for case studies involving hospitals in Thailand. Therefore it is important to understand the context of health with regard to RL and understand the role of value creation in health contexts. One of the key additional strategic reasons for the adoption of RL in health relates to the action by many companies and hospitals to address ‘green issues’, sustainability and corporate social responsibility.

2.6 Extending Strategy and RL

In contemporary marketing rising concerns about environmental issues have been noted as a business tool in order for enhancing the competitiveness of a company. Sarkis (2003) stated that there is more organisations are considering the integration of environmental practices into their strategic plans and daily operations. Lee and Lam (2012) stated that most organisations today must realise how to manage and save the environment and therefore rethink their market position, reformulate their business strategy and reengineer their business processes. A recent survey shows the number of respondents who are willing to increase spending on green issues is around 82% (Environmental Leader LLC & Media Buyer Planner LLC 2009). The reason why companies need a green image and an obvious sense of social responsibility is fundamentally strategic: to gain opportunities to improve the value of their goods and services and improve their competitiveness (Berry & Rondinelli 1998; Chen et al. 2006; Porter & van der Linde 1995; Shrivastava 1995). Over the last decade, sustainability has changed from an issue that only concerned dedicated environmentalists to an issue recognised throughout an organisation as an opportunity for increased profits and competitive advantage (Mishra & Sharma 2010).

Wu and Dunn (1995) argued that logistics managers can make environmentally responsible decisions that are coherent with corporate goals and objectives (corporate level strategy). This research also described an overview of environmentally responsible logistics activities (two system-wide logistics elements, transportation and reverse logistics) and their implications for business management (business level strategy). It also revealed the implications of logistics functions, examined in the context of the corporate value chain and
also identifies various environmental decision points at the operational level of logistics (functional level strategy).

Presley et al. (2007) and Robins (2006) both align sustainability with the ‘triple-bottom line’ factors of economic, environmental, and social dimensions, and argues that this is the underlying framework we use to develop and apply strategic justification for project evaluation with sustainability implications. The most common definition of sustainability is “development that meets the needs of the present generation s to meet their own needs” (WCED 1987, pp. 1-6). Dyllick and Hockerts (2002) also state that corporate sustainability can be divided into three key elements (economic, environment, and social) and provides direction for firms to develop a strategy through corporate sustainability with six criteria: Eco-Efficiency, Eco-Effectiveness, Socio-Efficiency, Socio-Effectiveness, Sufficiency, and Ecological Equity. Savitz and Weber (2006) note that sustainability can be defined as operating a business in a way that causes minimal harm to living creatures. According to McMullen (2001) sustainability has become an important concept at present and most organisations need to manage sustainability as part of their operations through multiple stakeholders. Presley and Meade (2002) also argue that sustainability is often seen as a community or institutional response to threats against human and planetary survival. Moreover, the U.N. Commission on the Environment and Development defined sustainability as follows: sustainability is operating our organisations and living our lives in a manner which meets the needs of the present without compromising the ability for future generations to meet their needs (http://www.everblue.edu/sustainability-overview/what-is-sustainability).

Social sustainability is related to CSR and the terms have frequently been used interchangeably (Jenkins 2004; Hutchins & Sutherland 2008). Additionally, business sustainability can be defined as “adopting business strategies and activities that meet the needs of the enterprise and its stakeholders today while protecting, sustaining and enhancing the human and natural resources that will be needed in the future” (Blumberg 2005, pp. 373-385).

A multi-industry survey of 48 executives by Deloitte’s (2010) shows that most organisations need to build a business strategy through a sustainability concept in order to gain competitive advantage (http://www.deloitte.com). Dyllick and Hockerts (2002) argue for the importance
of sustainability for companies’ development of a strategy. Bryson and Lombardi (2009) argue that companies can gain a competitive advantage by integrating sustainability into their business models, and combining different individual competencies and developing new routines and business practices that provide them with distinctiveness in the marketplace. Sharma et al. (2010) argue that the strategy relating to environmental responsibility can bring not only competitive advantage but also superior financial performance to the company. Revell and Blackburn (2005) show that even though the cost of undertaking environmental measures in SMEs is high, owner-managers tend to be highly resistant to voluntarily improving their environmental performance. The reason of this is that SME owner-managers in the UK accept the idea that there are business benefits for improving their environmental performance. Therefore, the sustainability concept exists to build a company’s strategy and consequently competitive advantage.

Recent research also indicates that reverse logistics (RL) is a key factor encouraging businesses to improve competitiveness by embracing sustainability. Presley et al. (2007) states that reverse logistics (RL) and building appropriate RL partnerships can lead a company to better management of corporate sustainability. According to Greve (2010) reverse logistics (RL) is the key to meeting sustainability needs and demands in companies by adding value in three major ways: providing the infrastructure, processing inventory and extending the life of assets. Lee and Lam (2012) also stated that managing reverse logistics (RL) can help a company to better gain competitiveness through sustainability. The intent here is not to research green logistics or sustainability and logistics, but to understand that there is an important relationship between sustainability, reverse logistics and green logistics as one key element in trying to provide context for understanding what specific methods of reverse logistics are used in hospitals to gain the benefits of adoption of reverse logistics as a strategy to improve business value.

Fig. 2.6 shows, in a representational form, where reverse logistics relates to green logistics and identification of some, not all, of the methods adopted in reverse logistics. What this diagram does not allude to is the role neither of strategy nor to all other elements in RL that create other methods of RL which can be adopted and used in business organisations. The next sections in this chapter address those issues.
2.7 Health Strategy and the creation of value - an extended evaluation

According to the Gallup research and reporting in the Gallup Workplace Audit (GWA), Buckingham & Coffman (1999) show that there is a real relationship between employee engagement and productivity, profitability, employee retention, and customer service at the business unit level for hospitals, and that these relationships can and do lead to the creation of business value.

In 2008 Porter argued that: “Today organizations in all spheres must compete to deliver value. Value is the ability to meet or exceed the needs of customers, and do so efficiently. Companies have to deliver value to their customers, and countries have to deliver value as business locations. This is now just as true for a hospital delivering healthcare, or a foundation making charitable contributions, as it is for a company producing a product or service” (p. xi). This change from earlier strategic goals is done to focus attention on business value as it drives customer or client satisfaction through attainment of other levels of business value, competitive advantage, cost minimisation, etc.
In 2010 Porter re-iterated this position on value, specifically in health settings, stating at length:

> Value should always be defined around the customer, and in a well-functioning health care system, the creation of value for patients should determine the rewards for all other actors in the system. Since value depends on results, not inputs, value in health care is measured by the outcomes achieved, not the volume of services delivered, and shifting focus from volume to value is a central challenge. Nor is value measured by the process of care used; process measurement and improvement are important tactics but are no substitutes for measuring outcomes and costs. Since value is defined as outcomes relative to costs, it encompasses efficiency. Cost reduction without regard to the outcomes achieved is dangerous and self-defeating, leading to false “savings” and potentially limiting effective care” (Porter 2010, p. 2477).

These two quotes can be seen as a response to the now voluminous literature in health sciences and health management where the focus is both on the specific business outcomes and efficient use of resources. Recently, Nagurney et al. (2012) focused on the attainment of cost and risk minimisation of a blood banking system where specifically attention was oriented towards supply side but not on the creation of value to the customers. Blank and Valdmani (2010) evaluated efficiency in Dutch hospitals again by focusing on cost inefficiency measures in the hospital’s operating environment. Syam and Cote (2012) modelled location and allocation of resources in relation to specialised healthcare services in the US. Their focus too was on efficiency in the allocation and models and on the supply side of health.

There are many published papers on cost minimisation in pharmaceuticals (Ladabaum et al. 2002; Bhandari 2011), operating theatres (Barbieri et al. 2005; George et al. 2001), use of specific drugs (George et al. 2001; Sarpong 1999), etc. However, other researchers are concentrating on the demand side of health and looking at the value creation effects of adopting changes in healthcare systems. Hynes et al. (2004) have shown how the use of information systems in healthcare for veterans in the US can lead to improvements in the quality of delivery, focusing on the creation of value for clients. Oliver (2008) in another study of US veterans shows how the adoption of the VHA healthcare systems has improved outcomes for patients. Testi and Tanfani (2009) use modeling of operating theatres in
hospitals to improve both the delivery of OR services and better outcomes, and less delays for patients. Again their emphasis is as much on the delivery of value to patients as it is on decreasing costs and improved efficiency in the hospital.

According to Porter (2010) then, re-inventing strategy in hospitals for creating value can be seen in terms of redefining healthcare delivery. The hospitals should reconsider the core issue in healthcare for becoming the value of healthcare delivered; Value: Patient health outcomes per dollar spent. It is very important then to design how a healthcare delivery system to dramatically improve value for patients and to construct a dynamic system that keeps rapidly improving. In order to make this happen, the creation of a value-based healthcare system requires, as Porter argues, a fundamental restructuring of healthcare delivery, not incremental improvements. The process improvements are care pathways, lean production, safety initiatives, disease management and other overlays to the current structure. They are beneficial but not sufficient. He argues, as does Porter and Teisberg (2006) and Teisberg (2010) that healthcare is about the patient at its core (see Fig. 2.7 below).

![Figure 2.7: Redefining Health Care Delivery](image)

*Source: Porter and Teisberg (2006)*

Porter and Teisberg also argue that adoption of this value-based competitive healthcare system will enable hospitals and healthcare providers to enter a ‘virtuous cycle’ that creates value through improvement (Fig. 2.8).
Teisberg (2010) stated that to increase the value of and improve quality and at the same time reduce costs, it is essential that the focus goes beyond just the economic forms of business value, which in this chapter we have derived from the original Porter models and from the Resource-based View of the firm (see Fig. 2.8 above). The keys for improving value in the health industry, as proposed by Teisberg, are as follows:

- Defining services from the perspectives of patients;
- Organising care delivery around solutions;
- Creating multidisciplinary teams; and
- Measuring results to accelerate learning.

According to Porter and Teisberg (2006) the recent strategy of hospitals, applied in their operations management, is to focus on the principles of Value-Based Competition and they should be altered to include a new set of principles as follows:

- The focus should be on value for patients, not just reducing costs;
- There must be unrestricted competition based on results;
- Competition should centre on medical conditions over the full cycle of care;
- High quality care should be less costly;
• Value is driven by provider experience, scale, and learning at the medical condition level;
• Competition should be regional and national, not just local;
• Information on results and prices is needed for value-based completion and must be widely available; and
• Innovations that increase value must be strongly rewarded.

According to Value-Based Competition (Porter & Teisberg 2006), customer satisfaction could be seen in terms of high quality value for patients. The hospitals, they argue, should focus on the value for patients rather than lowering costs. Porter (2010) also suggested that the fundamental issue in healthcare is value for patients, not access, volume, convenience, or cost containment. Then the hospital should find how to design a healthcare system that dramatically improves patient value. The other important issue is the quality improvement. Quality improvement is the key driver of cost containment and higher value, where quality means good health outcomes for patients. These can be defined in terms of prevention, early detection, right diagnosis, and right treatment to the right patient. On the one hand, the health outcomes are better health for patients rather than more treatment (Porter 2010). Interestingly, Porter and Teisberg (2006) also argued that the hospitals should pay more attention to regional and national competition rather than localisation. The reason for this is that the hospitals may gain more profit by reconfiguring themselves as a regional and national competitor.

Porter and Teisberg (2006) suggested that hospitals should realise that unrestricted competition based on results and competition should centre on medical conditions over the full cycle of care. It improve the institution’s reputation. As a result, the hospitals can gain a competitive advantage. Additionally, hospitals can add more value in terms of being seen to be ‘green’. The cost reduction strategy can be defined as implementing change and reforms to minimise costs, leading to lowest price of a product. Finally, the market share will increase as a result. Therefore it can bring business value (cost reduction and profit maximisation) to the firm/hospital.

Profit Maximisation is another business value which hospitals can obtain through reverse logistics activities. Porter and Teisberg (2006) stated that competition should be regional and
national rather than local. Hospitals should provide their services widely and offer more variety in order for meet the different customers’ satisfaction. As a marketing expansion strategy when companies expand their products or services it should include, they argue, alternative industries and geographical areas. Companies can enjoy revenue growth through new market opportunities and thus garner profit maximisation.

Resource efficiency is an important value which helps the company gain a sustainable competitive advantage. Resource efficiency can be defined as how companies can manage their materials with the concept of “Reduce - Reuse - Recycle - Repair" stated in descending order of priority. This can apply in the reverse logistics activities like incineration or waste management in hospitals. Tudor et al. (2008) stated that the Cornwall National Health Service (NHS) in the UK can achieve significant resource and financial efficiencies through better resource efficiency in healthcare waste management. This again is supply side value creation. On the other hand, Porter and Teisberg (2006) suggested that hospitals should focus on principles of value-based competition in terms of existing companies’ resources, information and innovation. These principles are:

- Information on results and prices needed for value-based competition must be widely available; and
- Innovations that increase value must be strongly rewarded.

To apply the Value-Based Competition to hospitals through reverse logistics (RL) the table below offers a re-evaluation of the outcomes and creation of value of implementing reverse logistics. The business value which hospitals then must realise is specified in detail in the following table which brings together the elements of both approaches to strategy and the reverse logistics activities (Table 2.3).
Table 2.3: Possible forms of Value Creation when Reverse Logistics is implemented in a hospital

<table>
<thead>
<tr>
<th>Reverse Logistics Activities</th>
<th>Business Value</th>
<th>Value-Based Competition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reuse</td>
<td>Customer Satisfaction</td>
<td>Value for patients: High quality, Regional and National</td>
</tr>
<tr>
<td>Repair</td>
<td>Competitive Advantage</td>
<td>Environmental Sustainability, Unrestricted Competition, Centre on Medical Conditions</td>
</tr>
<tr>
<td>Reduce</td>
<td>Cost Reduction</td>
<td>Less Costly</td>
</tr>
<tr>
<td>Recycle</td>
<td>Profit Maximization</td>
<td>Regional and National</td>
</tr>
<tr>
<td>Refurbish</td>
<td>Resource Efficiency</td>
<td>Provider Experience, Scale, and Learning at the medical condition</td>
</tr>
<tr>
<td>Retrieval</td>
<td></td>
<td>Waste Management, Widely Available Information, Adding More Innovation</td>
</tr>
<tr>
<td>Incineration</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2.3 shows the possible forms of value creation that the adoption of reverse logistics in a hospital can have: competitive advantage, customer satisfaction, cost reduction, profit maximisation, and resource efficiency through reverse logistics activities: reuse, repair, reduce, recycle, refurbish, retrieval, and incineration. According to Porter and Teisberg (2006) the business value which the hospital should add could be seen in terms of Value-Based Competition. However, in the adoption of reverse logistics in hospitals we do not know whether the value creation objective is simply economically based or more oriented towards the customer. That is the intent of this research to find out in a set of Thai hospitals. Porter (2001) and Porter and Teisberg (2006) are looking at the overall outcomes of their proposition of value-based competition. In this research the intent is to take that apart by looking within the hospitals, department by department to evaluate the creation of value through the adoption of one or many forms of reverse logistics activities.

This theorising by Porter and Teisberg (2006) therefore not only sets this research within the context of a traditional view of strategy, but addresses the concerns of Porter and others about the need to re-focus on value to the client/customer as a key indicator for determining the effects of a strategy such as reverse logistics in a hospital. Therefore the model proposed earlier in this chapter needs to be modified to address that additional focus in the research as suggested by Porter and Porter and Teisberg (Fig. 2.12).
The objective of this literature review of the existing research and theory related to reverse logistics and healthcare in hospitals was to try and understand what research and theorising had been done and therefore what is evident about the use of reverse logistics in hospitals. The review shows that almost all researchers of reverse logistics in hospital globally have focused on the impact of one process or one type of reverse logistics methods. Studies have shown that the adoption of recycling or returns can decrease operational costs, or improve efficiency, or decrease inventory in specific departments or across the hospital as a whole.

This review has developed a broader perspective. The argument presented here is that there are many different types of reverse logistics activities that can be, and are used, in hospitals and that each can be employed differently in different parts of hospitals with the intent of creating some form of value differentially (Fig. 2.10).
Figure 2.10: The Reverse Logistics – value creation relationship (modification of Fig. 2.9)

This review has also shown that there are two different perspectives on value creation in health. Some research focuses on value created by, and for, the supply side of health and it is driven by the creation of economic value: cost reduction, profit maximisation, and process improvement. Porter and others have argued from different perspectives. They argued that healthcare improvement will come from the demand side, stating that economic benefits accrued to the supply side are only effective when the ultimate value created is for and to the patient. Part of this research will also look at the creation of value from both the supply side and from the demand side to see if Thai hospitals’ strategies deal with both. There is however, one more key element to this study and it is a theoretical argument that is very important in the context of Thailand.

In Thailand, private hospitals, which include the three studied in this research (Bumrungrad, Vejthani and Bangkok Pattaya), have business strategies which focus both on their image and their operations. Goffman (1959) argued in a well-documented conceptualisation about social behaviour in groups and organisations that there is both a concern about ‘image’ and the way the organisation is imagined socially (albeit in this case in a business and health context, and a concern about the strategies put in place to gain efficiencies, manage costs, enable
profitability and improve operations so that the ‘image’ is maintained). The former conceptualisation, the image, Goffman calls the ‘front stage’, the latter, the operations; Goffman terms the ‘back stage’. For this research that differentiation of strategy is important so the research model and the analysis of the data collected will be evaluated within this dichotomy of ‘front stage’ and ‘backstage’ and this is represented in a modification of the research model (Fig. 2.10) as an extended representation (Fig. 2.11) and frame the conceptual basis of this research.

Figure 2.11: Goffman Theory and The Reverse Logistics – value creation relationship

In the next chapter the research methods used to conduct this research and to analyse the data are discussed.
3 CHAPTER THREE: Research Methodology

This chapter describes the research methodology and research design applied in this study to evaluate the strategic role of Reverse Logistics in Thai private hospitals. This chapter deals with issues relating to the research methodology and design of the study and argues their justification.

3.1 Methodology

According to Creswell (2009), typically, the research methodology used can be one or a combination of three approaches (quantitative, qualitative and mixed methods). A quantitative approach can be defined as an application of numbers for understanding the social world through measuring relationships and sometimes causality. A qualitative method applies words or images for exploring and understanding the social phenomena of interest. Mixed methods use both.

According to Creswell (1994, 2007), the quantitative approach can be defined as traditional, positivist, experimental, or empiricist and Neuman (2006) also argued that quantitative research expresses meaning by using numbers such as percentages or statistical coefficients. A quantitative study is consistent with the quantitative paradigm, and is explained by Creswell (1994) as an inquiry into a social or human problem, which is based on testing a theory composed of variables, measured with numbers, and analysed with statistical procedures. The findings from the quantitative approach determine whether the predictive generalisations of the theory hold true. The quantitative approach holds that “the researcher should remain distant and independent of that being researched” (Creswell 1994, p. 6). In this research the objective is to evaluate and examine the implementation of RL and how it relates to workplace functions. It is people’s perceptions that this research seeks to explore. Therefore dealing with quantitative theory in this context is not relevant.

Mixed methods methodology (Creswell 1994, p. 6) is a combination of both quantitative and qualitative strategies to develop understandings of the social world from various perspectives.
This is an exploratory study of reverse logistics in Thai hospitals and therefore requires the researcher to seek out new information and use existing frameworks of study to explain what is observed rather than use theory to determine a framework to measure relationships. As a result a qualitative approach is adopted here.

Bouma and Ling (2004) state that a qualitative method is an approach for answering questions in specific areas or given situations. It also gives answers in more detail such as what is happening in a conversation, the meaning of the message, feelings, and effects. A qualitative research is an appropriate approach to explain and describe a phenomenon from various participants’ perspectives (Leedy & Ormrod 2005; Orlikowski & Baroudi 1991). In order to undertake qualitative research, the researcher should consider the following:

- The researcher is the main avenue for data collection and analysis;
- The perspectives and experiences of participants will be the key to the observations and findings; and
- The research must involve field research and detailed descriptive findings.

It is appropriate here then to adopt a qualitative approach as the research is exploring in detail how each reverse logistics activity specifically adds value to the private hospital, built on data derived from a series of interviews with stakeholders involved in each of the hospitals studied. It is only through interviews and getting rich information that this can be done. In this research the qualitative approach is applied through three case studies.

Qualitative research more generally refers to a study that investigates a social human problem where the researcher conducts the study in a natural setting and builds a whole complex representation by rich description and explanation (Creswell 2008). Qualitative methods are essentially descriptive and inferential in character. According to Creswell (2007) and Gillham (2000), qualitative methods focus primarily on the kind of evidence of what people tell you, and what they do, and that will enable researchers to understand the meaning of what is going on. The researcher can gain an understanding of the nature of phenomena from the participants’ point-of-view. Their perspectives provide deeper insights into what the research problem is. Qualitative methods enable the researcher to carry out investigations where other methods are not justifiable, where little is known about the study, or to explore complexity, and/or view the case from the inside-out (Gillham 2000; Johansson 2007).
Creswell (2007) further suggests that qualitative research takes place in natural settings. In this research the settings are three private hospitals in Thailand and within them, a number of departments. The interviews happened within that context. Tashakkori and Teddle (2003) claim that qualitative inquiry is more comprehensible as a study in situations where the intention is to understand the big picture for social scientific criticism using particular kinds of social theory, methodology or philosophy. This research uses business value as a theoretical construct derived from strategy theory as a means to examine data collected at each of the three hospitals, in order to understand and then theorise about the role of reverse logistics in hospitals.

Creswell (1994, p. 4) suggests that “data in qualitative research are in the form of words include quotes or descriptions or particular events” and a qualitative study is rather consistent with the inductive model of thinking, evolved methodological design, and may include a few terms defined at the beginning of the plan. Creswell (1994) also emphasises that the qualitative model is not being tested in the study but is rather modified in the study. In this research the focus is on reverse logistics in hospitals. The intent in this study is to use the activities of reverse logistics (re-use, re-sale, re-distribution, repair, refurbishing, remanufacturing, retrieval, recycling and incineration) to examine how these activities are used strategically in hospitals in Thailand to create business value for the organisation. Therefore, this approach is most suitable to use.

This study is conducted as empirical research undertaken by engaging with theories and interpreting data using qualitative, and hermeneutic (or interpretive), rather than quantitative methods. An interpretive approach was applied within this research in order to help the researcher better understand the knowledge of reality, including the domain of human action, as it is social construction by human actors (Walsham 1993, 2006). This approach is consistent with the construction of the social world characterised by interaction between the researcher and participants (Mingers 2001). According to Corbitt (2000, 1997) an interpretive approach is consistent with the ‘strategy’ theoretical approach where that social construction of strategy can be iterative.

As mentioned previously the aim of this research is to evaluate the implementation of RL activities in relevant hospital departments and assessing their adoption of business value. The
researcher needed to visit participants at the hospitals in order to understand the RL activities context and how these activities played a strategically role leading to better gaining in-depth of the RL concept and adoption of business value. Essentially, the researcher must use an interpretation of what those involved in the hospital claimed, said, believed, wrote, noted and decided about.

An interpretative research methods approach looks for multiple interpretations and a deep understanding of the often conflicting rationalities of the actors involved in information systems innovation (McGrath 2005). Interpretive research assumes that “our knowledge of reality is gained only through social constructions such as language, consciousness, shared meanings, documents, tools and other artefacts” (Kline & Myers 1999, p. 69). Interpretive phenomenology uses the researcher as the data collection instrument and takes a self-conscious approach to analysis. Interpretive research uses interviews in combination of open-ended and structured questioning methods and looks for meaning in the narratives created (Maggs-Rapport 2008).

The interpretivist tradition steers researchers towards a different outlook, where the primary goal is not to develop theory that is testable in a narrow sense. The interpretivist research makes an understanding of people in relation to the environment in the complex world of lived experience from the point of view of those who live it (Gregor 2006). The process of interpretive phenomenology develops through three distinctive stages which are fore-understanding, interrogation and reflection (Maggs-Rapport 2008). Once the phenomenon is explored, texts can be analysed by comparing emergent themes across and within groups to discover commonalities and shared ideas (Morrison 1992).

The overall context of the research then will be an interpretivist multiple-case study which is used to obtain a high level of confidence in the robustness of the method (Campbell 1975; Yin 1994). The population and sample for this research includes three significant private hospitals in Bangkok (Bangkok Pattaya Hospital, Vejthani Hospital and Bumrungrad Hospital) as case studies.
3.2 Case Study Research

Case study research is “an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident” (Yin 2003, p. 13). Yin (2003) also suggests the researchers who adopt a case study design were conscious that their findings could be challenged. Many studies come across as quite solid in methodological terms, with in-depth case studies being common (Walsham & Sahay 2006). Simply adopting case studies with a misunderstanding of the logic behind theoretical sampling, as opposed to statistical sampling, could lead to unjustified criticisms of case study-based papers (Andrade 2009). However, case studies are appropriate for studying topics where attitudes and behaviours can best be understood within their setting (Andrade 2009; Gillham 2000; Yin 2003).

Case study research includes descriptive facts, folk concepts, cultural artefacts, structural arrangements, social processes, and belief systems normally found in the group, process, activity, or situation under study (Given 2008). However, Yin (2003) proposed that adopting a consistent and planned approach to the research process can assure the validity of the data collected and support the interpretations made. Therefore, the research needed to be able to understand the social construction of ideas in a single case context. Consequently, this study adopts a case study as an appropriate tool to enable the researcher to obtain the “insider view” of the selected firm and enhancing a comprehension of the current firm status directly informants within the private hospitals (Fletcher & Plakoyiannaki 2011; Yin 2003).

This study uses three case studies focusing on a case comparison in order for more in-depth understanding of different examplars. By definition cross-case analysis relates to comparisons being made across different places, or of the same place across different times (Gu & Ryan 2008, 2011) or of different places at different times. Nonetheless they are related to each other by the commonality of a theme identified by the researcher.
3.3 Research Design

The research design explains how this research was conducted and the research processes are illustrated in Figure 3.1, showing each step that took place in the two stages.

- The first stage consisted of collecting texts, hospital records, government publications, Thai government and hospital policy documents, and annual reports of private hospitals in order to understand the context of the case studies. This enabled the collected in stage 2 to create a better understanding of the role and extent of reverse logistics in the hospitals. The organisational chart of each hospital is considered for studying their complexity in terms of structure and internal departments where reverse logistics activities occurred.
The second stage is a set of interviews relating to the use of Reverse Logistics in specific departments within each hospital. The details about where the interviews were targeted and with who are described below. The interviews were recorded and initially transcribed in the Thai language and then into English and checked. An analysis was done using coding to develop themes, leading to building a model for each hospital. Following the analysis conclusions were drawn and then, using a focus group, the outcomes were tested and reviewed to confirm the interview findings. The analysis followed a hermeneutics cycle of interpretation based on themes derived from the literature review, reported in Chapter 2, and from notes taken during the interviews. This stage of the research is detailed in the following section.

3.4 The Hospitals, Interviews and Participants

3.4.1 Selecting the Hospitals

The study was conducted in Thailand with three case study private hospitals being selected from a list of the top ten private hospitals in Thailand (Herrick 2007). Private hospitals were chosen rather than public hospitals as they are private companies and are required to be run as businesses, creating an environment of high quality service delivery, attracting clients for treatments and enabling a cost structure that generates a profit. The public hospital sector in Thailand is totally subsidised and provides basic services at high quality. However, there is no anticipation in Thailand that a profit for each institution is their priority. Rather the expectation of the Royal Thai Government is for them to provide basic and sometimes advanced healthcare services at minimal cost when it is demanded by the general population.

In Thailand the current situation in the private healthcare industry is very competitive, with growth stimulated by a growing middle class demand and by developments in what is termed ‘medical tourism’. According to Herrick (2007), the development of medical tourism has been intense not only around the world but especially in Thailand. Wealthy patients from developed countries travel for medical reasons with the highest number of patients being 1,000,000 to Thailand, 250,000 to Singapore and 500,000 to India (Herrick 2007). Interestingly, the data also shows a rapid increase in the number of medical tourists (Figures 3.2 and 3.3).
Figure 3.2: Worldwide Medical Tourism Industry
Source: Adapted from McKinsey & Company and the Confederation of Indian Industry (2010)
The research sought ways to get three hospitals on the Herrick list to participate as case studies and subsequently, personal contacts were employed to approach 3 hospitals. Three agreed to participate: Bumrungrad Hospital, Vejthani Hospital and Bangkok Pattaya Hospital. Bumrungrad Hospital has become one of the most popular Thai private hospitals for medical tourism. Vejthani and Bangkok Pattaya Hospitals are also significant players in the provision of medical services and procedures to international medical tourists (Figs. 3.4, 3.5 and 3.6).
Figure 3.4: Bumrungrad Hospital’s Revenue contribution by nationality
Source: http://bh.listedcompany.com/company_profile.html
Figure 3.5: Vejthani’s Hospital Revenue contribution by nationality
Source: http://www.vejthani.com/about.php?about_us_id=1

Figure 3.6: Bangkok Pattaya Hospital’s Revenue contribution by nationality
The main reason for international patients coming to Thai private hospitals such as Bumrungrad, Vejthani and Bangkok Pattaya Hospital is their relative price (McKinsey & Company and the Confederation of Indian Industry 2010) and the high quality guaranteed with the adoption, as required by the Royal Thai Government, Department of Health, by the Thai private hospitals of the international standard known as JCI\(^3\) (Joint Commission International).

Bumrungrad and Vejthani Hospitals are stand-alone organisational entities operating exclusively. Bangkok Pattaya Hospital however is part of a network of hospitals with a common ownership group. Bangkok Pattaya Hospital is part of the Bangkok Hospital Group network (Fig. 3.7). Originally, there were five hospital members: Bangkok Hospital, Samitivej Hospital, BNH Hospital, Phyathai Hospital, and Paulo Memorial Hospital. They all work together under the network team management of Bangkok Dusit Medical Service (BDMS). As of March 2015, Bangkok Hospital Group is now the largest private hospital group in Thailand with 40 hospitals under 6 ‘hospital brands’: Bangkok, Phyathai, Samitivej, Paolo Memorial, BNH, and Royal International. More interestingly, it is also one of the biggest private hospital networks in Asia (http://www.phukethospital.com/Health-Network/Hospitals-Clinics.php). The Bangkok Hospital network provides high quality medical services with advanced medical technologies, specialised check-up programs, a dedicated team of practitioners and very efficient medical services operating over 29 healthcare facilities throughout the main provinces of Thailand.

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\(^3\) JCI accreditation is considered to be the gold standard in global healthcare. JCI consultants are the most skilled and experienced in the industry. (www.jointcommissioninternational.org/about/)
The chosen hospitals, their business, services and their image as part of their ‘obvious’ strategy, or what Goffman (1959) terms the ‘front stage’ of organisational behaviour. These three hospitals’ business strategies link their vision and mission to customers being the core business focus, complementary to the Porter healthcare strategy for value creation. Vejthani Hospital focuses on a collaborative work culture as mentioned in the mission, vision and value and it also wants to create the best healthcare environment. Bangkok Pattaya Hospital focuses on enhancing the efficiency of day-to-day operations of the hospital leading to business value creation. All three hospitals see their business strategy as moving more and more toward an international market in medical tourism. They want to meet international standards in order to compete in the healthcare industry not only in Thailand but also in the Asian region, especially with the creation of the Asian Economic Community (AEC). The ‘front stage’ perspective of the strategies of the three hospitals is that of images that focus on
the customer, with the provision of the best medical care and services with high quality medical staff, and the best medical technology.

3.4.2 Interviews

To develop consistency across the 3 case study hospitals the researcher used the document analysis in stage 1 to identify key departments, common in each hospital, where there was clear evidence that reverse logistics activities had been adopted. The 4 departments used in each of the case studies in this research are:

- Out-Patient Department (OPD)
- In-Patient Department (IPD)
- Pharmacy Department (PD), and
- Waste Management Department (WMD).

The organisational location of each of these departments is shown in the Organisational Structure diagrams presented in the following chapter.

The definitions of OPD, IPD, Pharmacy Department and Waste Management Department as applied in this study are different. Their scope here is broader than what is normally expected. The reason of this is for easy and better understanding of the intent of study and the themes of how these variables are linked to a better understanding of the study.

- The Out-Patient Department (OPD) can be defined as one main department that is responsible for out-patients (An out-patient is someone who does not stay in hospital while he or she receives treatment). The Out-Patient Department in this study means all operations that are undertaken relating to OPD.

- The In-Patient Department (IPD) can be defined as one main department that is responsible for in-patients. (An in-patient is someone who stays in a hospital bed while receiving treatment). IPD here means all operations in the hospital that relate to OPD.
• Pharmacy Department (PD) can be defined as the department staffed by a team of pharmacists, technicians and support staff who are responsible for dispensing medicines to patients. In this study, all operations relating to medicines are classified under the Pharmacy Department.

• Waste Management Department (WMD) can be defined as all operations concerned with hospital waste and incineration in the hospital.

The selection of interviewees was then constrained by the researcher to senior leadership in each hospital and then to various participants from within each of the 4 identified departments. The researcher used the highest administrative officers such as CEO or COO within each hospital to identify relevant people in each department for interview. The researcher used the criteria of involvement in the adoption and use of reverse logistics within the department as essential. Interviewees were specifically chosen because of their roles in implementing and managing RL in their departments. For example, one CEO suggested the researcher should interview the head/manager or director in each department as a first priority task in order to gain full knowledge of RL relating to their responsibility. The researcher then adopted a referral system of choosing interviewees as they were referred from the head/manager or director in a department. This process can help the researcher collect data more consistently covering all perspectives across the organisation regarding implementing and managing of RL.

The participants came from all four departments in each of the case study hospitals ranging across all levels in the organisational structure from the top-business administration officer to the junior medical team as well as from the non-clinical officer. After receiving permission from the CEO of the hospital to collect data, the first interviewee was the COO of the hospital who then suggested a list of participants for interview in relation to the relevant department. Participants were contacted via e-mail and/or by phone according to their availability. The participants were given a Plain Language Statement describing the research project using simple English language and Thai language and a consent form to guarantee anonymity while participating in the interview. The consent form also asks if the participants are comfortable having the interview recorded and a statement that the recordings will only be used by the researcher only for the purpose of analysis. These documents were presented to the
participants prior to the interview, signed and filed in RMIT University, according to the university’s Ethics protocols.

The number of interviewees was 31 across the 3 hospitals, i.e. Bumrungrad Hospital, Vejthani Hospital and Bangkok Pattaya Hospital. The list of participants and their roles and location are listed in Table 3.1.

Table 3-1: Participants

<table>
<thead>
<tr>
<th>Type of Study</th>
<th>Number of Interviewee</th>
<th>Position</th>
<th>Interviewee Category</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>CASE STUDY 1 BUMRUNGRAD HOSPITAL</td>
<td>11</td>
<td>COO</td>
<td>Top Management</td>
<td>Clinical Staff</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CPO, CAO</td>
<td>Clinical Staff</td>
<td>Non-Clinical Staff</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Division Director of Pharmacy</td>
<td>IT Manager, IT Staff</td>
<td>IT Technician</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Manager Pharmacy Division</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Out Patient Pharmacy</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Doctor (Surgery)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Nurse</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Marketing Officer</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>International Marketing Officer</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>IT Manager, IT Staff</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CASE STUDY 2 VEJTHANI HOSPITAL</td>
<td>10</td>
<td>CEO</td>
<td>Top Management</td>
<td>Clinical Staff</td>
</tr>
<tr>
<td></td>
<td></td>
<td>COO, Assistant COO</td>
<td>Clinical Staff</td>
<td>Non-Clinical Staff</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Manager Pharmacy Division</td>
<td>Non-Clinical Staff</td>
<td>IT Technician</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Nursing Director</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Physician (Surgery)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ambulatory Service Staff</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>International Marketing Manager</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>IT Manager, IT Staff</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CASE STUDY 3 BANGKOK PATTAYA HOSPITAL</td>
<td>10</td>
<td>CEO, COO</td>
<td>Top Management</td>
<td>Clinical Staff</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Division Director of N Health</td>
<td>Clinical Staff</td>
<td>Non-Clinical Staff</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pharmacy Manager</td>
<td>Non-Clinical Staff</td>
<td>IT Technician</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Nursing Director</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Physician (Surgery)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pharmacist</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>International Marketing Manager</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Housekeeping Head</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>IT Manager</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FOCUS GROUP</td>
<td>5</td>
<td>Director, Researcher, Lecturer</td>
<td>Logistics Innovation Centre</td>
<td>Research Paper</td>
</tr>
</tbody>
</table>

The distribution of the interviewees across the hospitals organizational structures are shown below in Figs 3.8 - 3.10
Figure 3.8: Bumrungrad Hospital Organisational Chart (Source of interviewees)
Figure 3.9: Vejthani Hospital Organisational Chart (Source of Interviewees)
Following analysis of the data emerging from the interviews, as described below in Section 3.5, the researcher decided it was important that the conclusion be re-tested both by some of the participants and by a number of independent experts from the Logistics Innovation Centre in the Faculty of Engineering at Mahidol University, Thailand.
The interview questions used in the research are as follows, both in English and in Thai.

**Interview Questions:**

**For CEO & COO:**

1. Do you have a supply chain strategy in the hospital? Please explain and give details.
   คุณมีกลยุทธ์การจัดการห่วงโซ่อุปทานในโรงพยาบาลหรือไม่ โปรดอธิบาย และให้รายละเอียด
2. Can you please describe and explain the supply chain into the hospital.
   โปรดอธิบายการจัดการห่วงโซ่อุปทานในโรงพยาบาล
3. Does the hospital have a policy of Green Logistics? If no, please explain? If yes, what is the policy and how does it work?
   ทางโรงพยาบาลมีนโยบายเกี่ยวกับ Green Logistics หรือไม่ ถ้าไม่ โปรดอธิบาย ถ้ามีแล้วโปรดอธิบายว่า นโยบายคืออะไรและมันมีประสิทธิภาพดีไหม
4. Does the hospital have a policy of reverse logistics? If so what is the policy?
   Why has the hospital adopted reverse logistics? If no, can you please explain why not? What happens to waste?
   ทางโรงพยาบาลมีนโยบายเกี่ยวกับการจัดการรีเวิร์สโลจิสติกส์หรือไม่ ถ้ามีแล้วอะไรคือนโยบาย แล้วทำไมโรงพยาบาลจึงจัดการรีเวิร์สโลจิสติกส์ ถ้าไม่มี โปรดอธิบายว่าทำไมถึงไม่มี แล้วของเสียของโรงพยาบาลมีการจัดการอย่างไร
5. What is the strategic role of reverse logistics in the hospital?
   อะไรเป็นกลยุทธ์เชิงบทบาทของการจัดการรีเวิร์สโลจิสติกส์ในโรงพยาบาล
6. Who is the person taking the major responsibility for supply chain and logistics operations in your hospital?
   ใครเป็นผู้รับผิดชอบหลักในการจัดการห่วงโซ่อุปทานและโลจิสติกส์ในโรงพยาบาลของคุณ
7. What are the different components of reverse logistics used in the hospitals?
   อะไรเป็นองค์ประกอบของการจัดการรีเวิร์สโลจิสติกส์ที่ใช้ในโรงพยาบาล
8. Which reverse logistics activities have been already implemented in your hospital? And in which department? Please explain.
   ในโรงพยาบาลของท่านมีการใช้ reverse logistics activities อะไรบ้าง และในแผนกไหน โปรดอธิบาย
9. What are the benefits in terms of business value creating by having reverse logistics activities in the hospital and within each separate department?
   อะไรเป็นประโยชน์ของการจัดการรีเวิร์สในกรณีสร้างประโยชน์ทางธุรกิจในโรงพยาบาลและในแต่ละแผนก
10. What are the reverse logistics activities, if any, that the hospital is intending to implement in the near future?
อะไรเป็นกิจกรรมของการจัดการรีเวิอร์สโลจิสติกส์ที่โรงพยาบาลมีแผนจะปฏิบัติเร็ว ๆ นี้

The next step was to interview the managers or the head of departments relating to the use of Reverse Logistics in their department with the following questions:

11. Which reverse activities does this department use?
แผนกของท่านมีการทารีเวิอร์สโลจิสติกส์อะไรบ้าง

12. Why have these activities been adopted in this department?
ทำไมจึงตัดสินใจทารีเวิอร์สโลจิสติกส์ในแผนกนี้

13. How does the adoption of these activities relate to the hospital’s strategy?
การทารีเวิอร์สโลจิสติกส์เกี่ยวโยงกับกลยุทธ์ของโรงพยาบาลอย่างไร

14. Who are the people taking the major responsibility and getting involved of reverse logistics operations in this department?
ใครเป็นผู้รับผิดชอบหลักของการทารีเวิอร์สโลจิสติกส์ในแผนกนี้

15. How do the activities of reverse logistics assist the operations of the department?
Please explain
รีเวิอร์สโลจิสติกส์ช่วยการจัดการในแผนกท่านอย่างไร โปรดอธิบาย

16. What are the benefits in terms of business value creating by having reverse logistics activities in your department?
อะไรเป็นประโยชน์ในเชิงคุณค่าทางธุรกิจของการทารีเวิอร์สโลจิสติกส์ในแผนกท่าน

17. What would happen if reverse logistics were not in place?
จะเกิดอะไรขึ้นถ้าไม่มีการจัดการรีเวิอร์สโลจิสติกส์

Following analysis of the data from each interview the researcher tested the conclusions in a focus group using the following questions:

โมเดลนี้เป็นโมเดลที่แสดงถึงชนิดของรีเวิอร์สโลจิสติกส์ที่ใช้ในโรงพยาบาลเพื่อสร้างคุณค่าทางธุรกิจ

- ไม่เห็นผิดกับความคิดเห็นดิฉันไหม
- ทำไม
3.5 Focus Group Interview

Bellenger (1976) states that the focus group shares problems and provides in-depth information to researchers with a specific topic through a discussion group atmosphere. It generates more in-depth analysis and insight into the behaviour and thinking of individual group members. Trauth and Jessup (2007) argue that a focus group is a good method for collecting data and benefits the researcher in terms of detailed evidence and interpretation of findings.

Wildemuth (1993, p. 450) provides a definition of the focus group as an approach with its “goal of understanding the social world from the viewpoint of the actors within it, is oriented toward detailed description of the actor’s cognitive and symbolic actions, that is, the meaning associated with observable behaviors”. Clearly, it can be seen that the focus group becomes an appropriate method in this research to both test the conclusions emerging from an analysis of the sets of interviews done and in order for answering the research question: “What are the strategically critical Reverse Logistics activities that create business value in Hospitals?” The representational mapping of RL activities in each department in each hospital was also tested together with the validity of the perceived business value created. Importantly, it also tested the perceptions of the COO or CEO and Logistics researchers or experts about the research model that mapped relationships between reverse logistics activities and business value created relating to theoretical conceptualisation used in this research.

Interview Questions for Focus Group

18. In your opinion, how do you think reverse logistics does create business value in your hospital?

19. What are the expected benefits from the use of reverse logistics in your hospital?

20. What are the future plans for further reverse logistics as a strategy in your hospital?
21. What is the future plan for supply chain management in your hospital?

22. This a model of a hospital in Thailand mapping the types of reverse logistics used to the perceived business value that the reverse logistics activity created.

- Do you think that this is a good strategy?
- Why or why not?
- Do you think the operations of reverse logistics shown in this model could be improved?

3.6 Analysis

The process of data analysis is eclectic (Creswell 2008). Following McGrath (2005) the researcher had to deal with interpretations of data providing insights arising from a hermeneutic understanding, and from engaging the social world of the company and its supply chain (Alvesson & Deetz 2000). McGrath (2005) suggested that interpretive work was no more than an interpretation unless it had a limited critique. One form of a limited critique would question whether an outcome increasing managerial control was desirable to all (McGrath 2005). In essence this approach had to be considered in the ways the research took the evaluations of data from those involved in the research cycles and made sense of them, understanding that the entire project was driven by and implemented because of decisions made by the company’s CEO.

Data analysis techniques helped the researcher to summarise the large amounts of data and to understand the effects of a number of variables on the final outcome. Data analysis techniques also helped the researcher to minimise the confounding effects inherent in most data collection processes. In addition, data analysis techniques enabled the researcher to assess the effects of alternative future scenarios (Sachan & Datta 2005). Walsham (2001) argued that in-depth field studies raise awareness of differences. Walsham’s study can be used to explain the difference between an interpretive approach to research and interpretation; that interpretive approach required at least a limited critique. Data analysis required that the researcher be comfortable with developing categories and making comparisons and contrasts (Chambers 2011; Creswell 2008; Patton 2002). Creswell (1994, 2007, 2008) suggested that
the researcher be open to possibilities and see contrary or alternative explanations for the findings. In this data analysis process, the researcher took a voluminous amount of information and reduced it to certain patterns, categories, or themes and then interpreted this information by using some schema.

Patton (2002) suggested that the themes, patterns, understandings, and insights that emerged from fieldwork and subsequent analysis were the fruit of qualitative inquiry. Data from the interviews were transcribed and rechecked for correction by the researcher (Patton 2002; Riessman 2003). Since the interviews were conducted in Thai the transcripts were translated into English and analysed by the researcher. The interviews were also compared with other interviews and documents from the same organisation (Eisenhardt 1989). The first and major step, in examining qualitative data comprised coding data techniques to screen various common process problems. Then each factor in the system framework was identified into meaningful categories, which the researcher had to identify and describe themes, patterns and concepts, and then organise them into meaningful categories. This made it possible to understand and explain these themes, patterns or concepts into a meaningful format (Miles & Huberman 1999; Riessman 2003). Each transcript was coded and cross-referenced to the factors in the structure of the study framework to enable content analysis across the private hospitals and interviewees.

This research used the narrative method because narrative research is a promising approach for obtaining an in-depth understanding of people’s lives (Riessman & Quinney 2005). The term ‘narrative’ carries many meanings and is used in a variety of ways by different disciplines, but often it is synonymous with the term ‘story’. As in all stories, multiple voices and identities come into play (Larsson & Sjoblom 2009). Narrative has energised many fields in social sciences such as social movements, organisations, politics and other macro-level processes (Riessman & Quinney 2005). Individuals construct stories of experience, nations, governments and organisations construct preferred narratives about themselves. Narrative analysis takes the perspective of the teller. When telling a story, tellers were people who were listeners to the stories in the past, recapitulated what happened then, and there is always the marking of the moral point in the telling of the story (Riessman 2003).
Narrative methods could be used as a methodological tool when conducting research in social work practice (Riessman & Quinney 2005). In this research, the story is related more to the background of the business than the individual experience of participants. Riessman (2003) also suggested that a person telling a story to a researcher was not only reporting on a set of events in a simple way, but also imparting knowledge about how the story evolved. In this case, the researcher and people telling the stories can be seen as doing a narrative co-production (Larsson & Sjoblom 2009). In telling the stories, meaning was transferred through these several different levels. ‘What’ someone says (identical) is connected to ‘how’ something be said (textual) and to ‘whom’ it is said (interpersonal) (Riessman 2003). The social context (Babbie 2007) was important in the process of understanding the meaning of the narrative because narrative studies opened up different forms of telling about the experience.

Narrative thinking generated from the research report was a narrative story. Narrative thinking was a researcher’s ability to be aware of how a researcher produces reality, and how to explicate the personal process of knowing of the researcher in the text (Heikkinen et al. 2007). Therefore, the process of writing a story of a social process, such as an Action Research study, was difficult even to imagine relating the story that was true in terms of correspondence. According to Lieblich et al. (1998), classification and organisation of types of narrative analysis was presented into two dimensions. The first type of narrative analysis was holistic versus the categorical approach. This approach was appropriate when the researcher was interested in a phenomenon shared by a group of individuals or when the researcher tried to understand the person as a whole (Lieblich et al. 1998). The second type of narrative analysis was about content versus form. In the second type of narrative analysis, it was about the explicit content of an account and the structure of the plot. In combination, the explicit content of an account and the structure of the plot aspects could be a good strategy in this second type of narrative analysis (Clandinin 2007; Lieblich et al. 1998). Riessman (2003) suggested that personal narratives did not reveal the past as it actually was. Instead, they gave us the truth of experiences that were neither open to proof nor self-evident, and could only be understood through interpretation, by paying careful attention to the context that shaped them.
According to Patton (2002, p. 5), “the themes, patterns, understandings, and insights that emerge from fieldwork and subsequent analysis are the fruit of qualitative inquiry”. Following analysis of themes and translation into English, the information was sorted following (Miles & Huberman 1994), into meaningful categories so that the themes, patterns or concepts could be understood and explained. In this research, the research framework derived in the literature review initially guided the themes. The researcher accepted that unexpected themes would most probably arise and become part of the analysis. This study used an analytical technique of taking the literature and applying that to the collected data. From the judgments that were made on the data and the referrals that were also made to the literature to substantiate the author’s personal judgment, this technique was defined as ‘hermeneutics’ (Gadamer & Linge 2008; Thanasankit 1999). The Hermeneutic Cycle of investigating data is presented below in Figure 3.7.

![Figure 3.11: The Hermeneutic Cycle](source: Thanasankit (1999))

In order for a better analysis of data in this research the thematic analysis constitutes an effective method. This is because it provides a structured way of understanding how to develop themetic codes and sense themes. The interviews were transcribed and themes were
identified from the transcription. The process of themetic analysis can be divided into three stages. The first stage is to design what sampling and design issues are. The next step is to develop themes and codes. Finally, the third stage is validating and using codes (Boyatzis 1998).

In order for replicating, extending or refruting prior discoveries, theory should be adopted to develop the themes and codes (Boyatzis 1998). In this research the themes originated from the initial conceptual model. The division themes of Out-Patient, In-Patient, Pharmacy and Waste Management are identified through interview transcription. Table 3.2 shows the themes and sub-themes identified from the analysis issues that emerged in the transcribed interviews.

<table>
<thead>
<tr>
<th>THEMES</th>
<th>SUB-THEMES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Division</td>
<td>Out-Patient Department</td>
</tr>
<tr>
<td></td>
<td>In-Patient Department</td>
</tr>
<tr>
<td></td>
<td>Pharmacy Department</td>
</tr>
<tr>
<td></td>
<td>Waste Management Department</td>
</tr>
<tr>
<td>Process</td>
<td>Supply Chain Management</td>
</tr>
<tr>
<td></td>
<td>Hospital Logistics</td>
</tr>
<tr>
<td>Reverse Logistics Activities</td>
<td>Reduce</td>
</tr>
<tr>
<td></td>
<td>Reuse</td>
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<tr>
<td></td>
<td>Recycle</td>
</tr>
<tr>
<td></td>
<td>Return</td>
</tr>
<tr>
<td></td>
<td>Refurbish</td>
</tr>
<tr>
<td></td>
<td>Repair</td>
</tr>
<tr>
<td></td>
<td>Incineration, Waste Management</td>
</tr>
<tr>
<td>Business Value</td>
<td>Competitive Advantage</td>
</tr>
<tr>
<td></td>
<td>Profit Maximization</td>
</tr>
<tr>
<td></td>
<td>Customer Satisfaction</td>
</tr>
<tr>
<td></td>
<td>Cost Reduction</td>
</tr>
<tr>
<td></td>
<td>Resource Efficiency</td>
</tr>
</tbody>
</table>

### 3.7 Summary

Bouma and Ling (2004) state that a qualitative method can generate answers to questions on specific areas or given situations. It also provides answers in more detail such as what is happening in a conversation, the meaning of the message, feelings, and outcomes. It was considered appropriate here then to adopt a qualitative approach as the research is exploring how each RL activity specifically adds value. This research is seeking detail across 3 separate organisations using interviews down the hierarchical structure of the hospitals and focused in 4 similar departments within each hospital, departments chosen following interviews with the
COOs because of the importance operationally in them in terms of the application of reverse logistics.

This research applied case studies analysis as a critical method in order to achieve all 3 main research questions as mentioned previously in Figure 3.1: and in the Research Design, Page 58. It is divided into 2 main stages.

Firstly, it is collecting texts, hospital records, government publications, Thai government and hospital policy documents, and annual reports of private hospitals in order to understand the context of the case studies. This enabled the collected in stage 2 to create a better understanding of the role and extent of reverse logistics in the hospitals.

Secondly, it is a set of interviews relating to the use of Reverse Logistics in specific departments within each hospital. The details about where the interviews were targeted and with who are described below. The interviews were recorded and initially transcribed in the Thai language and then into English and checked. An analysis was done using coding to develop themes, leading to building a model for each hospital. Following the analysis conclusions were drawn and then, using a focus group, the outcomes were tested and reviewed to confirm the interview findings. The analysis followed a hermeneutics cycle of interpretation based on themes derived from the literature review, reported in Chapter 2, and from notes taken during the interviews.
4 CHAPTER FOUR: Analysis of the Hospitals’ Reverse Logistics Applications

This chapter analyses the data collected from the interviews, document analysis and focus group described in Chapter 3. The intent here is to provide an analysis of the types of reverse logistics across the hospitals and understand the intent of these choices. In each department studied the types of reverse logistics used are mapped again to the strategic intent using the model proposed in Fig. 2.8.

4.1 Case Study One: Bumrungrad Hospital

4.1.1 Bumrungrad Hospital and Supply Chain Strategy

In the previous chapter it was shown that the key overall strategic goals of Bumrungrad Hospital were customer focus, adoption of high quality medical technology, employing the best possible medical staff and efficient use of resources. It was evident that the ‘front stage’ strategy for the hospital focused on customers’ satisfaction. In this chapter the analysis focuses on the ‘back stage’ processes related to reverse logistics and then comparing what was happening strategically at this level compared to the overall strategy of the hospital and suggesting why this was the case.

4.1.2 Bumrungrad Hospital's Units of Analysis

The unit analysis of this study has been divided into 4 categories. The identified categories are Top Management such as COO and CPO, Clinical: staff; Division Director of Pharmacy, Manager Pharmacy Division, Out Patient Pharmacy, Doctor, and Nurse, Non-Clinical Staff, for example, International Marketing Officer, and IT Technician; IT Officer and IT Officer. Table 4.1 describes the codes assigned to the units of analysis that will be applied throughout this research, where they belong in the designated category, and the number of times the interview was conducted with each interviewee.
Bumrungrad Hospital applies three concepts to its strategy and management of operations. The first concept is supply chain management, a subcomponent of that, reverse logistics, and sustainability in order to obtain efficient operations and performance (Fig. 4.1).

Table 4-1: Bumrungrad Hospital’s Units of Analysis

<table>
<thead>
<tr>
<th>NO.</th>
<th>Interviewee</th>
<th>Interviewee Category</th>
<th>Position</th>
<th>*Number Interviewed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>TM1</td>
<td>Top Management</td>
<td>COO</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>TM2</td>
<td>Top Management</td>
<td>CPO, CAO</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>C1</td>
<td>Clinical Staff</td>
<td>Division Director of Pharmacy</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>C2</td>
<td>Clinical Staff</td>
<td>Manager Pharmacy Division</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>C3</td>
<td>Clinical Staff</td>
<td>Out Patient Pharmacy</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>C4</td>
<td>Clinical Staff</td>
<td>Doctor (Surgery)</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>C5</td>
<td>Clinical Staff</td>
<td>Nurse</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>NC1</td>
<td>Non-Clinical Staff</td>
<td>Marketing officer</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>NC2</td>
<td>Non-Clinical Staff</td>
<td>International Marketing Officer</td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>IT1</td>
<td>IT Technician</td>
<td>IT Manager</td>
<td>1</td>
</tr>
<tr>
<td>11</td>
<td>IT2</td>
<td>IT Technician</td>
<td>IT Officer</td>
<td>1</td>
</tr>
</tbody>
</table>

* Number of times interviewed

Figure 4.1: Overview of Bumrungrad Hospital Operational Management
In the interviews it was clear what the strategic intent of the use of the supply chain and its management in Bumrungrad Hospital was more efficient and led to effective management of costs and delivery of services. The COO (TM1) explained that:

*The hospital management uses Supply Chain concept as a strategy in order for better management of medicines, medical supplies and general supplies.*

A more specific reason was noted by the Manager Pharmacy Division (C2) who claimed that:

*"The hospital already applied the concept of hospital logistics within its operations. The products used in the hospital are different from the general products used. The reason why these products require a high standard is to ensure the maximum quality for the customer/client and that it is according to the hospital policy. The medicines are different from general product because there is a seasonal trend for using them, for example, in the 'raining' season the demand for influenza vaccine is highest. Therefore it is difficult to forecast the demand of products compared with the general goods. The health guidelines are the other factor that affects the inventory of the hospital. The health guidelines must be up to date all time as stated by the Ministry of Public Health for ensuring the efficiency of using the medicines or vaccines”.*

The operationalisation of the entire hospital and departmental supply chain relies to a large extent on the benefits accrued through advanced IT and appropriate technological software. The CPO or CAO (TM2) stated:

*"Importantly, the use of technology (IT) must be considered as the main tool for supply chain efficiency. Bumrungrad Hospital applies software for a better management system. We use Microsoft Amalga HIS. It can provide a well organised systems of the company’s record keeping and ensuring thorough and accurate documentation and reporting to provide the best of care for patients. Its about efficiency in what we do and using the supply chain to do it”.*

The IT Manager and the IT Officer (IT1 & IT2) made the following claim:

*"We also created new software for use with specific purpose within the supply chain of the hospital. The benefit is that it helps us monitor the stock of medicines with our application of JIT and increase the efficiency of inventory management, reduce waste and minimise reversal of orders.”*
According to the Division Director of Pharmacy (C1) with reference to the benefit of IT, he said:

“The technology that can help the hospital’s operations is the software named AMALKA, applying to inventory management. This is produced by the hospital. The advantage of this is a real time management process and can control all products used in the hospital.”

The hospital has applied the supply chain concept as a strategy in order to implement better operations in its logistics, especially improving efficiency in operations and effectiveness so that clients are delivered services in a better way. The Manager Pharmacy Division (C2) remarked:

“Importantly, the RL Strategy directly involves the strategy of the hospital. It can help the business growth of the hospital indirectly. The main reason for applying RL is to reduce the inventory cost.”

The hospital has been operating a ‘green’ policy since 2008 according to the report Thailand in Quality\(^4\). This green policy invokes strategies to make the operations of the hospital as ‘environmentally’ friendly as possible, not only with the types of products used, but also with the management of waste, energy and water and training staff to be conscious of waste created during normal operations. In order to make better operations possible the hospital launched a 5-year plan to guide and manage the green policy. All companies in the supply chain at Bumrungrad Hospital cooperate with the hospitals’ green policy and work together within a green supply chain. For example the hospital uses recycled bags made from old clothes and biodegradable materials. The other green concept that the hospital has applied concerns saving and consumption of energy. The ideal is to reduce the costs of electricity or water as much as possible. As part of that ‘green policy, and as part of the operational efficiencies already noted, the hospital also applied reverse logistics practices within the company and across all aspects of its operations. The COO (TM1) stated that:

“The hospital applies many reverse logistics activities such as Waste Management (Water Treatment), recycling and return of medicines, and application of reusable medical instruments”.

\(^4\) Thailand in Quality is a safety and quality standard used by hospitals in Thailand.
Research participants claimed that whilst the hospital had already applied a reverse logistics strategy and incorporated many RL activities within its operations, it was still in the initial stages of application. The hospital, for example, manages the waste from all departments. The toxic waste, mostly in the form of medical and surgical waste, is collected and destroyed by outsourcing to a service provider. Water treatment is also an example of reverse logistics used in this hospital. The benefit noted is a saving in costs. The hospital also applies reuse but for less than 10% of medical instruments. There are two types of reused medical instruments: single-use and multiple-use. More than 90% of medical instruments are international standard single-use as the market is an international one and the hospital also complies with the relevant RTG policy (patient safety) and its focus on single use. Accordingly, reuse is one of the reverse logistics activities in the hospital but it cannot be realised as a business strategy in itself, because it is part of a compliance regime required by the Thai Ministry of Public Health. Adherence to the JCI standard is important for the hospital’s accreditation. The Division Director of Pharmacy (C1) remarked:

“Reverse logistics can help the hospital in terms of recycling pharmaceutical stock... and ... The benefit of Reverse Logistics is in reduction of pharmaceutical waste with it being more than 50% of total hospital waste.”

Recycling and return are reverse logistics activities applied only in the Pharmacy Division of the hospital, leading to benefits such as reduced costs and ensuring the quality of medicines that enhance the hospital’s brand reputation.

4.1.3 Reverse Logistics Activities at Bumrungrad Hospital

The various components of reverse logistics used in designated departments at Bumrungrad Hospital are shown in Fig. 4.2. Following the interviews it was found that the hospital adopted various types of reverse logistics activities including reduce, reuse, recycle, refurbish, repair, and incineration in the four main departments of the hospital, OPD, IPD, Pharmacy Department (PD) and Waste Management Department (WMD).
Figure 4.2: The different components of Reverse Logistics in Bumrungrad Hospital

a) Out-patients Department

There are two significant reverse logistics activities, recycle and return, being applied in the Out-Patient Department (OPD) of Bumrungrad Hospital (Fig. 4.3).
In the Out-Patient Department (OPD) the hospital applies reverse logistics activities in terms of return of prescribed medicines. For example after the patients receive their medicines from the hospital and they become allergic to them, according to the hospital’s policy they can return them and get their money back with full value. The hospital is required to assess the patient and ensure that the patients are indeed allergic. Once checked the patient is prescribed alternative medicines. According to the hospital policy relating to ensuring efficiency of the medicine quality, all returned medicines must be destroyed. However, only 5% of medicines are returned to the Pharmacy Department. Importantly, they must be unpacked and be in good condition. The Out-Patient Pharmacy Manager (C3) commented:

“More than 95% of return-medicines must be destroyed in complying with the rules and regulations relating to patient safety and the quality of medicines.”
The OPD also uses recycle bags, made from re-cycled clothing (Fig. 4.4). The hospital encourages patients to use recycled fabric bags instead of plastic bags. For example, if patients use recycled bags, they will receive a discount (value is 20 baht per transaction). This helps improve the company’s reputation and ‘green’ image and in turn the perception that it engages in corporate social responsibility (CSR). The COO (TM1) claimed:

“TM1 proudly presents the green policy of the hospital including recycled bags. The hospital can gain benefits in terms of our overall image, our green image and perceptions of our corporate social responsibility (CSR).”

Figure 4.4: Recycled Bags at Bumrungrad Hospital
Source: Photograph supplied by Bumrungrad Hospital

b) In-Patient Department

The In-Patient Department (IPD) applies 3 reverse logistics activities (Fig. 4.5).
• **Reuse of materials that are made from cloth**

According to the hospital’s policy on patient safety, the hospital can reuse the materials that are made from cloth such as bed sheets, blankets, pillow cases and patients’ clothes. However, how many times the hospital can do this means complying with the rules and regulations regarding hygiene and ISO 9001. One Doctor (Surgery) (C4) and a Nurse (C5) stated:

"Reuse is considered as one of the RL activities applied within the IPD department and can provide benefits in terms of cost reduction to the hospital."

Materials re-used are laundered and sterilised in the hospital laundry through an internal supply chain. Materials such as this are subject to wear or the need for disposal, if seriously soiled, and the reverse logistics process is supplemented by purchasing new materials through the externally sourced supply chain.
• **Reuse of medical equipment**

There are two main types of medical equipment (instruments for surgery) used in this hospital: firstly, single-use occasions; and secondly, equipment that can be used many times such as lancets and scalpels. Normally they must be cleaned and sterilised to ensure that they will not cause infection to other patients. As mentioned previously, the target market of Bumrungrad Hospital is the high-end of the market. These clients can afford the high prices. Therefore, the hospital policy focuses on patient safety by enforcing the vision and business goals by providing high quality professional care and patient satisfaction. Medical equipment then is rarely reused within this hospital. The COO (TM1) stated:

> “The reuse of medical equipment (instruments for surgery) can reduce operational cost. The figure from this is not outstanding enough for generating revenue or profit so single use must be the best and is the common form of practice. We dispose of almost all equipment as waste.”

The Doctor (Surgery) (C4) claimed that:

> “In our Department medical instruments are rarely reused or not reused at all according to the requirements of the JCI standard. It adds cost but is essential to avoid infections and we therefore dispose of any instrument we use, whether metal, plastic or cloth.

• **Refurbishment of furniture**

A complex portfolio of furniture exists throughout hospitals, including beds, screens, examination tables, trolleys, chairs of many sorts, waiting area furniture, desks, shelving, cabinets and storage furniture, and in this hospital because of its target market, decorative furnishings. Normally, they must be refurbished or replaced when they break. However, according to the hospital’s vision statement, ‘World Class Medicine, World Class Service’, Bumrungrad Hospital prefers to buy new furniture items and not to repair them. The COO

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5 JCI accreditation is considered to be the gold standard in global healthcare. JCI consultants are the most skilled and experienced in the industry. (www.jointcommissioninternational.org/about/).
also emphasised that decorating trends always change so the furniture must always reflect what is ‘up-to-date’. The COO (TM1) stated:

“We are concerned about the hospital’s image presenting as a World Class Medicine World Class service therefore most furniture at both front and back office must be always modern and up-to-date in order for enhancing the professional number one status of world class healthcare image in Thailand.

The external supply chain is used in the refurbishment and changes in the hospital’s furniture, either for medical or decorative purposes, either because of image change, technology changes or replacement of worn-out furniture. The hospital uses reverse logistics in the hospital to remove these items as waste, often using the waste as a capital item, either being paid for the waste or as part of amortisation of capital invested.

- Repair - computers, medical machines, hospital equipment

Computers are used throughout the hospital from the front office to the back office, in wards, clinics and laboratories. They are central to the hospital’s administration and medical treatment regime. As mentioned previously, the hospital operates various types of software in various departments in order to enhance operational efficiency. Accordingly, the hospital must pay significant attention to operating a well-maintained set of computers which are used throughout all departments. When they are out of order, they must be fixed. The IT centre is the department responsible for repairing them. The IT Manager (IT1) claimed:

“The repair of computers or medical machines or hospital equipment is the best way when they are out of order instead of purchasing new.

Many types of medical machines are used in the hospital and it is noted that the cost of items such as Ultrasound Machines, X-Ray Machines, and Pharmacy Machines is very high (more than 1 million baht in some cases) and must be well-maintained for long periods. Large equipment such as an MRI Scanner or a CAT Scan machine will cost over US$1,000,000. They are operated every day and since they are crucial diagnostically, if a machine is out of order or needs to be re-calibrated, then they need to be fixed immediately if possible first,
instead of buying a new one. Part of the reverse logistics strategy implemented in Bumrungrad Hospital then relates to a constant supply, re-supply and reversal of equipment that is significant for the hospital’s operations, its cost structures and its reputation.

c) Pharmacy Department

The Pharmacy Department is staffed by a team of pharmacists, technicians and support staff who are responsible for dispensing medicines to out-patients and in-patients. Their strategic plan in using reverse logistics is to reduce waste and return of medicines (Fig. 4.6).

Figure 4.6: PD (Pharmacy Department) and Reverse Logistics Activities

C1, the Division Director of Pharmacy Department, indicated the need to contain costs in Pharmacy as nearly all patients used its services through the doctors and specialists. Reverse logistics was a significant factor used to maintain management of costs. He added:

“We have already implemented RL within our systems. We will recall the medicine if it may be harmful or having side effects to users. We use RL in the hospital and this department with recycle and return of medicines which have nearly expired (not less than 6 months). The benefit of these actions is in reducing the loss of money from expired medicines. It can be clearly seen that RL can help the hospital to decrease the loss of money from expired medicines showing up in millions of baht
per month. However, it does not cover all types of medicines. In some cases, for example, there are the types of medicines that we must reserve on the shelves all of the time. We will not neglect the life time of medicines. According to the mission of the hospital, we want to provide the best quality of medicine to the patients. We must make sure the life time of medicines is not more than six months. As mentioned before we will recycle the medicines and return them back to the vendors or manufacturers”.

He continued at length:

“The internal audit is a policy used across every department of the hospital to inspect the life time of medicines and move them to use in other departments which need those medicines. Importantly, it is difficult to apply RL in medicine within the hospital because it depends on the trends. The using of medicines cannot be forecast like normal products. The use of medicines in hospital follows seasons. By the way, RL relates to Logistics in terms of Inventory in the medicines warehouse. It can help the hospitals to reduce the cost of inventory. Although we don’t have a logistician we have the head of each department to be responsible for RL.”

Fig. 4.7 shows the process of supply chain management of medicines used in Bumrungrad Hospital. Typically, the medicine supply chain starts with the Pharmacy stock which generates a Purchasing Order (PO) after monitoring all stock via Trackcare. Next the vendors receive a PO from the Pharmacy Stock and prepare the medicines as per order. Then the medicines are transported to the hospital. The receiving unit at the hospital receives and checks that the quality and quantity of the medicines are correct. All received medicines must be kept in the hospital’s store. The store is responsible for distribution of the medicines to Pharmacy OPD and Pharmacy IPD. The Pharmacy OPD dispenses the medicines to patients on the order of doctors and pharmacists. On the other hand, Pharmacy IPD dispenses the medicines to patients on the order of general, specific and ICU ward medical staff.

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6 The name of the software that manages the hospital’s supply chain.
Fig. 4.7: Medicine Supply Chain Management

Fig. 4.8 shows how the hospital adopts reverse logistics activities through recycling and returning the medicines to the vendors. According to the policy of the hospital all medicines must have expiry date more than 6 months ahead to be stored. The reason of this is to ensure the ultimate quality of the medicines that the patients will obtain for medical treatment. Therefore all medicines must be monitored constantly. All units such as the Pharmacy OPD and Pharmacy IPD involved with the medicines are required to check their stock as a routine task (normally every six months). After monitoring the life cycle of medicines if it finds some medicines with expiry date less than 6 months, they have to be returned to the store. Then the store will return medicines back to the vendors. This can reduce much pharmaceutical waste. The hospital also gains savings by eliminating waste and enables the hospital to detect trends in use of medicines and plan orders in a better way.
Recycling and return can apply to nearly all types of medicines according to the Pharmacy Director (C1). However, there are some types of medicines that are unsuitable for a reverse logistics strategy. For example, seasonal drugs such as influenza vaccines have short shelf lives but ones that the hospital must maintain and be ready to use any time is part of hospital policy. Therefore, the inventory of this cannot be changed. If it expires, it will become a loss and waste undoubtedly. ‘Vital drugs’ are the other drug type that cannot have a reverse logistics strategy applied because a vital drug such as Adrenaline, an essential medicine for stimulating the heart, must be on constant stand-by for immediate use. Therefore, the hospital cannot reduce the volume of doses and it is difficult to estimate how much of it should be stocked.

The Pharmacy Department in Bumrungrad Hospital has set up a special pharmacy centre. Its main responsibility is to monitor and prepare all medicines that are used in both Pharmacy OPD and Pharmacy IPD before distribution to wards and medical staff and then to the patients (Fig. 4.9).
All medicines in Bumrungrad Hospital must be linked to the database system’s software, Trackcare, in order to monitor how many medicines will be used in the pharmacy OPD and pharmacy IPD and then delivered to patients. Importantly, the information flow must be in real time for completing the tasks of the pharmacy centre. The main task is to monitor the volume of used medicines (one time open and then thrown away) in both the IPD and OPD. The Special Pharmacy Centre monitors and prepares how many doses of the medicine will be used in OPD and IPD, for example, when the doctor orders 1 gram of an antibiotic injection for patient at OPD, but only 0.5 grams of it is actually used for the patient. Therefore, the rest must be thrown away according to the pharmacy rules (one time open) and patient safety. However, the Special Pharmacy Centre is the coordinating centre for arranging the rest of one time open medicine and immediately distributes them to the IPD and OPD as required. It is possible to use the same type of medicine at the same time because there are more than 400 patients in the IPD wards at any one time at Bumrungrad Hospital. The Out-Patient Pharmacy (C3) confirmed this as follows:

“The special pharmacy centre can reuse one time open medicine and helps the company to reduce the cost finally.”
The systems in the PD are supported by management of medicines using the Pharmacy Robot (Fig. 4.10). This is important because it improves efficiency and decreases costs and enables reduction of returned medicines.

![Pharmacy Robot](image)

**Figure 4.10: Pharmacy Robot**

The Division Director of Pharmacy (C1) claimed that:

“...*The Pharmacy Robot enhances the efficiency of task performance in the Pharmacy Department, reducing around 70 percentage of medication filling errors. The benefit of this can be seen in terms of cost saving such as dispensing labour costs, new staff training costs, and inventory costs... One of the benefits of the Pharmacy Robot is uncovering cost avoidance: 1,687,000 baht of medication costs and drug filling costs during 6 month. It also saved dispensing labor costs of around 303,996 baht, training costs saved 176,000 baht, and inventory costs saved up to 1,049,308 baht through managing returns.*”

The pharmacy robot, used in both the OPD and IPD of the Pharmacy Department in Bumrungrad Hospital, reduces medication errors by making management and ordering much more simple, avoiding over-reliance on memory, simplifying key processes, and increasing efficiency. The system allows highly-trained pharmacists and technicians to spend less time...
on routine tasks, and more time on patient care. It also leads to a reduction in waste and recycling and also assists in the management of reverse logistics operations in the hospital.

d) Waste Management and Green Policy

Waste management is central in the reverse logistics strategy of Bumrungrad Hospital (Fig. 4.11). The COO (TM 1) said:

“Bumrungrad Hospital has already applied a reverse logistics policy into hospital management. It can be clearly seen in terms of waste management and water treatment.”

The company uses outsourcing for the collection and destruction of toxic waste. The non-toxic waste, such as paper, must be recycled and used again at the back office. Water treatment and re-use is also a significant waste management strategy used in Bumrungrad Hospital. Large volumes of water are used in hospital services, and the COO (TM2) noted the very high impact on hospital operating costs of water consumption. Therefore, water treatment is a strategy that helps the hospital’s cost reduction plans. The hospital applies a high level of sophisticated technology for water treatment so it can make sure that the recycled water is clean and for everyday use. Water is essential for health, hygiene and productivity in the hospital.

Toxic waste is removed and sent to a biological waste management centre. This is an essential strategy of the hospital required by law and necessary to meet accreditation standards internationally. The planning of this waste disposal is important for the replenishment of materials disposed of in biological waste, associated with medical treatments. This process is a significant item in the management of the supply chain in the hospital and maintenance of efficient operational systems. This is unavoidable waste and therefore comes with unavoidable costs. Managing it effectively as part of the supply chain and reverse logistics policies of the hospital enables better cost and operational management across all departments in the hospital.
Bumrungrad Hospital has implemented an environmental or ‘green’ policy since 2008. Reverse Logistics operations are a key part of it. The recycled bags referred to above have been in use since 2008 and this plays a key role in helping the hospital’s image as a green hospital, important in the international market place it competes in. The COO (TM 1) said that:

“In the year 2008, the hospital started to use a Green Project. This project concept is to move green policy forward throughout all companies that get involved with the hospital. So the recycled bags have been used since that time.”

4.1.4 The nature, patterns and characteristics of interactions between reverse logistics activities and business value creation

This section reports on mapping the types and nature of reverse logistics activities used in all 4 departments in Bumrungrad Hospital chosen for analysis, and the hospital’s staff assessment of where these RL activities create business value. It is important to note here,
applicable across all three hospitals, that the value created is a relative measure reported by
the interviewees. For business competition reasons, none of the three hospitals would disclose
actual figures.

a) Out-Patient Department (OPD)

In the OPD there are two reverse logistics activities applied (recycle and return) (Fig. 4.12).

![Diagram of Reverse Logistics Activities and Business Value in the OPD]

Figure 4.12: Reverse Logistics Activities and Business Value in the OPD

The hospital gains business value in the form of competitive advantage, customer satisfaction
and cost reduction due to effective reverse logistics activity (recycling). The COO (TM 2) of
the hospital said that recycling has become a minor reverse logistics activity which is applied
in the OPD. An example of recycling is the recycled-cloth shopping bags, as stated by TM 2:
“The benefit of recycled bags helps the hospital in terms of cost reduction: Reducing the material cost even though it is not too much, but it helps”

This has become a campaign to enhance the green image and enhance the environmental savings of the hospital. The green image can help the company enjoy customer satisfaction and also build competitive advantage through product differentiation. There is benefit, TM2 noted, in getting ‘the message out there’ about the hospital and even though the bags are a minor item, they have had a significant impact. As BH is a private hospital, its brand in the market place is significant in terms of improving and maintaining the status of the hospital competitively in Thailand, especially the professionals and middle class who willingly choose private hospitals for their daily and urgent medical care.

Based on the interviews and analysis, return can be recognised as the main RL activity that gives the business value to the hospital as customer satisfaction. As mentioned before, all returned medicines must be destroyed according to the needs of patient safety, efficiency of medicine delivery and quality of treatment. The two clinical managers (C2 and C3) responsible noted, respectively:

“The medicine return policy of the hospital assures gaining one hundred percentage of customer satisfaction.”

“The return policy can provide customer satisfaction for the hospital.”

This policy, the two senior administrators (TM1 and TM2) noted, enhances the hospital’s image both nationally and internationally. The patients, they believe, are very satisfied as a result of this return policy and have trust in the quality of medicines as well. As shown in the discussions previously in this chapter, cost management is a very significant issue for Bumrungrad Hospital. It is a private company and must meet strategic financial targets and return a profit for its owners on a yearly basis. Medicines constitute a very high cost for hospital operations and therefore must be very effectively managed to control costs. Using reverse logistics, the pharmacy robot and a pharmacy information system, enables the hospital to management those costs very effectively.
b) In-Patient Department (IPD)

Based on the interview data, the most important value creating RL activity of this department is repair. The explanation is that repair of medical devices can provide business value in terms of cost reduction by extending the life of equipment, appearing as being more valuable financially and extending the value derived from their use. It also helps the hospital gain an advantage from a more efficient use of resources/investments. Return on investment was noted as a very significant issue by the COO. He said that when we invest so much in large-scale expensive equipment, it is essential that we maximise its use and get the best possible return on what we invest. Repair and maintenance is essential.

One of the Doctors (C4) said:

“At IPD the repair of medical machines such as Ultrasound Machines, MRI Machines is the main RL activity and provides business value in terms of cost reduction: saving the operational cost instead of buying a new machine.”

The Nurse (C5) also stated that:

“C5 claims that reuses of the medical instruments are applied but it is rarely. The reason of this is the hospital focuses strongly on patient safety and the hospital must follow the rules of JCI7.”

The two top managers also commented on this with TM 1 adding:

“According to the hospital policy about patient safety and with reference to the major customers, we need to still make it affordable to pay so we reuse some medical equipment within our hospital. However, where it is necessary and possible, we do not like to”

The other important RL activity used in the IPD is refurbishing of capital equipment. As mentioned before, some furniture and hospital equipment in the hospital’s front and back

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7 JCI accreditation is considered to be the gold standard in global healthcare. JCI consultants are the most skilled and experienced in the industry. (www.jointcommissioninternational.org/about/)
offices, in the wards and offices, and in public areas are refurbished when they are old or not up-to-date. It helps the company to save on operational costs. However, the amount of the money saved is not high compared to the savings from repairs (Fig. 4.13).

![Diagram](image)

**Figure 4.13: Reverse Logistics Activities and Business Value in the IPD**

The least significant of the RL activities applied within the IPD department is reuse. The reason why reuse is the least important of RL is that according to the hospital policy and in terms of patient safety, the reuse of medical instruments is not often mandated in day-to-day operations.

**c) Pharmacy Department**

The Pharmacy Department produces benefits in terms of business value in three ways, through cost reduction, improving resource efficiency and assisting in profit maximisation from applying reverse logistics strategies as recycling and return of undated or out-of-date medicines into the supply chain.
The Division Director of Pharmacy (C1) stated that:

“Planned Recycling and Return can reduce more than 50 percentage of total pharmaceutical waste. The amount of pharmaceutical waste from expired medicines is less than 6 figure baht. If we did not have reverse logistics, we may have lost huge revenues from expired medicines at nearly 100 percentages.”

The Manager Pharmacy Division (C2) added:

“Recycling and returning medicines under our policy guidelines can reduce costs and enable the company to obtain good figures in accounting terms.”

Cost reduction is the most significant business value that the hospital gains from adopting recycling and return strategies. Pharmaceutical waste is one of the main waste generating
elements from the hospital. As mentioned before, Bumrungrad Hospital already applies supply chain management strategies in order to gain better and high quality management of the pharmaceutical inventory. The interviewees argued that this can help the hospital to reduce pharmaceutical waste. The recycling and return reverse logistics strategies can enhance the efficiency of supply chain management and can help reduce pharmaceutical waste as well. All of the interviews highlighted that there is a clear and direct relationship between the adoption of recycling and better management of medicines and the management and subsequent reduction in costs in the hospital’s operations. Without this RL strategy, profitability would be significantly compromised.

Bumrungrad Hospital also gains significantly from RL in terms of profit maximisation derived from the implementation of recycling and return of pharmaceutical products. As mentioned before, it helps the company recoup material costs. TM1, TM2, and C1 all claimed that the recycling and return of pharmaceutical products helps the hospital to generate significant profits. COO (TM 1) said:

“TM1 showed that recycling pharmaceutical stock can provide a good figure in our financial statement in terms of cost reduction more than increasing the profit.”

Reducing pharmaceutical waste can also provide business value in terms of resource efficiency. It was the direct intention of senior managers in the hospital that medicines which are nearly expired are used more efficiently and effectively. As mentioned previously, C1 also claimed that RL can help the hospital from losing huge revenues from expired medicines, with up to 100% of value.

d) Waste Management

The recycling of water is the major RL activity employed in the Waste Management Department of BH. The business value gained is better resource efficiency. The hospital uses recycled water for watering the yards and gardens, for plants in the hospital and for cleaning (Fig. 4.15). The COO (TM1 believes that is the most effective way of utilising water in the hospital. The recycled water also helps reduce costs to the hospital but it is a minor RL
activity for providing business value in terms of cost reduction because it only saves a small amount of money (25,000 – 50,000 baht per month). The COO (TM1) commented:

“The hospital can gain the benefit from reverse logistics especially in water treatment and use. The value of cost saving is about 25,000 – 50,000 baht per month even though it is only a small amount of money in terms of the overall operational costs of the hospital”.

![Diagram of Reverse Logistics Activities and Business Value](image)

Figure 4.15: Reverse Logistics Activities and Business Value in the Waste Management Department

### 4.1.5 Summary

Having discussed the specific departmental RL strategies used in Bumrungrad Hospital, it is important to address the question: What are the strategically critical Reverse Logistics activities that create business value overall? Fig. 4.16 summarises the RL activities used at Bumrungrad Hospital and the business value strategic outcomes it has achieved through RL.
Bumrungrad Hospital used various reverse logistics activities to create business value, perceived by the hospital leaders as either competitive advantage, or profit maximisation, or customer satisfaction, or cost reduction, or resource efficiency. The strategically critical Reverse Logistics activities that created the most business value in hospital is gained in the Pharmacy Department and it provides the hospital with significant business value in terms of cost reduction, profit maximisation and resource efficiency.
4.2 Case Study Two - Vejthani Hospital

4.2.1 Vejthani Hospital Units of Analysis Categorisation

There are 4 categories of data sources used in the analysis of Vejthani Hospital (VH). The identified categories are Top Management such as CEO, COO, and Assistant Director, clinical: Pharmacy Division, Nursing Director, Physician (Surgery), Ambulatory Service, non-clinical staff, International marketing officers, and IT: technicians. Table 4.2 shows the codes assigned to the units of analysis that will be applied throughout this section on VH, the category that they belong to, and the number of times an interview was conducted with each interviewee.

Table 4-2: Vejthani Hospital Units of Analysis Categorisation

<table>
<thead>
<tr>
<th>NO.</th>
<th>Interviewee</th>
<th>Interviewee Category</th>
<th>Position</th>
<th>*Number Interviewed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>TMV1</td>
<td>Top Management</td>
<td>CEO</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>TMV2</td>
<td>Top Management</td>
<td>COO</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>TMV3</td>
<td>Top Management</td>
<td>Assistant COO</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>CV1</td>
<td>Clinical Staff</td>
<td>Pharmacy Division</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>CV2</td>
<td>Clinical Staff</td>
<td>Nursing Director</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>CV3</td>
<td>Clinical Staff</td>
<td>Physician (Surgery)</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>CV4</td>
<td>Clinical Staff</td>
<td>Ambulatory Service</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>NCV1</td>
<td>Non-Clinical Staff</td>
<td>International Marketing Staff</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>ITV1</td>
<td>IT Technician</td>
<td>IT Division</td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>ITV2</td>
<td>IT Technician</td>
<td>IT Staff</td>
<td>1</td>
</tr>
</tbody>
</table>

* Number of times interviewed
4.2.2 Hospital Logistics and Supply Chain at Vejthani Hospital

Vejthani Hospital has a comprehensive Supply Chain strategy, a green policy and employs Reverse Logistics in the hospital management processes (Fig. 4.17). The hospital has adopted supply chain and RL strategies as a strategic management tool in order to for operations in hospital logistics to proceed more efficiently. For example, the CEO (TMV 1) stated that:

“Our company has a well-managed operational management process resulting from efficient hospital-logistics and supply chain management. JIT can bring the benefit to our hospital in terms of cost reduction, for example, the operational cost first decreased from 10% to 8.5% in 2008 and this has continued since then. It also kept the profit margin increasing by 22% over a 5 year period without increasing the price. Interestingly, the doctors are considered a significant factor that can enhance an efficient of supply chain management within the hospital.”
The reasons for having supply chain management and reverse logistics strategies in Vejthani hospital include, for example the statement by COO (TMV2) that:

“Targetting to decrease an inventory time from 90 days to 60 days for better performance of inventory management at Vejthani Hospital is crucial for strategy”.

The CEO (TMV1) said:

“We want to enhance and improve hospital logistics and map activities to the new policy that will emerge soon with greener corporate image”.
The IT Division and IT Staff (ITV1 and ITV2) claimed that:

"Improving efficiency with software namely PEOPLESOF in order for better managing procurement and delivery of medicines and medical supplies is essential for us in this hospital."

However, as the CEO (TMV1) noted there was no central logistics or supply chain management team:

“There is no logistician team formally which is responsible for all logistics tasks within hospital but the head of all departments are the main persons who take all responsibility regarding Logistics tasks within hospital management."

This is a significant difference to Bumrungrad Hospital where the SCM and RL strategies are centrally managed. The hospital has also focused on energy saving since 2010 in compliance with government laws and regulations launched by RTG Ministry of Energy. The CEO (TMV1) stated:

“Vejthani Hospital has realised a green policy; therefore it has followed the government policy concerning the energy saving since the last two years”.

Furthermore the COO (TMV2) added:

“Significantly, after replacing the air conditioning systems with new chillers, it can be clearly seen that there is a decrease in consumer saving of around 300,000 baht per month and it is also complying with the new policy of the Ministry of Energy that launched an energy saving campaign according to the national energy saving plan”.

The Assistant COO (TMV3) noted:

“We want to follow the recent policy launched by Thai-Ministry of Energy. Therefore, we decided to follow the campaign of Energy saving. We also receive money subsidied by the Thai- government for this specific purpose.”
The hospital also reduced its electricity consumption by replacing electricity with fuel oils for sterilisation of clothes belonging to patients and clinical dress, and bed sheets.

The hospital has applied reverse logistics activities but it does not consider RL as its main strategy. This is because the hospital is more concerned with patient safety, and green policy in complying with JCI rules and regulations. The interviewees who work at Vejthani Hospital claimed that the hospital already applied reverse logistics activities within its operations but it is still in the initial stages. The hospital segregates all types of waste from all departments and then toxic wastes are collected and destroyed by an outsourced company. The hospital also sometimes reuses medical instruments.

### 4.2.3 Reverse Logistics Activities in Vejthani Hospital

The different components of reverse logistics implemented in four departments at Vejthani hospital (Figure 4.18) are as varied as that of Bumrungrad Hospital. After interviewing the participants, there was evidence that the hospital has adopted various reverse logistics activities such as reduce, reuse, recycle, refurbish, repair, and incineration in the four main departments, the OPD, IPD, Pharmacy Department (PD) and Waste Management Department (WMD).
a) Reverse Logistics Activities in Out-Patient Department (OPD)

In the Out-Patient Department (OPD) of Vejthani Hospital the key reverse logistics activity relates to the return of medicines. According to the hospital’s policy, the patient can return their medicines to the hospital if they are unsatisfied if they suffer from allergy or personal reasons (for example the size of the tablet). To serve many people well and follow the mission statement, the hospital must offer a return policy to customers. The returned medicine must be unpacked and returned within 7 days. They patients then get a full refund. Pharmacy Division (CV1)) stated:

“The return policy is an effective reverse logistics in this hospital.”

According to the Nursing Director (CV2):
“The return policy of pharmacy from the patient is one of the best way for fulfilling customers’ satisfaction.”

The CEO (TM1) and the Pharmacy Division Manager (CV1) also noted:

“At Vejthani Hospital the returned medicines must be destroyed totally even though it can bring an increase in the amount of pharmaceutical waste, resulting in increasing cost. The reason of this is to keep the customers’ satisfaction and customers’ loyalty high as part of the mission and vision of the hospital, providing the best quality to the customers.

Figure 4.19 below shows that return is a reverse logistics activity that plays a major role in the OPD at Vejthani Hospital.

![Figure 4.19: OPD and Reverse Logistics Activities](image)

**b) Reverse Logistics Activities in In-Patient Department (IPD)**

Three reverse logistics activities are applied in the In-Patient Department (IPD) at Vejthani Hospital. These are described in more detail below.
• **Reuse the materials that are made from cloth**

According to the hospital’s policy on patient safety, the hospital can reuse the materials that are made from cloth such as bed sheets, blankets, pillow cases and patients’ clothes. However, the number of times the hospital can do this depends on the hygiene and rules governing the practices of ISO and complying with JCI conditions. The Nursing Director (CV2) stated that:

“We always reuse some materials that are made from cloth such as bed sheets, blankets, pillow cases and patients’ cloth but we need to make sure about patient safety with for one hundred percentages of hygiene level in order for prevention of patients’ infection.”

The Ambulance Service Head (CV4) also remarked:

“We use a single-use sheet for bed sheets at the Emergency Room. The reason of this is it is very difficult to clean with 100% hygiene level. However, we use bed sheets that are made from paper so they can be thrown away after they are used. This produces waste but is cost effective”

• **Reuse of medical equipment or devices**

There are two main types of medical equipment (instruments for surgery). Firstly, the medical equipment that can use only be used once (single use). In Vejthani Hospital this is waste and has to be disposed of as a cost. Secondly, some medical equipment can be used many times such as lancets, scalpels, etc. Normally they must be cleaned and sterilised until it is certain that they will not cause an infection to the patients. However, it is essential that these objects are replaced frequently and a planned ordering process in the SCM stage is implemented. The discontinued equipment is recycled to metal dealers or to medical equipment manufacturers for redevelopment as new equipment.

The target market of Vejthani Hospital is international patients. They can afford the high fees. Therefore the hospital policy focuses on patient safety by ensuring the vision and the goal are executed, by providing high quality professional care and customer satisfaction. The medical equipment is therefore rarely reused. The CEO (TMV1) said:
“Medical equipment or devices (instruments for surgery) are rarely reused even though it can reduce the operational costs. But it shows in a small figure and we are concerned more about patient safety, therefore the single use must be the best and we therefore dispose of them.”

- **Refurbish furniture**

  Furniture and capital equipment in all areas of VH are refurbished when they are broken or damaged or a change in image is required. However, due to the policy of VH, most of this used furniture must be donated to the public hospital or community as a charity. The COO (TMV2) said:

  “Most furniture which used in both front and back office is donated to the community depending on its life cycle and trend of the fashion which always be changed.”

- **Repair computers or medical machines or hospital equipment**

  Computers are used everywhere in the hospital from the front office through to the back office, in wards, offices, supply offices, reception, etc. When they break down they must be fixed. The IT Centre is the department that is responsible for this job. The hospital operates various types of software in various departments to maintain operational efficiency. Accordingly, the hospital must pay more and more attention to operating proper maintenance of computers. IT Division (ITV1) commented on this procedure:

  “The main responsibility of the IT centre is to fix all computers that operate within the hospital. The software that is used in the supply chain in the hospital must be well maintained in order to ensure all hospital - logistics tasks in the hospital are completed and are effective.”

  IT Staff (ITV2) claimed that:

  “Most medical machines which operate in hospital are costly so they need to be well maintained. The best way out could be fixing them when they are out of order rather than purchasing a new one.”

  In addition IT equipment and software must be upgraded on a 3-4 year cycle to keep operations as effective and efficient as possible. Old machines are donated or used for trade-in value back to the IT supply companies.
There are many types of medical machines being used at the hospital. The cost of medical machines such as Ultrasound Machines, X-Ray Machines, and Pharmacy Machines is very high so they need to be well maintained. These must be operated every day and VH, like Bumrungrad Hospital, operates most equipment 24/7. When they become unoperational, or have minor faults or they need re-calibration, they need to be repaired as soon as possible instead of buying a new one.

In the In-Patient Department (IPD) there are three main RL activities (reuse, refurbish, and repair) and these play a role in the IPD of Vejthani Hospital (Fig. 4.20).

![Figure 4.20: IPD and Reverse Logistics Activities](image)

c) **Reverse Logistics Activities in the Pharmacy Department (PD)**

Interviews highlighted that there are two RL activities playing a significant role in the Pharmacy Department at Vejthani Hospital. These are explained in more detail here.
• Recycling and return of medicines back into the supply chain - Medicine Supply Chain Management

Figure 4.21 shows the process of supply chain management for medicines in Vejthani Hospital. Typically, the medicine supply chain starts with the Pharmacy stock which generates a Purchasing Order (PO) after monitoring all stock via Trackcare, Peoplesoft, and HIS (the name of the software for procurement in the hospital’s supply chain).

Next the vendors receive the PO from the Pharmacy Stock and prepare the medicines as per order. Then the medicines are transported to the hospital. The receiving unit at the hospital receives and checks that the medicines are the right quality and quantity. Then all received medicines must be kept in the hospital’s store which is responsible for distributing the
medicines to Pharmacy OPD and Pharmacy IPD. Pharmacy OPD dispenses the medicines to patients as per doctors’ and pharmacists’ instructions. IPD dispenses the medicines to the patients as demanded by the ICU Ward.

Figure 4.22 shows how the hospital adopts reverse logistics activities: recycling and returning of the Pharmaceutical stock or medicines to the vendors. According to the policy of the hospital, all medicines in the hospital inventory must have an expiry date of more than 6 months.

![Diagram showing reverse logistics activities](image)

**Figure 4.22: Reverse Logistics Activities: Recycling and Return the medicines**

The reason for this is to ensure the sustained quality of medicines that the patients will obtain for medical treatment. Therefore all medicines must be constantly monitored. All units such as the Pharmacy OPD and Pharmacy IPD must check their stock as a routine task (normally every six months). After monitoring the life cycle of medicines if some medicines are found to have expiry dates of less than 6 months, they must be returned to the pharmacy store who then will return these medicines to vendors. The benefit here is the reduction of much pharmaceutical waste. The hospital also saves money by eliminating that waste. The Pharmacy Division (CV1) contended:

“According to the statistics showing in the number of expired medicine in hospital for two years ago, it has reduced significantly from 2% of total pharmaceutical waste to less than one percentage. We are strongly focusing on cost avoidance of expired medicines; therefore it should be the least as possible as it can”
The COO (TMV2) stated on this matter:

“An outstanding figure of recycling and return of Pharmaceutical stock after implementing can be shown in the inventory rate decreasing from 0.8 % to 0.62% within one year, adding significant savings”

Recycling and return are applied to nearly all types of medicines, except seasonal medicines, in Vejthani Hospital. Vejthani Hospital offers cutting-edge technologies, with the ability to operate maximum safety and accuracy (The Smart Dispensing Robot EVV220). Vejthani Hospital Smart Dispensing Robot EVV220 is designed to reduce or eliminate the risk of cross-contamination, simplifies filling processes, is easy to use, incorporate and maintain (Fig. 4.23). The advantage of Vejthani Hospital Smart Dispensing Robot EVV220 is that the doctor's order is transmitted directly to the Smart Robot Robotic Direct Fill Vejthani Hospital Smart Dispensing Robot EVV220 and then dispensed. The robot is used to reduce or eliminate the risk of cross-contamination, and simplifies filling of prescriptions. The pharmacy robots are used in both the OPD and IPD at Vejthani Hospital. The benefit of this is that it reduces medication error by lowering complexity, avoiding over-reliance on memory, simplifying key pharmacy processes, and increasing efficiency.

Figure 4.23: Smart Dispensing Robot EVV220: the first in Asia
Source: Photograph supplied by Vejthani Hospital
The system allows highly trained pharmacists and technicians to spend less time on routine tasks, and more time on patient care. It reduces costs and increases client satisfaction. The Pharmacy Division Manager (CV1) remarked:

“The pharmacy robots provide a high efficiency performance without error at a rate of 99.99% and it reduces the labour cost of pharmacists but not a huge amount of money.”

The Nursing Director (CV2) added:

“The pharmacy robot helps to reduce the timing of medicine dispensing compared with the manpower of the pharmacist”

The Doctor (CV3) commented:

“The benefit of Pharmacy robot is to reduce the medication errors, leading to an efficiency in medicine dispensing”

In summary, there are two significant RL activities (reduce and recycle, return) that play a role in the Pharmacy Department of Vejthani Hospital (Fig. 4.24).
Figure 4.24: Pharmacy Department and Reverse Logistics Activities

d) Reverse Logistics Activities in Waste Management Department (WMD)

Interviews with TMV1, TMV 2, and CV 1 showed that Vejthani Hospital has been concerned with waste management for a considerable length of time and emphasised the centrality and quality of waste management within the general administration of the hospital. The CEO (TMV1) claimed that:

“We have a well-operating waste management system in place, especially in waste segregation. We focus strongly on toxic waste being generated from all departments within the hospital. Toxic waste must be demolished and destroyed by an outsourcing company in complying with laws and regulation of the Ministry of Public Health that are concerned about the environment and safety. Therefore the hospital must be responsible for waste management resulting in costs.

He added later:

“In order for cost saving of waste management, the hospital has a well-managed waste segregation process by assigning a team such as medical staff and housekeepers to separate all hospital waste. Recycling is one key tool we use for reducing the hospital waste. For example, we have a recycling campaign as seen in a competition within all departments of hospital. The winner is considered to be
which department can recycle hospital waste the most without harming humans or the environment. But based on the value of recycling of hospital waste, it shows up only as a small amount of money or saving of costs but it can bring environmental awareness to employees reflecting through responsibility of the organisation (hospital).”

Power management is also a significant issue in VH. Excessive use of power is considered to be bad management and is therefore seen as a central part of the SCM policy and strategy of the hospital. The COO (TMV2) noted:

“Significantly, we can reduce the cost of energy consumption. It shows about 10 percentage of total energy consumption. Normally, the energy cost is about 3,000,000 baht, but after implementing a new chiller system we can save money at least 10 percentage more: about 300,000 baht per month. Accordingly, we won an award in ISO50000 relating to energy saving from the Ministry of Energy.”

Figure 4.25 below shows that Vejthani Hospital’s Waste Management Department has implemented two RL activities: recycle and incineration as part of waste management operations at the hospital.

![Figure 4.25: Waste Management Department and Reverse Logistics Activities](image-url)
4.2.4 Value Creation through RL in Vejthani Hospital

a) Out-Patient Department (OPD)

In the OPD department, based on interviews and analysis, return activities in RL are the main RL activities that provide business value in the form of customer satisfaction. As mentioned before, all returned medicines must be destroyed according to the policy on patient safety and for maintaining efficiency in medicine quality. This policy can enhance the hospital’s image and so is treated as very important. The patients are happy with this return policy and have trust in the quality of medicine as well. The COO (TMV2) claimed that:

“Customers’ satisfaction could be considered as an important thing that the hospital must realize. The return medicines from customers are a hospital policy related to keeping customers loyalty and customers’ satisfaction. Additionally, it is very important to maintain this policy as one strategy for completing in the health care industry in Thailand.”

The CEO (TMV1) claimed further that:

“The return products from customers can provide customer satisfaction leading to customer loyalty finally. In the competitive world of Thailand’s health care system, this is very important for us.”

The relationships between RL activities implemented in the OPD and the business value they create for Vejthani Hospital are shown in Fig. 4.26.
b) Value Creation through RL in In-Patient Department (IPD)

The interview data shows that the most important RL activity implemented in this department is repair. On this subject the CEO (TMV1) said:

“Based on the amount of cost saving, Repair could be the main RL activity applied in the IPD department.”

The reason for this is that repair of medical devices and equipment can provide business value in terms of significant cost. The CEO (TMV1) further noted:

“The main policy of our company is trying to save cost as much as possible as we can while we are keeping the best quality, related to the mission and vision of the company.”

It also helps the hospital in that its resources are used more efficiently. The least important RL activity is refurbish and reuse. The COO (TMV2) remarked:
“We rarely reuse medical instruments although it can provide cost savings to the company. According to our vision and mission, and JCI accreditation, we must provide the best medical service and quality to our customers.”

Furniture and capital equipment are refurbished when they are old or not up-to-date. It helps the company to save on operating costs. The amount of money saved is not high compared with savings from repairs. The reason why reuse is the least important of RL activities in the IPD is that according to the hospital policy and patient safety, associated with JCI conditions, the reuse of medical instruments is rarely applied. The benefit of this can be seen in terms of business value: cost reduction and resource efficiency. The relationships are shown in Fig. 4.27. The strongest relationship based on the opinions given by the interviewees is cost reduction derived from repairs, reuse and refurbishment.

![Reverse Logistics Activities and Business Value in the IPD at Vejthani Hospital](image)

Figure 4.27: Reverse Logistics Activities and Business Value in the IPD at Vejthani Hospital
c) Value Creation through RL in Pharmacy Department (PM)

The most significant RL activity in terms of creating business value, implemented in the Pharmacy Department, provides cost reduction, profit and better resource efficiency, respectively, for Vejthani Hospital (Fig. 4.28).

The recycling and return of medicines can provide significant cost savings concerning pharmaceutical wastes (Baht). For example the Nursing Director (CV 2) stated:

“Recycling and Return can reduce a huge amount of pharmaceutical waste. There was a decrease of pharmaceutical waste from 2% to less than 1% of total hospital waste since 2012.”

Recycling also has the capacity, in the opinion of the interviewees who work at Vejthani Hospital, to improve profits to the hospital resulting from cost reduction and from well managed pharmaceutical waste. Additionally, the top management also argued that the
recycling and return of medicines also provides resource efficiency through better use of pharmaceuticals, resulting from the reduction of pharmaceutical waste and better management of hospital logistics including pharmaceutical inventory management. Recycling also helps the hospital not suffer from material costs as the COO (TMV2) mentioned:

“Recycling pharmaceutical stock can provide a good figure in the financial statement in terms of cost reduction more than increasing the hospital’s profit.”

Reducing the amount of pharmaceutical waste can also provide business value in terms of resource efficiency with the application of robotics and software packages to improve efficacy of process, better uses of medicines, better ordering, less need for overstocked inventory and improved timeliness of stock ordering.

d) Value Creation through RL in Waste Management Department (WMD)

In the Waste Management Department, RL activities such as recycling and incineration effectively reduce costs and enable better and more efficient resource use (Fig. 4.29).
The segregation of waste processes in Vejthani helps the hospital to divide waste types and improve recycling, reduce costs and reuse some products such as paper. Recycling provides business value in terms of resource efficiency and through effective and planned resources management systems, built on quality management principles. The COO (TMV 2) stated:

“Vejthani Hospital has an excellent Environmental Management System (EMS) including hospital and medical care services, guaranteed by receiving ISO 14001 accreditation in 2004 and ISO 9001 in 2000, and ISO 9000 in 1994.”

The CEO (TMV1) mentioned further:

“Our hospital makes a contract with 2-3 outsourcing companies regarding waste management. The toxic waste such as medical waste and infectious waste must be controlled strictly in complying with laws and regulations of Ministry of Public Health. Outstandingly, the cost of waste management is quite high. Therefore we need to control the costs as best as we can. The waste segregation must be
undertaken and they can be divided into three categories: general waste, toxic waste, and infectious waste. It can provide cost reduction to the hospital. According to the statistics, it can be clearly seen that we can save the cost of waste management by nearly 20 percentages after we undertake waste segregation.”

4.2.5 Summary

Having discussed the specific departmental RL strategies used in Vejthani Hospital (Fig. 4.30), it is again important to address the question: What are the strategically critical Reverse Logistics activities that create business value?

Vejthani Hospital, ‘front stage’, strategically focuses on customers’ satisfaction and this means providing high quality service and a collaborative work culture. In the ‘back stage strategy in the Out-Patient Department (OPD) of Vejthani Hospital the key reverse logistics
activity relates to return of medicines. The hospital leaders claimed that it provides business value and this refers to customer satisfaction. In IPD the major RL activity is repair because the repair of medical devices and equipment can provide business value in terms of significant cost reduction. It also achieves other business value in resource efficiency. Interestingly, the most significant RL activity in terms of creating business value, implemented in the Pharmacy Department, is cost reduction, profits and better resource efficiency, respectively. Finally, in the Waste Management Department, RL activities such as recycling (major RL activity) and incineration effectively reduce costs and create better and more efficient resource use.

4.3 Case Study Three - Bangkok Pattaya Hospital

The unit analysis of this part of the study at Bangkok Pattaya Hospital (BPH) has been divided into 4 categories. The identified categories are Top Management such as CEO, COO, and Division Director of N Health, Clinical Staff, Pharmacy Manager, Nursing Director, Physician (Surgery), and Pharmacist, Non-Clinical Staff, International Marketing Officer and Housekeeping Staff and Technicians; IT Manager. Table 4.3 below shows the codes assigned to the units of analysis that will be applied throughout this study, the category that they belong to, the position where they come from, and the number of times each person was interviewed.

4.3.1 Units of Analysis Categorisation of Bangkok Pattaya Hospital
4.3.2 Hospital Logistics and Supply Chain

Bangkok Pattaya Hospital, like Bumrungrad and Vejthani Hospitals, also has a significant Supply Chain strategy in place, and specifically it aligns with a N-Health Strategy. N Health, as used in Bangkok Pattaya Hospital, is a subsidiary company of Bangkok Dusit Medical Services Public Company Limited (BDMS). The main responsibility of N Health is to support all services and hospital management staff such as Laboratory Services, Sterile Processing, Technology & Engineering, and Supply Chain Management of hospitals within Dusit Medical network including Bangkok Pattaya Hospital. Supply Chain Management is a responsibility of N Health. It is relevant to managerial hospital logistics in the following areas: procurement services; in-hospital logistics services; and inventory.

Whereas both Bumrungrad Hospital (centrally managed) and Vejthani Hospital (decentralised management) have internally managed supply chain and reverse logistics strategies, Bangkok Pattaya Hospital’s supply chain and its reverse logistics strategies are
externally managed. In all three hospitals, the intent of the strategies are the same but it is the management of those strategies that differentiates them.

BPH has implemented a set of RL activities as part of their overall supply chain and hospital business strategies (Fig. 4.31). The CEO (TMP 1) asserted:

“The hospital management had already applied Supply Chain strategy aligned with N Health Services in order for quality management of Procurement Services, Internal & External Logistic Services, and Stockroom Management.”

The COO (TMP2) made the following statement:

“Bangkok Pattaya Hospital occupies an excellent position in its Supply Chain Strategy starting with procurement, warehousing, and distribution.”

The Division Director of N Health (TMP3) stated:

“We have clarity in the Supply Chain Strategy in order for supporting all hospitals that are a member of the N Health network. Importantly, we strongly believe that we can provide excellence in logistics and supply chain management to all members. Significantly, for example, there is a decrease in the inventory day at Bangkok Pattaya Hospital by about nearly 50% in the past 12 months”
a) Network Hospital

Bangkok Pattaya Hospital is part of a network of hospitals under the one ownership and it is this strategy that provides many benefits to the hospital, for example, purchasing power, lower costs, improved inventory management, more efficient processes and more effective management. The Division Director of N Health claimed that:

“The N Health is a central service as considered as a representative of hospital network that enhances the power of purchasing (with the huge volume of purchasing) dominating from all suppliers. Accordingly, Bangkok Pattaya Hospital can get the lowest price.”

b) Sustainability Policy and Corporate Social Responsibility (CSR)

The hospital has a sustainability policy within the supply chain of Bangkok Pattaya Hospital and this network tries to cooperate under the concept of a green supply chain. The hospital
also implements a energy savings strategy through an energy consumption reduction plan. COO (TMP2) stated that:

“Presently, we want to go forward to the Green concept and Corporate Social Responsibility (CSR). As the coming of AEC (Asian Economic Community) in 2015, we must realise what the new trend and how the hospital prepare itself in order for competing in the healthcare industry.”

c) SCM and Reverse Logistics

The Bangkok Pattaya Hospital has applied Logistics and Supply Chain Management in its day-to-day operations. The Division Director of N Health (TMP3) stated:

“We started to use this for many year ago and we have a formal logistics staff who are responsible directly for all tasks related to logistics and supply chain management.”

Bangkok Pattaya Hospital has implemented a variety of Reverse Logistics activities but in the words of senior management, this process is still in the initial stages. According to the CEO (TMP1):

“The hospitals in the network apply many reverse logistics activities such as, recycling and return of medicines, and reusability of medical instruments.”

The Division Director of N Health (TMP3) stated:

“Reverse Logistics can help the hospital in terms of recycling the pharmaceutical stock”.

4.3.3 Reverse Logistics Activities in Bangkok Pattaya Hospital

The various components of Reverse Logistics in key departments at Bangkok Pattaya Hospital are shown in Fig. 4.32. Following the interviews, it emerged that the hospital has adopted various reverse logistics activities such as reuse, recycle, return, refurbish, repair, and incineration in the OPD, IPD, Pharmacy Department (PD) and Waste Management Department (WMD).
Figure 4.32: Different components of Reverse Logistics in Bangkok Pattaya Hospital

a) Reverse Logistics Activities in the Out-Patient Department (OPD) of Bangkok Pattaya Hospital

- **Return of medicines**

The hospital has implemented one very significant form of reverse logistics activity in terms of return medicines from out-patients (Fig. 4.32). According to the hospital’s mission and vision statements, Bangkok Pattaya Hospital is willing to receive medicines from customers when necessary. However, the return policy cannot be applied across the board. The main reason for the return policy is customers’ experience of allergies resulting from using those medicines. COO (TMP2) noted:

> “Bangkok Pattaya Hospital has a medicines return policy in order for meeting the customers’ satisfaction”
The Pharmacy Manager (CP1) added:

“It is normally to get the medicines returning from the customers resulting from the main reason: medicine allergy. However, the return medicines must be maintained completely in full packages with a good condition. Normally, the return medicines will not be in terms of a refund but in the replacement of the new medicines.”

According to the Pharmacist (CP4):

“The return policy can help the hospital to meet customers’ satisfaction. The customers feel happy with it certainly. The reason for this is that it shows the hospital provides medical services with care and concern to all patients.”

With reference to the Bangkok Pattaya Hospital policy, people can return them and get a full refund. To ensure that medicines are of high quality all returned medicines must be destroyed. This adds costs to BPH operations. The Pharmacy Manager (CP1) claimed:

“More than 90% of returned medicines must be destroyed in complying with existing rules and regulations. These are determined by the Thai Ministry of Public Health and concerns relating to patient safety and the quality of medicines”

- **Recycled Bags or Biodegradable Bags**

Figure 4.33: Recycled bags and Biodegradable bags
Source: Photograph supplied by Bangkok Pattaya Hospital

The other reverse logistics activity employed in OPD is recycled rather than plastic bags. Recycled bags which are made of paper are used widely among all N Health network
hospitals including Bangkok Pattaya Hospital. According to the CEO, the justification is to follow corporate social responsibility guidelines in order to improve image and compete in the Thai, Asian and global healthcare industry. The CEO (TMP1) stated:

“Our hospital has a policy that wants to provide the best quality to the customers but in order to compete in the healthcare industry. It is important to be responsible for environmental issue as the recent trend at present. Therefore, the ideas of recycled bags has emerged and has been applied it now. In the future, biodegradable bags will be used.”

These sentiments were echoed by the COO (TMP2) who claimed:

“The green policy of the hospital includes the promotion and use of recycled bags, offering incentives such as discounts to our clients to use them. The hospital can also gain benefits in terms its corporate social responsibility (CSR). It’s a way of attracting clients.”

Figure 4.34: OPD and Reverse Logistics Activities
b) Reverse Logistics Activities in the In-Patient Department (IPD)

There are two Reverse Logistics activities that are utilised in the IPD at Bangkok Pattaya Hospital (Fig. 4.35). The repair of medical machines is considered to be a major activity in this department.

- The repair and re-use of Medical Machines, equipment and materials

Bangkok Pattaya Hospital has invested significantly in the most up-to-date medical equipment for diagnosis and treatment. This equipment is very expensive and the hospital has initiated, through the N Health network, a policy to maintain it so that it can be implemented on a 24/7 basis. This necessitates the recycling and re-use of parts and regular maintenance. Many machines are dangerous because they involve the application of radioactive materials. It is essential that maintenance is part of the supply chain and the recycling of used radioactive materials is essential for public and staff safety.

The Nursing Director (CP2) claimed:

“It is the best way to apply the Repair Medical Machines such as X-Ray Machine as a best way in obtaining resource efficiency.”

Meanwhile the COO (TMP2) made the following assertion:

“The best way out for using these resources with most efficiency is to fix the medical machines because we are concerned more about how to use the resources within the hospital relating to improving our image. The reason is most medical machines are costly and some parts of medical machines are harmful to humans and the environment. Therefore they must be fixed or recovered as quickly as possible as they can be in order to use them with the best resource efficiency and safety.”

According to the Division Director of N Health (TMP3):

“N Health network assists Bangkok Pattaya Hospital to fix or repair the medical machines using a central technician team for this specific purpose.”
The Nursing Director (CP2) added:

“We rarely reuse the medical instruments such as surgical instruments because we are concerned about the patient safety in accordance with the JCI conditions even though it can save cost to the company but we can reuse some material such as bed sheets or pillows cases. They must wash and clean in complying with the hospital policy regarding the hygiene.”

**Figure 4.35: IPD and Reverse Logistics Activities**

c) **Reverse Logistics Activity in the Pharmacy Department**

A variety of reverse logistics activities occur in the Pharmacy Department at Bangkok Pattaya Hospital. Significantly, the recycling and return of pharmaceutical waste is considered to be the major RL activity here. The COO (TMP2) claimed that:

“The main RL activity at pharmacy department is the recycling, return of pharmaceutical waste resulting from operations in the hospital and enabled by N Health service and its management of our hospital’s supply chain”
Bangkok Pattaya Hospital uses a Supply Chain Management strategy as a key component of its operations. As mentioned in Chapter 4, Bangkok Pattaya Hospital is a network hospital and N Health supports the internal hospital management in its bid to compete with others and reach the quality standard of treatment services. The three main Supply Chain Management services provided by N Health are as follows:

- **Procurement Services** to procure medical equipment, medical supplies and other goods and services to support the delivery of healthcare services more efficiently, carried out by professional personnel who are knowledgeable and experienced about pharmacists’, nurses’, and engineers’ needs.

- **Internal & External Logistic Services**: The internal and external logistics services are systematic and what is required is prompt logistics of medicine, medical supplies, and medical samples for examination at a laboratory. The transporters are trained at the Mobile Transporter© program, designed especially for tasks in the hospitals.

- **Stockroom Management**: This aspect includes planning, procurement, storage and distribution of pharmaceutical drugs and medical devices by teams of experienced pharmacists who can disburse drugs to customers and delivery is consistent with international standard medical treatment standards. This inventory management and medical supply helps the hospital manage costs more effectively.

The CEO (TMP1) stated:

“We work well together with our network company. N Health is a central service company to serve all companies professionally in Supply Chain Management. It provides a good service of procurement, logistics and stockroom management. Therefore, it can help the hospital to control the inventory of medicines and medical supplies in accordance with JIT and real time concepts.”
The Division Director of N Health (TMP3) remarked:

“N Health can provide a good figure of the inventory cost decreasing more than 12% with supporting recycling and return of pharmaceutical stock in Bangkok Pattaya Hospital since 2013.”

- Recycling and Returning Pharmaceutical stock or the medicines back into the supply chain

The recycling, return of pharmaceutical stock is managed not only within the hospital but also across the hospital network. It can therefore enhance more efficient control of the number of expired medicines. The Division Director of N Health (TMP3) proudly reported that:

“In the year 2013, the company data shows that N Health can provide a good performance in controlling the number of pharmaceutical waste decreasing by more than 80 percent.”

The process of supply chain management of medicines at Bangkok Pattaya Hospital via the N Health network is depicted in Fig. 4.36. Typically, the medicine supply chain starts with the Pharmacy stock which generates a Purchasing Order (PO) after monitoring all stock via MedTrak\(^8\) (http://www.medtraksystems.com/main/) and SAP\(^9\) (the name of the software for managing the hospital’s supply chain) (http://help.sap.com/healthcare).

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\(^8\) MedTrak Systems is a fully integrated, Electronic Medical Record (EMR) and Medical Practice Management Software Service.

\(^9\) SAP for Healthcare solutions has the capacity to help manage patient engagement, patient administration and billing, clinical care delivery. Care collaboration providers need to make better decisions while managing costs through analysis and control of business operations.
Fig. 4.36 shows the movement of medicines and medical supplies starting from the hospital network warehouse and ending with the patients. The medicines are shipped directly to 12 IPD wards in the hospital, into the three main dispensary pharmacy centres (i.e. Beauty, OPD, and IPD), and finally, to patients or end users.

The pharmaceutical system at Bangkok Pattaya Hospital and the Dusit Medical Network is controlled by a hospital logistics system using SAP and Medtrak. These software packages support the hospital’s inventory management. Fig. 5.36 also shows how the hospital implements reverse logistics activities: recycling and return of the medicines to the suppliers. All three centres - Beauty, OPD, and IPD involved with supply of medicines - must check their stock every six months. If the expiry date is less than 6 months, they are returned to the warehouse. This enables pharmaceutical waste and operating costs to be better controlled and minimised (Fig. 4.37). The hospital also saves money by eliminating that waste.
d) Waste Management in Bangkok Pattaya Hospital

The N Health hospital network and Bangkok Pattaya Hospital specifically, has outsourced the collection and destruction of toxic waste. Non-toxic waste such as paper is recycled. Fig. 4.38 below shows the processes of how the hospital manages wastes including infection waste and toxic waste, water treatment, reusable products and equipment and general waste. Each is used to reduce costs, improve profitability and use resources more effectively.
Waste segregation is executed in all departments in Bangkok Pattaya Hospital to control the high cost of waste management. The costs of toxic waste and infectious waste are the highest. Normally, hospital waste is divided into two main categories and these are explained in more detail below.

- **General Waste**
  
  It can be defined as waste that is not harmful to humans and the environment.

*Recycled General Waste*

Some general waste is recycled including paper. Other general waste such as glass, plastic, and aluminium needs to be separated for recycling and then an outsourced company will collect them from the hospital.
**Reusable Medical tools**

According to JCI conditions, the hospital has significant concerns about hygiene and infection of medical tools, implements and equipment. Therefore, the medical tools are rarely reused.

**General Waste Water**

General waste water from all departments of hospital is cleaned in order to ensure hygiene and elimination of toxicity and risk of infection. Some water treatment is applied and reused for many purposes such as watering plants, cleaning, and flushing toilets.

**Waste Water from Laboratory Centres**

Waste water from these centres is carefully monitored and treated with chemical neutralisation in order to ensure patient safety, and to comply with laws and regulations and JCI conditions.

- **Infectious Waste and Toxic Waste**

Infectious and toxic wastes refer to hospital wastes that are harmful to humans and the environment. They must be used and managed carefully in accordance with the laws and regulations of the Thai Ministry of Public Health.

Hospital waste management is a critical environmental and public safety issue, due to the waste’s infectious and hazardous character. Importantly, the infectious and toxic wastes must be managed in a highly specialised way. As mentioned previously, the operational costs of toxic and infectious waste result from modern technology. For this reason Bangkok Pattaya Hospital decided to use an outside company. The CEO (TMP1) stated:

“The outsourcing company is the best solution for operating the toxic and infectious waste.”
The COO (TMP2) stated:

“*The waste segregation needs to become the primary process by our staff at the Waste Management Department. Next, they must be collected, stored and transported by an outsourcing company.*”

The Nursing Director (CP2) remarked:

“The toxic waste segregation is operated with the skilled staffs in the Waste Management Department. For example, the concentrations of BOD\(^{10}\), COD\(^{11}\) and heavy metals are measured in the wastewater. The wastewater’s toxicity was also investigated in order for ensuring the hygiene and elimination of toxicity and infection before reusing it as many purposes.”

It was noted by the Housekeeping Staff member (NCP2) that:

“It is my responsibility to segregate the hospital waste as a primary process. The recycled paper is firstly segregated and classified as a non-toxic waste. The toxic waste is packed with easily noticeable packaging in order to prevent wrong collection and ensure safety.”

The International Marketing Staff member (NCP1) contended:

“All staff needs to use recycled-paper as the hospital policy although it is not compulsory but it is part of the awareness of good staff here.”

In summary, recycling and incineration and chemical and filtration waste treatments are the major RL activities occurring in the Waste Management Department of Bangkok Pattaya Hospital (see Fig. 4.39).

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\(^{10}\) Biochemical oxygen demand (BOD) is the amount of dissolved oxygen needed by aerobic biological organisms in a body of water to break down organic material present in a given water sample at certain temperature over a specific time period.

\(^{11}\) Chemical Oxygen Demand (COD) is the total measurement of all chemicals (organics and in-organics) in the water / waste water.
4.3.4 Business Value Creation through implementation of Reverse Logistics at BPH

a) Out-Patient Department (OPD)

The use of recycling and return of medicines are key RL activities in the OPD at Bangkok Pattaya Hospital. They produce benefits/business values according to the interviewees in the form of competitive advantage for the hospital better customer service and therefore satisfaction. Like Bumrungrad and Vejthai hospitals, Bangkok Pattaya Hospital also uses recycled product bags to improve its image and maintain competitiveness. On this issue the CEO (TMP1) remarked:

“CEO claimed that the concept of recycled bags can provide the business value in terms of competitive advantage with enhancing the customers’ perception of CSR trend at present.”

The pharmacy manager (CP1) added his comment:

“The application of recycled bags can help the company to obtain competitive advantage. Importantly, it is a key healthcare strategy of this hospital.”
Another Reverse Logistics activity that is applied at the OPD of Bangkok Pattaya Hospital is to the practice of returning medicines that are faulty or patients have reacted to them, or they are unused. According to the interviewees this strategy is essential for client care and can provide business value in terms of competitive advantage and customer satisfaction.

The COO (TMP2) added:

“According to the hospital policy, the hospital can gain customer satisfaction from the adoption of medicines return policy.”

The Pharmacy Manager (CP1) also added:

“The medicine return can provide competitive advantage. It can enhance efficiency in competing in the healthcare industry here in Thailand and Asia generally.”

Based on interviews and analysis, recycling is a major RL activity that creates business value as competitive advantage for BPH. The use of recycled bags, interviewees argue, can enhance the hospital’s image with its focus on sustainability and can influence customer perception so that customer loyalty is created. The hospital gains business value, competitive advantage, and customer satisfaction, from the implementation of reverse logistics activities (Fig. 4.40). After interviewing the TMP1 of the company, the return strategy is considered to have a minor reverse logistics impact when applied in the OPD.
b) In-Patient Department (IPD)

According to the interviewees, the most important RL activity implemented in the IPD is repair (Fig. 4.41). The hospital can achieve better business value with a good repair strategy because it results in resource efficiency. Applying a sensible repair strategy to medical machines such as X-ray machines, computers, etc. ensures resource efficiency. On this theme the COO (TMP2) commented:

“The best way out for using the resource with most efficiency is to fix the medical machines because we are concerned more about how to use the resources within the hospital relating to the new CSR concept. The reason is that mostly medical machines are costly and some parts of medical machines are harmful to humans and the environment. Therefore they must be fixed or recovered as soon as possible in order to use them with the most effective resource efficiency.”

The Division Director of N Health (TMP3) commented on this matter:
“N Health network assists Bangkok Pattaya Hospital with fixing or repairing the medical machines because we own a central technician team for the specific purpose.”

Therefore, Bangkok Pattaya Hospital uses resources efficiently through their partnership in the N Health network where repairs to medical technology and machines are paramount.

![Diagram](image)

Figure 4.41: IPD RL Activities and Business Value Relationship

c) Pharmacy Department

Bangkok Pattaya Hospital’s Pharmacy Department benefits from this in that applying recycling and return policies in the supply chain leads to cost reductions, more profits and resources are used efficiently (Fig. 4.42).
According to the Division Director of N Health, resource efficiency is the most significant business value obtained when recycling and return Reverse Logistic strategies are employed. Pharmaceutical waste is one of the main waste generating areas in the hospital. However, proper use of IT systems and software packages can overcome this issue. Subsequently, the Division Director of N Health (TMP3) asserted:

“At present, each hospital within Bangkok Medical Service (BDMS) network occupies their warehouse. Each hospital operates and manages their own warehouse without cooperation between hospitals within the same region. In the future, we have an idea to build a central warehouse or region warehouse that all hospitals that are located in same areas or region e can use a central warehouse and share the use of medicines or medical supplies together. For example, there are four hospitals (Bangkok Pattaya Hospital, Bangkok Rayong Hospital, Bangkok Chanthaburi Hospital, and Bangkok Trad Hospital which are located in the eastern part of Thailand and are members of Bangkok Medical Service (BDMS) network. They will share the same central warehouse as a central warehouse in the eastern part together. So, they can share and link all data throughout business network the medicines and medical supplies and may be moved or exchanged among their warehouses. This can provide the hospital with adoption of recycling and return of pharmaceutical stock finally leading to them meeting their business value generation goals in terms of resource efficiency”.

Figure 4.42: Pharmacy Department RL Activities and Business Value Relationship
As mentioned in the previous section, Bangkok Pattaya Hospital already has an effective supply chain and operates as a member of a healthcare network. This helps the hospital to support the recycling and return of pharmaceutical stock and means resources are used more effectively. The CEO (TMP1) claimed that:

“The reduction of pharmaceutical waste can bring business value to us in terms of resource efficiency to the hospital”

The policy of recycling and return of pharmaceutical stock can also provide a competitive advantage because the supply chain functions more effectively, a position supported by the COO (TMP2). This official also claimed that the recycling of pharmaceutical stock can provide business value in terms of profit maximisation, a position supported by the division director of N Health (TMP3):

“As mentioned previously, the recycling of pharmaceutical stock can help the hospital to obtain profit maximisation resulting from an efficiency of supply chain performance.”

Bangkok Pattaya Hospital improves its profits as a result of RL activity in pharmaceutical products. Reducing pharmaceutical waste can also provide business value in terms of resource efficiency by making medicines more accessible and better managed through superior IT and inventory systems. Another benefit is that the hospital avoids losing revenue from expired medicines.

d) Waste Management Department (WMD)

Incineration means reduced costs due to better management of hospital waste through segregation in accordance with an outsourced company. Waste water management and treatment of contaminated water are minor RL activities in the Waste Management Department. The business value created is better resource efficiency and significant cost savings, according to senior management (Fig. 4.43). The hospital also consumes water more efficiently after waste water is processed using chemical neutralisation to ensure hygiene and no risk of harm to humans and/or the environment. This recycled water also provides cost
reduction but it is a minor RL activity because it only saves the hospital amount of money (15,000 – 25,000 baht per month). The CEO (TMP1) noted:

“The hospital can gain benefit from reverse logistics especially in water treatment. The value of cost saving is about 15,000 – 25,000 baht per month”.

Figure 4.43: Waste Management Department RL Activities and Business Value Relationship

4.3.5 Summary

The RL activities used in Bangkok Pattaya Hospital and the business value strategic outcomes they achieve are summarised in Fig. 4.44.
Reverse logistics activities that created business value, as perceived by the hospital leaders, were in the form of competitive advantage, or profit maximisation, customer satisfaction, cost reduction, and/or resource efficiency. It is clear that the main RL activity operating in the OPD is recycling. According to the CEO, this is done to satisfy the CSR requirements and enhance the hospital’s competitiveness. Repairs serve to ensure that resources are employed more efficiently. The hospital gains additional business value in terms of competitive advantage through better management of pharmaceutical stock via its membership in the N Health network. Finally, incineration reduces costs when hospital waste is segregated and its removal is outsourced. In the following chapter, the implications of the data presented and explained here are discussed in relation to the existing literature and in an attempt to finding patterns for the implementation of reverse logistics activities in the three Thai hospitals and in the business value they create.
5 CHAPTER FIVE: Discussion – Understanding the ‘front stage’ and the ‘back stage’ strategies in the Thai Private Hospitals Reverse Logistics Strategy

5.1 Introduction

The research literature suggests that the adoption of reverse logistics activities can lead to improved business value. The cycle of RL activities adopted as part of a strategic plan involves the need to attain strategic business value in various forms, which if successful it can be argued, promotes continuity in the business cycle. It was argued in Chapter 2, based on the extant literature that implementation of RL activities creates business value and generates customer value (Fig. 5.1). This chapter will apply the theory of Porter’s Generic Strategic Management (1979, 1980, 1985, 1987, 1991) and his Five Forces analysis (Porter 2008, p. 42); and Porter’s Healthcare Competition Analysis (Porter & Teisberg 2006). These theories serve to uncover the possible forms of value creation generated by the adoption of Reverse Logistics in the case study hospitals. This chapter analyses the strategic role of Reverse Logistics in all three hospitals (Bumrungrad, Vejthani, and Bangkok Pattaya Hospitals). It also evaluates the nature, patterns and characteristics of interactions between reverse logistics activities and business value creation.
In Chapter 2 the relevance and interrelationships when these three approaches to analysis of data about strategic decisions are applied, highlighted what was obvious and what was hidden. Goffman’s (1959) theoretical work uses the conceptualisation of ‘front stage’ and ‘back stage’ to show that organisations develop ‘impressions’ or ‘images’ of themselves they want others to believe. Extending this, Giddens added: “People are sensitive to how they are seen by others and use many forms of impression management to compel others to react to them in the ways they wish” (2005, p. 142). In order to provide an in-depth understanding of the results, this chapter discusses each of the main components of the research framework: including a discussion of case study comparisons (5.2); extending the analysis: hospital industry analysis and global competitors (5.3); reverse logistics strategy and back stage strategy: strategy theory, Porter’s theory and Porter’s five forces analysis (5.4); reverse logistics strategy and health strategy theory: Porter and Teisberg’s Theory (5.5); and
Conclusion: a reverse logistics theory that incorporates a proposed RL model and strategy (5.6).

5.2 Case Study Comparison

5.2.1 Reverse Logistics Strategy

A summary of the reverse logistics activities implemented in the four main departments in each of the three case study hospitals - Bumrungrad, Vejthani and Bangkok Pattaya - and the perceived business value they created for the hospital are shown in Table 5.1. Throughout the interviews all participants were given free use of terms they used. What they used in responses to questions and during discussions aligns almost exactly with the nomenclature of Porter.

There are some similarities and some differences that emerge from Table 5.1. At the OPD Department, Bumrungrad Hospital, recycling and return are perceived to create business value as competitive advantage, with other hospitals both locally and internationally, customer satisfaction and reduced costs. In comparison, Vejthani Hospital and Bangkok Pattaya Hospital have similar patterns of implementation focusing on returning activity. They apply reverse logistics through a return strategy within their respective OPD departments leading to the creation of perceived business value as customer satisfaction. Interestingly, all three hospitals apply reverse logistics activities (reuse and repair) similarly in their IPD departments. They also have similar perceptions of what the business value is in terms of cost reduction and resource efficiency. Importantly, the Pharmacy Department is considered an important department in all three hospitals in terms of where reverse logistics can have the most strategic and business value impact. Both Bumrungrad and Vejthani Hospitals apply a cost reduction strategy through recycling and return. However, Bangkok Pattaya Hospital has implemented only recycling in the Pharmacy department. The business value resulting from the reverse logistics activities is similar, in relative terms, with a focus on profit maximisation, cost reduction and resource use efficiency. The Bangkok Pattaya Hospital’s senior staff also perceived that RL activities in the Pharmacy Department help create competitive advantage. Additionally, all three hospitals have implemented recycling and
incineration as RL activities within their Waste Management departments, leading to the perception of business value as cost reduction and efficiently used resources.

**Table 5-1: Comparison of Reverse Logistics Activities and Business Value**

<table>
<thead>
<tr>
<th></th>
<th>OPD</th>
<th>IPD</th>
<th>PHARMACY</th>
<th>WASTE MANAGEMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BUMRUNGRAD</strong></td>
<td>RECYCLE</td>
<td>REUSE</td>
<td>REDUCE</td>
<td>RECYCLE</td>
</tr>
<tr>
<td></td>
<td>RETURN</td>
<td>REFURBISH</td>
<td>RECYCLE, RETURN</td>
<td>INCINERATION</td>
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<tr>
<td></td>
<td></td>
<td>REPAIR</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>BUSINESS VALUE</strong></td>
<td>COMPETITIVE ADVANTAGE,COST REDUCTION</td>
<td>PROFIT MAXIMIZATION,COST REDUCTION</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>CUSTOMER SATISFACTION,RESOURCE EFFICIENCY</td>
<td>COST REDUCTION,RESOURCE EFFICIENCY</td>
<td></td>
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<tr>
<td></td>
<td>COST REDUCTION</td>
<td>RESOURCE EFFICIENCY</td>
<td></td>
<td></td>
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<tr>
<td><strong>VEJTHANI</strong></td>
<td>RETURN</td>
<td>REUSE</td>
<td>REDUCE</td>
<td>RECYCLE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>REFURBISH</td>
<td>RECYCLE, RETURN</td>
<td>INCINERATION</td>
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<tr>
<td></td>
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<td>REPAIR</td>
<td></td>
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</tr>
<tr>
<td><strong>BUSINESS VALUE</strong></td>
<td>CUSTOMER SATISFACTION,COST REDUCTION</td>
<td>PROFIT MAXIMIZATION,COST REDUCTION</td>
<td></td>
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<tr>
<td></td>
<td>RESOURCE EFFICIENCY</td>
<td>COST REDUCTION,RESOURCE EFFICIENCY</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>RESOURCE EFFICIENCY</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>BANGKOK PATTAYA</strong></td>
<td>RECYCLE, RETURN</td>
<td>RECYCLE</td>
<td>REDUCE, RETURN</td>
<td>RECYCLE</td>
</tr>
<tr>
<td></td>
<td>RETURN</td>
<td>REPAIR</td>
<td></td>
<td>INCINERATION</td>
</tr>
<tr>
<td><strong>BUSINESS VALUE</strong></td>
<td>CUSTOMER SATISFACTION</td>
<td>COST REDUCTION,COMPETITIVE ADVANTAGE,COST REDUCTION</td>
<td>RESOURCE EFFICIENCY, PROFIT MAXIMIZATION,RESOURCE EFFICIENCY</td>
<td>COST REDUCTION</td>
</tr>
</tbody>
</table>
The purpose of this research is to understand the impact of the implementation of reverse logistics as part of hospital strategy and see the different ways it has been implemented in the three hospitals. The study began by defining reverse logistics as the process of moving goods from their typical final destination for the purpose of capturing value, or achieving proper disposal to the satisfaction of the customer or consumer. Remanufacturing and refurbishment activities may be part of the procedure. Reverse logistics includes processing returned merchandise due to damage, seasonal inventory, restock, salvage, recalls, and excess inventory. It also includes recycling programs, hazardous material programs, obsolete equipment disposition, and asset recovery.

Whereas both Bumrungrad Hospital (centralised management) and Veijthani Hospital (decentralised management) have internally managed supply chains and reverse logistics strategies, Bangkok Pattaya Hospital’s supply chain and its reverse logistics strategies are externally controlled. In all three case study hospitals, the intent of the strategies are the same, but their management differentiates them. All three hospitals implemented RL activities in their OPD, IPD, Pharmacy, and Waste Management departments. These RL activities were analysed in the previous chapter and their impact on creating business value to those departments was shown. This is aggregated and summarised in Fig. 5.2.
The most obvious pattern in the relative impacts of reverse activities strategies used in the three hospitals and the creating of business value is the importance of recycling (Fig. 5.3) and the two major perceived types of business value created, cost reduction and resource efficiency (Fig. 5.4).
Figure 5.3: The Major Outcome of Implementing RL Activities in All Forms
Figure 5.4: The Major RL activities implemented in Thai Hospitals
The same and different RL activities employed in the hospitals are summarised in Table 5.2.

Table 5-2: Similarities and Differences regarding RL Activities in the three Case Studies

<table>
<thead>
<tr>
<th>BUMRUNGRAD</th>
<th>The different components of Reverse Logistics in hospitals</th>
<th>SIMILARITY</th>
<th>DIFFERENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPD</td>
<td>RECYCLE, RETURN, REUSE, REFURBISH, REPAIR, REDUCE, RECYCLE, RETURN</td>
<td>RETURN, REUSE, REFURBISH, REPAIR, REDUCE, RECYCLE, RETURN</td>
<td>RECYCLE</td>
</tr>
<tr>
<td>IPD</td>
<td>RECYCLE, INCINERATION</td>
<td>RECYCLE, INCINERATION</td>
<td></td>
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<tr>
<td>Pharmacy</td>
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<tr>
<td>Waste Management</td>
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<table>
<thead>
<tr>
<th>VEJTHANI</th>
<th>The different components of Reverse Logistics in hospitals</th>
<th>SIMILARITY</th>
<th>DIFFERENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPD</td>
<td>RETURN, REUSE, REFURBISH, REPAIR, REDUCE, RECYCLE, RETURN</td>
<td>RETURN, REUSE, REFURBISH, REPAIR, REDUCE, RECYCLE, RETURN</td>
<td>REDUCE</td>
</tr>
<tr>
<td>IPD</td>
<td>RECYCLE, INCINERATION</td>
<td>RECYCLE, INCINERATION</td>
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<tr>
<td>Pharmacy</td>
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<tr>
<td>Waste Management</td>
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<table>
<thead>
<tr>
<th>BANGKOK PATTAYA</th>
<th>The different components of Reverse Logistics in hospitals</th>
<th>SIMILARITY</th>
<th>DIFFERENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPD</td>
<td>RETURN, RECYCLE, REUSE, REPAIR, REDUCE, RECYCLE, RETURN</td>
<td>RETURN, REUSE, REPAIR, REDUCE, RECYCLE, RETURN</td>
<td>RECYCLE</td>
</tr>
<tr>
<td>IPD</td>
<td>RECYCLE, INCINERATION</td>
<td>RECYCLE, INCINERATION</td>
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<td>Pharmacy</td>
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<tr>
<td>Waste Management</td>
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</table>

Significantly, Figures 5.2, 5.3, 5.4 and Table 5.2 show:

- Several RL activities used across the three hospitals create various kinds of business value. There is no sense from the aggregation that the relationships are simple.

- The relationships between RL activities and business value created are complex, indicating the interrelatedness of hospital processes and the impact of strategy as a complex phenomenon, rather than a simple one-on-one relationship. What was clearly apparent in the analysis was that there was a chain of impacts of any one of the RL activity strategies used. This is in one sense an obvious outcome as hospitals like other supply chains are not simple structures but rather parts of complex networks (Fawcett et al. 2014). This was especially the case for Bangkok Pattaya Hospital because of its inherent relationships as part of the N Health network in Thailand.

- The complexity in the relationships between business value and RL activities supports Breen’s (2006) conclusion that RL activities and their effects occur simultaneously.

- Recycling is the major RL activity used in these Thai private hospitals, albeit that all 6 other RL strategies also impact significantly on the creation of business value.
• The major effect of the implementation of RL activities in all forms is on value created, i.e. cost reduction and cost management. Two of the hospitals realised the significant impact of resource efficiency on business value.

• There are significant concentrations of impact on creation of business value in cost and management, and in better efficiencies obtained in resource use.

• The business value created as profit maximisation and customer satisfaction are relatively less significant than costs and resource efficiency, but their importance is still significant.

• However, these can be construed as overgeneralisations as the complexity of the aggregated patterns is highlighted rather than any clear differentiable relationship patterns. Without monetary value associated with these relationships, the relative values are just representational and real patterns cannot be realised. In the focus group these diagrams were tested and whilst the participants acknowledged the generalisations presented above, they too noted the need for ‘real’ monetary figures to make better sense of what the patterns show.

5.2.2 Reasons for Adoption of the Reverse Logistics Strategy

It is important to understand what was driving this pattern of RL strategy and its impacts on the creation of business value in a structured way. The explanation is based on the literature review in Chapter 2 which addressed the eight factors for designing and implementing of reverse logistics systems (Rahman & Subramanian 2012). These factors that push the hospitals to use reverse logistics are legislation, customer demand, strategic cost/benefit, environmental concerns, volume and quality, incentive, resources, and integration and coordination. Based on analysis of the interview data, the factors driving the implementation of reverse logistics strategy in the departments in the three hospitals can also be aggregated and are summarised (Table 5.3). The aggregated data shows that 11 factors emerged in the 4 main departments across the 3 case study hospitals. The table highlights that a variety of factors, but not all, do influence the decisions made at each hospital. A detailed discussion follows Table 5.3.
Table 5-3: Factors Driving the Implementation of Reverse Logistics Activities

<table>
<thead>
<tr>
<th>FACTORS</th>
<th>DEPARTMENTS</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>OPD</td>
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<tr>
<td>LEGISLATION</td>
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<tr>
<td>CUSTOMER DEMAND</td>
<td>BH, VH, BPH</td>
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<tr>
<td>STRATEGIC COST/BENEFIT</td>
<td>BH, VH, BPH</td>
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<tr>
<td>ENVIRONMENTAL CONCERNS</td>
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<tr>
<td>VOLUME, QUALITY</td>
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<tr>
<td>INCENTIVE</td>
<td>BH, VH, BPH</td>
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<tr>
<td>RESOURCES (TECHNOLOGY)</td>
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<tr>
<td>INTEGRATION, COORDINATION</td>
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<tr>
<td>VISION, MISSION COMPANY</td>
<td>BH, VH, BPH</td>
</tr>
<tr>
<td>ACCREDITATION</td>
<td>BH, VH, BPH</td>
</tr>
<tr>
<td>GOVERNMENT</td>
<td>BH, VH, BPH</td>
</tr>
</tbody>
</table>

BH: BUMRUNGRAD HOSPITAL   VH: VEJTHANI HOSPITAL   BPH: BANGKOK PATTAYA HOSPITAL

a) Out-Patient Department (OPD)

All 3 case study hospitals - Bumrungrad, Vejthani, and Bangkok Pattaya - were affected by a rather complex pattern of factors driving their implementation of RL strategies. In the OPD the pattern appears to be similar in each hospital in the aggregated tabular format, but there are differences between them. These are explained in more detail below.

Customer Demand and Incentive

The interviewees noted that with the recent trend of being ‘green’ being important to customers, customer demand has changed in that companies must be more environmentally responsible. Therefore, patients want more than just a good quality medical system that works for them. Hospital staffs believe an increase in customers’ interest in green issues means that supply chain practices must be trustworthy. This meets that practices and business operations must be sustainable. Thus Bumrungrad and Bangkok Pattaya Hospital have started to apply obvious sustainability or ‘green’ policies through the use of recycled bags,
something they have been doing for many years. Not only is customer demand affecting the implementation of RL activities associated with ‘green’ or sustainable issues, but also those customers are offered incentives to use them by the hospital is another driving factor. Patients can obtain refunds or discounts after using the recycled bags and although it is a small amount of money it makes patients/clients happier. The focus group review confirmed that in Thailand it is common to provide product incentives across many industries and this use of recycled bags and its associated incentive, is similar to other practices used elsewhere.

Vision and Mission, and Accreditation

Based on data analysis and interviews with hospital staff in the OPDs in each hospital, it was evident that implementation of RL was also driven by the company’s (hospital’s) vision and mission, and the demands of accreditation. These factors are influences in all 3 case studies. As mentioned in Chapter 4, Bumrungrad, Vejthai and Bangkok Pattaya Hospitals have clear corporate vision and mission statements to provide excellence in the delivery of medical services and a quality experience for patients/clients. Attaining customer satisfaction is one of the main ways for hospitals to realise their vision. The interviewees noted that the use of various reverse logistics strategies/activities could do this by offering the best possible services. It meant providing excellence in the supply chain and in using the reverse section of the supply chain to improve efficiency, decrease costs and improve service delivery.

There is a perceived need to have both domestic and international organisation accreditation including JCI, HA, ISO 14001, and ISO 9002. The interviewees noted that accreditation was essential in order to enhance customers’ perceptions of the high quality of the hospital leading to, they believed, improved customer satisfaction. These accreditation designations, the focus group members confirmed, are essential in the Thai, Asian and global medical marketplace as part of brand image. Internal accreditation determines processes and quality-driven procedures concerning waste management, recycling, clean water use, water and other material re-use, etc. All these are key components of a reverse logistics strategy and are therefore important as part of the overall strategy of each hospital. The difference noted here is that at Bumrungrad, the accreditation processes for reverse logistics activity implementation are managed centrally. In Vejthani each department makes those decisions and manages them in a more decentralised way. Bangkok Pattaya operates as part of the N Health Network which manages not only the accreditation process and its implementation in
operations, but also operates and manages the reverse logistics strategies. In all cases the types of accreditation were the same, something the focus group members noted is a key part of the competitive landscape across all industries in Thailand. If one company has accreditation X then their competitors will apply to get the same.

b) In-Patient Department (IPD)

Accreditation
As for the OPDs, it was essential for accreditation to be a key strategic accomplishment for each hospital, notably to ensure that the quality of services provided to both in- and out-patients were of the same highest quality. Underpinning this service provision with a well-managed and implemented supply chain management strategy and use of reverse logistics as part of the SC, was considered essential by each hospital’s central and department management sectors. Without the adoption of reverse logistics the interviewees believed, potential clients/ patients would not be totally confident in what was being delivered, especially as they had other medical services to choose from.

Strategic Costs and Benefits
According to Ravi et al. (2005), strategic costs are non-recurring costs incurred for the design and implementation of a reverse supply chain system and is also considered as an economic factor driving implementation of reverse supply chains. This is because these costs can be either recouped in the short to medium term or in some cases amortised in the long term. The need to address costs affected all 3 case study hospitals in adoption of RL activities both across the hospital and specifically within the IPD. As private companies, there was a concern always about profitability aligned with delivery of the best and highest quality medical services to patients. One clear way of delivering that overall strategic goal was to address costs. The interviewees all noted that the IPD was the highest cost sector within each hospital and any cost savings there would have significant outcomes. Thus strategies such as opting to use reverse logistics strategies and activities were important when they both addressed costs as participants said and also delivered benefits, which they also noted in their responses. This too was confirmed in the focus group. They all needed to obtain business value in terms of cost reduction resulting from an implementation of RL activity.
d) Pharmacy Department (PD)

Five key factors drove the implementation of RL activities in the Pharmacy Departments across the 3 case study hospitals. The major RL activity operating in all pharmacy departments was recycling and returns pharmaceutical stock. However, unlike the other departments across the three hospitals where similar driving factors operated, in the departments there were some clear differences between them.

Strategic Cost and Benefit
The recycling and return strategies of pharmaceutical stock in the pharmacy departments of all three hospitals and the adoption of pharmacy robots and the use of SAP software as an management tool were all designed to maximise benefits which controlled costs. Pharmacy supplies in the supply chain are a challenge for all hospitals (Bhakoo et al. 2012; Bhakoo & Choi 2013; Mica & Green 2012). This is considered to be the main factor that pushed implementation of recycling because all of the hospitals wanted to meet their business goals and needed to address cost and management issues in the PDs. Cost savings from the recycling of pharmaceutical stock could lead to benefits from the positive impact of return policies and practices on patient confidence and satisfaction with the hospital.

Vision and Mission
All of the hospitals had clear mission statements to provide excellent medical services and quality outcomes for patients/clients. They all applied a supply chain and a reverse logistics strategy and associated activities with the intent, in their words, to provide business value for the hospital/company derived from improved and growing customer satisfaction, enabling new clients to perceive the quality of their hospital and this improve their standing in the marketplace. Reverse logistics strategies through recycling, refurbishment, incineration, etc. were deliberately implemented to achieve the hospitals’ missions and maintain their financial standing. However, other factors played a role in driving the implementation of RL activities at the Bangkok Pattaya Hospital. These related to what Rahman and Subramanian (2012) termed volume and quality and integration and coordination.
Volume and Quality and Integration and Coordination

According to Guide and Van Wassenhove (2009) the volume of returns and quality of medical products and services are major drivers of reverse supply chains. Bangkok Pattaya Hospital as part of a hospital network applied RL in the form of recycling and return of pharmaceuticals not only within the hospital but also throughout its network, specifically in the eastern region of Thailand using central warehousing. The network of hospitals, the interviewees argued, enhances efficiency in the integration and co-ordination among its hospitals within the network, decreases costs, improves efficiency and reduces costs associated with errors. Using a network enables cost reduction through economies of scale as a result of the volumes of supply chain products used, creates consistency in quality across the networks, and better integrates and co-ordinates the supply chain in the hospital. In comparison, Bumrungrad and Vejthani are stand-alone hospitals and they have no high volumes of pharmaceutical stock and operate without the same integration and co-ordination. These two hospitals manage their costs and operations internally.

Resources (Technology)

Based on data analysis, the driving factor of resources (technology) yields influence only in two hospitals, Bumrungrad and Vejthani. According to Dowlatshahi (2005) the overall success of reverse supply chain systems also depends on the effective use of available resources including technology. The different technologies used in the 3 hospitals include a vast array of machinery requiring significant capital investment such as pharmacy robots, imaging machines, enterprise systems, computer stations, and patient care monitoring equipment, etc. These are used, according to the interviewees, to reduce medical service errors by lowering complexity, avoiding over-reliance on memory, simplifying key processes, and increasing efficiency. The system allows highly trained pharmacists and technicians to spend less time on routine tasks, and more time on patient care. It also leads to a less waste and recycling and also assists in the management of reverse logistics operations in the hospital.

e) Waste Management Department (WMD)

Similar factors across the 3 hospitals studied have motivated the management and medical staff in the hospitals to initiate RL activity in their waste management departments.
Legislation
According to Rahman and Subramanian (2012), legislation and the ensuing legal responsibilities and compliance requirements are a major driver for a firm’s environmental responsibilities. In Thailand the Ministry of Public Health requires hospitals to return inappropriate medicines and encourage the reuse of applicable hospital products. The main objective here is to protect the environment, avoid landfill and prevent contamination of water. In Thailand as in other countries the legislation serves to control the hospital waste and both toxic and non-toxic waste. Bumrungrad, Vejthani, and Bangkok Pattaya Hospitals have well-managed hospital waste removal operations and comply with the laws and regulations issued by the Thai Ministry of Public Health.

Customer Demand
Customer demand is another main driver of a firm’s environmental responsibilities. Rising customer demand with reference to green issues and to achieving the outcomes expected such as brand image and compliance, means that the hospitals must engage in environmentally friendly supply chain practices (New et al. 2000). Customer demand is a key factor driving RL implementation through the application of incineration and recycling, in the Waste Management Departments across all 3 case study hospitals. The interviewees noted and the focus group members confirmed that customer demand at present is not limited only to medical services but also to clients having sustainability or environmental concerns.

Strategic Cost/Benefit
The factor strategic cost/benefit also drives reverse logistic activity implementation similarly in all 3 hospitals such as incineration and recycling in the Waste Management Departments. Confirming Ravi et al.’s (2005) argument that strategic cost/benefit is considered to be an economic factor driving reverse supply chains, the interviewees and the focus group stated clearly that waste management in these Thai private hospitals is concerned with saving costs in their operations, whilst maintaining quality in medical service delivery.

Environmental Concerns
According to Mason (2002), environmental concerns and green issues are also drivers of reverse supply chain adoption. The discussion above highlights the use of reverse logistics
activities both to meet compliance as required by law or under accreditation practices, and as a means to enhance brand image.

Accreditation
As mentioned in Chapter 4, accreditation or awards are important for all 3 case study hospitals. These come from both domestic and international organisations such as JCI, HA, and the standards ISO 14001, ISO 9002, etc. According to the senior executives, in order to enhance customer satisfaction and service, there was a need to show sustainability and ‘green’ concerns in their operations, including the supply chain and the reverse components of that supply chain.

Government
The only hospital directly affected by government action is Vejthani where there has been a focus on energy saving since 2010, in accordance with the laws and regulations issued by the Thai Ministry of Energy.

5.3 Extending the Analysis

Again using Porter’s original conceptualisation of strategy and then his revisiting of that theory as it relates to the healthcare sector in the past 10 years, the discussion above can be extended. Porter argues that organisations focus on one of four strategic positions in their strategic thinking in any part of their organisational history (Fig. 5.5).
Clearly these hospitals see themselves as having broadly different ‘obvious’ strategies in the healthcare market. In Chapter 4 we saw that this ‘obvious’ focus was, and is, on provision of high quality healthcare solutions and related packages for high-end clients. There is an important emphasis on customer satisfaction and feedback attracting customers. However, there is also realisation that achieving that focus is expensive and so effective use of resources and cost controls are paramount to the ‘hidden’ or ‘back stage’ strategy at the operational level (after Goffman 1959). The ‘hidden’ strategy is more evident in the 2 lower quadrants and the lower left quadrant. In this study part of that ‘hidden’ strategy looked at the implementation of reverse logistics, both as a broad and narrow that dealt with costs and resources. To better understand how this ‘hidden’ strategy appears in the Thai hospitals, related to both the reverse logistics activities implemented and the business value they created, I have extended the analysis to address the specific targeted outcomes by each action through the business value created (Fig. 5.6).
Figure 5.6 illustrates the relationships between RL activities and each of the strategic goals organisations use according to Porter. It can be noted that the ‘hidden’ or back stage strategies are revealed in 3 forms, these being Cost Leadership, Customer Differentiation, and Resources Differentiation. After adopting RL activities in all 3 case study hospitals, it emerged that all are similar in terms of their ‘hidden’ strategies, with a slight difference at Bangkok Pattaya Hospital. This relates to the impact of being in a network of hospitals rather than as a stand-alone hospital. For better understanding of this ‘hidden’ strategy, it can be explained by the departments of three hospitals. The conclusions discussed below were re-checked with focus group participants for accuracy and re-checked with the hospitals’ senior staff as well.
a) Out-Patient Department (OPD)

At the OPD of all 3 case studies, their ‘back stage’ strategies are similar, in that they concentrated on *Customer Differentiation*. According to the Chapter 4 data analysis, the mission and vision of all case study hospitals was to provide the best medical service and quality medical care to customers. Significantly, the adoption of the main RL activity - the return of medicines from the customers - also gives the business value in terms of customer satisfaction. All of the hospitals apply a broad external strategy that recognises customer differentiation. However, the recycled bags policy at Bumrungrad Hospital and Bangkok Pattaya Hospital also creates business value in terms of enhancing the competitiveness that leads to customers’ satisfaction. Therefore, the ‘hidden’ strategy is revealed as a *Customer Focus Strategy* that targets only at market segmentation (the customers who are concerned with green issues or have environmental interests or are concerned about the hospital’s CSR obligations).

b) In-Patient Department (IPD)

As shown in Figure 5.6, the ‘hidden’ strategies at the IPD of all 3 case studies are focused generally on *Cost Leadership* at Bumrungrad Hospital and Vejthani Hospital, while *Resources Differentiation* is evident at Bangkok Pattaya Hospital.

With reference to the main RL activity, repair, Bumrungrad Hospital and Vejthani Hospital use a similar back stage strategy, i.e. Cost Leadership. Based on data analysis, it can be seen that both institutions achieved business value in terms of cost reduction and saved on operational and material costs. Accordingly, they can operate at a lower cost than their rivals and this means hitting the target market segment more successfully and internationally, or at least using the lowest price to value ratio (price compared to what customers receive). They succeed at offering the lowest price while still achieving profitability and a high return on investment.

However, only at Bangkok Pattaya Hospital is the other back stage strategy, Resources Differentiation, used and this results from adopting internal repair and maintenance of medical machines. As mentioned in Chapters 4 and 5, Bangkok Pattaya Hospital is a network
hospital while Bumrungrad and Vejthani Hospitals are not. Significantly, Bangkok Pattaya Hospital occupied a dominant position in using resources more efficiently than the latter two establishments.

c) Pharmacy Department (PD)

Based on data analysis the major RL activities, recycling and return of pharmaceutical stock, impact similarly in terms of business value in all three case hospitals’ pharmacy departments. However, there is a difference in business value creation as seen in Cost Reduction at Bumrungrad and Vejthani Hospital and Resources Efficiency at Bangkok Pattaya Hospital. It can be noted that Bangkok Pattaya being a network hospital, has a dominant focus on using resources more efficiently. Therefore, the key back stage strategy at Bangkok Pattaya Hospital is *Resources Differentiation and Efficiency*. Its senior executives claim that the hospital has a competitive advantage with this resources efficiency. On the other hand, the ‘back stage’ strategy at both Bumrungrad and Vejthani is to concentrate on *Cost Leadership* resulting from cost reduction of pharmaceutical waste. It can enhance and save operational costs and provide a cheaper price than their rivals.

d) Waste Management Department (WMD)

Fig. 5.6 shows two types of strategies (*Cost Leadership* at Vejthani and Bangkok Pattaya Hospital, and *Resources Differentiation* at Bumrungrad Hospital) used in the Waste Management Department. The differences exist because the main RL activity is different. Incineration is applied at the WMDs of Vejthani and Bangkok Pattaya Hospitals and they provide the same business value in terms of Cost Reduction (Waste Reduction), i.e. *Cost Leadership*. At Bumrungrad Hospital the focus is on recycling. This assists the hospital in terms of resources being employed efficiently and enabling it to meet the goal of maintaining a competitive advantage. These strategic directions behind the scenes in each hospital, and specifically in each one’s department, are summarised in Table 5.4.
Table 5-4: The ‘back stage’ Strategies and Hospital Departments

<table>
<thead>
<tr>
<th>Porter Theory</th>
<th>BUMRUNGRAD</th>
<th>HIDDEN STRATEGY</th>
<th>RL Activities and Business Value Creation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Competitive Advantage</td>
<td>CPD</td>
<td>Customer Differentiation and Customer Focus Strategy</td>
<td>Focus on Customers’ satisfaction (Medicine Return and Recycled Bag)</td>
</tr>
<tr>
<td>Cost Leadership</td>
<td>IPO</td>
<td></td>
<td>Targeting at specific customers (Green Issue, CSR)</td>
</tr>
<tr>
<td>Differentiation</td>
<td>PD</td>
<td>Cost Leadership</td>
<td>Cost Reduction (Material Cost, Operation Cost)</td>
</tr>
<tr>
<td>Cost Focus</td>
<td>WMD</td>
<td>Cost Leadership</td>
<td>Cost Reduction (Waste Reduction, Material Reduction, Labour Reduction)</td>
</tr>
<tr>
<td>Differentiation Focus</td>
<td></td>
<td>Resources Differentiation</td>
<td>Resource Efficiency (The Recycle: Water Retreatment)</td>
</tr>
</tbody>
</table>

| VEITHANU        | CPD                    | Customer Differentiation           | Focus on Customers’ satisfaction (Medicine Return)                               |
|                 | IPO                    | Cost Leadership                    | Cost Reduction (Material Cost, Operation Cost)                                   |
|                 | PD                     | Cost Leadership                    | Cost Reduction (Waste Reduction, Material Reduction, Labour Reduction)           |
|                 | WMD                    | Cost Leadership                    | Cost Reduction (Waste Reduction), Energy-Saving                                  |

| BANGKOK PATTAYA | CPD                    | Customer Differentiation and Customer Focus Strategy | Focus on Customers’ satisfaction (Medicine Return and Recycled Bag)               |
|                | IPO                    | Resources Differentiation          | Targeting at specific customers (Green Issue, CSR)                               |
|                | PD                     | Resources Differentiation          | Focus on Resources Efficiency (Network Hospital)                                 |
|                | WMD                    | Cost Leadership                    | Focus on Resources Efficiency (Network Hospital)                                 |

However this type of analysis of strategy is limited to one particular approach. As was highlighted in Chapter 2, Porter and Teisberg and others have extended their thinking in relation to healthcare, so it is important to address the data in terms of this extended analysis as well.

5.4 Reverse Logistics Strategy and Health Strategy Theory

According to Porter (2010), re-inventing strategy in hospitals for creating value can be seen in terms of redefining healthcare delivery. Hospitals, he argues, should reconsider the core issue in healthcare of becoming the value of healthcare delivered; value being patient health outcomes per dollar spent. It is very important, he argues further, to design how a healthcare
delivery system can dramatically improve value for patients and how to construct a dynamic system that keeps rapidly improving. In order to fulfil this, the creation of a value-based healthcare system requires a fundamental restructuring of healthcare delivery and not incremental improvements. The process improvements are care pathways; lean production, safety initiatives, disease management and other overlays to the current structure are beneficial but not sufficient. He argues, as does Porter and Teisberg (2006) and Teisberg (2010), that healthcare at its core is about the patient.

To apply this Value-Based Competition to the Thai hospitals studied here through their implementation of reverse logistics (RL), this means re-evaluating the outcomes of the reverse logistics activities used and the creation of business value. In Fig. 6.1 at the beginning of this chapter there is a proposition about whether the business value created can affect customer value, the argument suggested by Porter and Teisberg. The business value which hospitals realised is specified in the following table (Table 5.5) bring together the elements of both approaches to strategy and the activities of reverse logistics, using a specific example of the Pharmacy Departments in each hospital.

Table 5-5: The Value-Based Competition and RL Activities at Pharmacy Department
Source: Compiled from Focus Group Interviews

<table>
<thead>
<tr>
<th>RL Activities Pharmacy</th>
<th>Business Value</th>
<th>Value-Based Competition</th>
<th>Claimed from Focus Group Interview Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recycling Return</td>
<td>Profit Maximization</td>
<td>Regional and National</td>
<td>All participants including CDOs and Logistics Experts agree that the business value creation resulting from the implementation of RL Activities at Pharmacy Department can allow the hospital to gain the profit maximization and enhance the value-based competition to the regional and national finally.</td>
</tr>
<tr>
<td></td>
<td>Cost Reduction</td>
<td>Less Costly</td>
<td>All participants including CDOs and Logistics Experts support that the business value creation resulting from the implementation of RL Activities at Pharmacy Department can provide the cost reduction or less costly to the hospital according to the Value-Based Competition.</td>
</tr>
<tr>
<td></td>
<td>Resources Efficiency</td>
<td>Waste Management</td>
<td>All participants including CDOs and Logistics Experts held the view that the business value creation resulting from the implementation of RL Activities at Pharmacy Department can give the benefit in terms of Resources Efficiency with reducing the Pharmaceutical waste according to the Value-Based Competition.</td>
</tr>
</tbody>
</table>
In addition, Porter and Teisberg (2006) focused on what they claimed were the key principles of Value-Based Competition for hospitals:

- Value for patients and not just reducing costs;
- There must be unrestricted competition based on results;
- Competition should centre on medical conditions over the full cycle of care;
- High quality care should be less costly;
- Value is driven by provider experience, scale, and learning at the medical condition level;
- Competition should be regional and national, not just local;
- Information on results and prices required for value-based completion must be widely available; and
- Innovations that increase value must be strongly rewarded.

The impact of these principles within each case study hospital is not complete. There is no evidence that attention has been paid to the principle of unrestricted competition based on results in the interview data or in the document analysis. There is a trend across Thailand for more aggregation of the N Health network type which is the business setting for Bangkok Pattaya Hospital. There is no evidence of application of the principle that competition should centre on medical conditions. Each of the hospitals focuses on high-end healthcare and provision of expensive medical procedures. Vejthani Hospital specialises in the provision of gender re-assignment surgery while Bumrungrad Hospital focuses on transplantation and plastic surgery. Their focus is not on ‘general medical conditions’. The analysis is shown in Table 5.6.
In terms of more recent work done on health and strategy, Teisberg (2010) argued that effective healthcare strategy had to do the following: define services from the perspectives of patients; organise care delivery around solutions; create multidisciplinary teams; and measure results to accelerate learning. Again applying these requirements to all three hospitals, some differentiation is obvious in terms of their strategy (Table 5.7). At this stage only Bumrungrad Hospital meets all requirements.
Table 5-7: Value-Based Competition

<table>
<thead>
<tr>
<th>TEISBERG (2010)</th>
<th>HOSPITALS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>BUMRUNGRAD</td>
</tr>
<tr>
<td>Define services from the perspectives of patients</td>
<td>YES</td>
</tr>
<tr>
<td>Organize care delivery around solutions</td>
<td>YES</td>
</tr>
<tr>
<td>Create multidisciplinary teams</td>
<td>YES</td>
</tr>
<tr>
<td>Measure results to accelerate learning</td>
<td>YES</td>
</tr>
</tbody>
</table>

In this study a strategy of supply chain efficiency and application of reverse logistics, can be characterised as having certain characteristics. These are explained in more detail below.

- **Regional and National**
  Based on data analysis and interviewing all participants including logistics experts, they all agree, for example, that business value creation resulting from implementation of RL activity in the Pharmacy Department (PD) permits the hospital to maximise profits and enhance value-based competition regionally and nationally. The reason is the hospital can obtain business value in terms of cost reduction in labour and waste management to make a profit. This makes the hospital able to compete not only nationally but also globally.

- **Less Costly**
  The focus group interviewees and experts agreed that business value creation resulting from implementation of RL activity can help the hospitals reduce costs, which is relevant to the value-based theory of Porter and Teisberg being less costly. The direct benefit that the hospitals can gain when they implement the RL model or strategy is cost reduction, albeit it without precise data for reasons of confidentiality, savings were achieved for labour waste management, pharmaceuticals, and toxic and non-toxic waste.
• Resource Efficiency

Based on data analysis and participants’ comments those of the focus group experts, it was agreed that business value creation resulting from RL activity was due to resource efficiency by reducing waste, reducing inventory stock, reducing storage and space costs, delivering services better and using JIT, enabling better delivery of medical services through advanced technology. According to Porter and Teisberg (2006), brand image becomes another characteristic in terms of value-based competition resulting from the implementation of RL activity in each hospital.

• Brand Image

The interviewees and focus group members all strongly supported the contention that business value creation resulting from RL activity was due to better medical services provision, improved patient satisfaction, and developing economies of scale in operations in the hospitals though new technologies, better staff productivity, and supply chain and logistics, and from application of reverse logistics. They all provided benefits to the hospital (Fig. 5.7).

This analysis of the impact of a supply chain and specifically, a reverse logistics strategy, in the 3 case study hospitals has highlighted how RL strategies were able to create business value. The analysis shows that the ‘back stage’ operations of the hospitals enabled strategic goal-seeking in terms of cost and resource efficiency, enabling leadership, competitiveness and market positioning. However, as indicated in Chapter 2 and in the model (Fig. 5.1), at the beginning of this chapter, and described first in Chapter 4, there is also a ‘front stage’ or ‘obvious’ strategy that impacts on the business performance of each of these 3 Thai private hospitals.
5.5 Case Study - Hospital Industry Context Analysis – understanding the ‘obvious’

It is important to understand again why RL activity and strategy adoption is so critical to these Thai hospitals. To drive the global positioning strategy of these hospitals it they had to
assess both the ‘obvious’ positioning and the ‘image’ that they presented in the global healthcare market place, and to assess their operations’ cost drivers. This section uses Porter’s traditional Five Forces Analysis in terms of the reverse logistics strategies all three hospitals implemented as part of the ‘hidden; operational processes which enabled the ‘obvious’ positioning of each hospitals in their marketplace. Porter argues that the bargaining power of customers and suppliers, threat of substitute products and threats from new entrants (Porter 1979, 2008) affect how well the organisation will perform and the strategy employed.

New competitors in the Thai healthcare system have not been noted recently. Each new hospital needs to invest huge amounts of capital in infrastructure and land. The market is not saturated but the risks of new private hospitals opening means risks of getting ‘known’ and accepted and risks in the long term. New rivals in healthcare according to the senior staff in the three hospitals are highly unlikely to emerge. Where there is potential is in countries like Malaysia where the central government see opportunities to provide healthcare to the other ‘Islamic’ countries. Singapore is pushing ahead with public-private partnerships, but at a high cost since Singapore has very high labour and land costs. It is also very difficult for new hospitals, catering for this particular market to recruit and pay medical experts and doctors. Until the new Asian Economic Community begins in 2015, there is little likelihood of the same salaries being paid to attract excellent doctors and so it will be difficult.

There is the threat of substitutes for the healthcare services the three Thai hospitals provide. The target market of Bumrungrad, Vejthani, and Bangkok Pattaya Hospitals is high-end and expensive (for Thailand). The number of hospitals in Thailand which service international patients is small. It is difficult to find any other form of healthcare in the Thai health sector for substitution of products or services that are offered at Bumrungrad Hospital, Vejthani Hospital, and Bangkok Pattaya Hospital. Some hospital and health services provision is competitive in Singapore and to a lesser extent in Malaysia but there is a significant price differential. This was noted by the senior staff interviewed and constituted one of their major competitive edges.

More than 90% of the total number of medicines and medical supplies which are used in Bumrungrad, Vejthani, and Bangkok Pattaya Hospitals come from local suppliers rather than imports. Accordingly, it affects prices, lowering them as they are considered, according to
senior staff in the hospitals, to be ‘stable’ suppliers. According to Thai National Statistics (Thai Medical Vacation Research 2014) there has been a significant increase in the number of medicine and medical suppliers, increasing the competition between the medical suppliers. The outcome is cheaper prices of medicines and medical supplies provided to all three hospitals. This, according to the interviewees, has a significant impact on lowering operational costs.

The behaviour of health consumers significantly affects the operational profitability of all three hospitals. This, according to the CEOs of the hospitals, is because customers are always very price sensitive. These potential and existing customers/clients can switch easily to a cheaper fee for medical treatment. Associated with this switching is the lack of switching costs, at almost zero. Therefore, a key factor that the hospitals need to consider always is service provision, but at a price that reflects marketplace reality and that of competitors. Customer service then becomes a significant selling point of the ‘obvious’ strategy. Customer care becomes the paramount message. Bumrungrad Hospital, for example, will include resort hotel recuperation in some of its packages.

There is now an increase in the number of hospitals, such as Paulo Memorial Hospital, that want to target international clients and compete with Bumrungrad, Vejthani, and Bangkok Pattaya Hospitals. Although this hospital, for example, positions itself currently at the medium level of purchasing power of buyers (patients) in the future it desires to occupy the same position of Bumrungrad, Vejthani, and Bangkok Pattaya Hospitals and compete with them (see Fig. 6.1 above).

In summary, based on analysis using Porter’s strategy model, the three Thai hospitals are competitive in their particular specialised context because of their strong positioning in the market, their ability to gain cost savings from suppliers, the lack of real new competitors and their image positioning. Their ‘obvious’ strategy is one based on high quality care, high-end clients and using that image to focus on high quality delivery of medical services and excellent customer satisfaction. However, their market position is still subject to serious precise sensitivity and a lack of switching costs. The three hospitals focus heavily on service provision and giving the best service and quality at the lowest possible price instead of focusing only on price competition. According to Teisberg, Brown, and Porter (1994), the key to success in healthcare reform is innovation, information, and competition and they
argue that innovation leading to new ways of delivering quality healthcare at much more cheaply is the key to long-term success strategically.

These three hospitals have implemented reverse logistics as part of their supply chain management operations. The interviewees noted that they perceived that reverse logistics is in their opinion an innovation which, together with their use of innovative and cutting edge medical technology and health information systems, enable better information management, better operations and more efficient use of data. This leads to better service delivery on the one hand, the ‘obvious’ and more efficient use of resources and subsequent lowering of costs, on the other, the ‘hidden’. This strategy they believe will lower costs and this, the senior staff interviewees state, is the key success in long-term healthcare competition and delivery in the Asian and global/international contexts.

In Chapter 4 the nature and extent of competition, both local and international was shown. It is summarised in Table 5.8. This is important not only for the economic status of each hospital but forms the ‘obvious’ in the organisational strategy in this study. These hospitals want to be seen to be the best and provide the best customer care, not only locally but also globally.

Table 5-8: Competitor Analysis and Comparison
Source: Compiled from data analysis and interview

<table>
<thead>
<tr>
<th></th>
<th>Bumrungrad</th>
<th>Vejthani</th>
<th>Bangkok Pattaya</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenue (Million baht)</td>
<td>11388.78</td>
<td>7563.21</td>
<td>9565.72</td>
</tr>
<tr>
<td>Profit (%)</td>
<td>13.94</td>
<td>11.23</td>
<td>12.37</td>
</tr>
<tr>
<td>Capacity</td>
<td>554</td>
<td>500</td>
<td>500</td>
</tr>
<tr>
<td>Quality</td>
<td>JCI, HA</td>
<td>JCI, HA</td>
<td>JCI, HA</td>
</tr>
<tr>
<td></td>
<td>ISO9001, ISO14001</td>
<td>ISO14001</td>
<td>ISO9001, ISO14001</td>
</tr>
<tr>
<td>Target</td>
<td>International</td>
<td>International</td>
<td>International</td>
</tr>
</tbody>
</table>
Bumrungrad Hospital earned the most revenue in 2013, i.e. 11388.78 million Thai baht. Bangkok Pattaya Hospital and Vejthani Hospital generated revenues of 9565.72, and 7563.21 million Thai baht, respectively. Profitability is slightly different among all hospitals. It is 13.94%, 11.23% and 12.37% for Bumrungrad Hospital, Vejthani Hospital and Bangkok Pattaya Hospital, respectively. The number of beds in each hospital is similar, these being 554, 500, and 500, also respectively. All three hospitals operate according to quality assurance standards such as JCI, HA and ISO. Their target markets are fundamentally international (Table 5.9).

<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>STRENGTH</th>
<th>TARGET</th>
</tr>
</thead>
<tbody>
<tr>
<td>MALAYSIA</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| 1. PRICE LOWER THAN SINGAPORE MEDICAL TOURISM  
2. HOSPITAL NETWORK  
(WITH 12312 CAPACITY, LARGEST NETWORK IN SOUTHEAST ASIA)  
3. COOPERATION WITH THE MEDICAL SCHOOL OF JOHN HOPKINS | DIVIDED INTO 3 GROUPS  
1. COUNTRY LACKING OF MEDICAL SERVICES  
(INDONESIA, MYANMAR, VIETNAM, LAOS AND CAMBODIA)  
2. COUNTRY WITH HIGH MEDICAL COST  
3. COUNTRY WITH HIGH SERVICE TIME  
(UK, MIDDLE EAST AND CHINA) | |
| SINGAPORE | | |
| 1. NEW TREND AND UP-TO-DATE OF MEDICAL SERVICES  
2. GLOBAL STANDARD QUALITY  
3. EXCELLENT IN ENGLISH PROFICIENCY | 1. SOUTHERN ASIAN, CHINA AND RUSSIA AND SOME OF USA, ENGLAND, EUROPE | |
| INDIA | | |
| 1. NEW TREND AND UP-TO-DATE OF MEDICAL SERVICES  
2. EXCELLENT IN ENGLISH PROFICIENCY | 1. HIGH-END TOURISM OF EUROPEAN AND MIDDLE-EAST  
2. MEDICAL OUTSOURCING MARKETING | |
| AUSTRALIA | | |
| 1. NEW TREND AND UP-TO-DATE OF MEDICAL SERVICES  
2. EXCELLENT IN ENGLISH PROFICIENCY  
3. HIGH STANDARD QUALITY | 1. PATIENTS FROM DEVELOPED COUNTRY  
(USA, UK, EUROPE) | |
| THAILAND | | |
| 1. NEW TREND AND UP-TO-DATE OF MEDICAL SERVICES AND MEDICAL TOURISM  
2. GLOBAL STANDARD QUALITY  
3. HIGH STANDARD QUALITY  
4. PRICE LOWER | DIVIDED INTO 3 GROUPS  
1. COUNTRY LACKING OF MEDICAL SERVICES  
(INDONESIA, MYANMAR, VIETNAM, LAOS AND CAMBODIA)  
2. COUNTRY WITH HIGH MEDICAL COST  
3. COUNTRY WITH HIGH SERVICE TIME  
(UK, MIDDLE EAST AND CHINA) | |

The ‘obvious’ positioning globally of these Thai private hospitals is one based on the quality of services delivered to patients by the expertise employed at each hospital, enabling the best
outcomes to occur in terms of customer satisfaction. Services are delivered in a ‘hidden’ context at the best possible price. Table 5.9 shows that the focus on price and on customer care and satisfaction forms the basis of the healthcare strategies of these Thai hospitals. As a result they position themselves globally within a context of medical sophistication (expertise on the one hand and purchasing power/target markets on the other (Fig. 5.8). These three hospitals occupy the apex of the model with Bumrungrad being in the most advantageously competitive position.

![Medical Sophistication Diagram]

**Figure 5.8: Competitive Positioning**

5.6 Conclusion

Based on data analysis in Chapters 4 and 5 and the application of theory in this chapter, it is evident that the reverse logistics activities in these hospitals’ 4 departments resulted in the creation of business value in each of the hospitals. The analysis in Chapter 4 concluded that the strategy of Bumrungrad, Vejthani, and Bangkok Pattaya Hospitals are relevant to their vision and mission focusing on customer satisfaction and the customer as their core business. This can be recognised as a macro strategy relating to healthcare and the articulation of hospital policy. According to Goffman (1959) this strategy can be seen as a ‘front strategy’ or ‘obvious strategy’ resulting from the hospitals wanting to provide excellent medical services to people who will then be return customers. The front stage relates to the Supply Chain Management that becomes an integral part of hospital policy. However, both of them can enhance a good image of hospital with reflecting in sustainability concept or Corporate Social Responsibility (CSR).

The analysis revealed that all 3 case study hospitals have well defined ‘back stage’ strategies in place where RL activities are conducted in each hospital’s four key departments. It was shown that creating business value through cost reduction and more efficient use of resources meant implementing reverse logistics activities. In addition, those RL activities enabled some competitive advantages to emerge such as cost leadership and resource differentiation in the micro context. In summary, the ‘back stage’ operations became more significant when RL was implemented, compared to the ‘front stage’ image-type strategies in each hospital.

This chapter suggests that some possible theorising is possible, building on the conclusions from the analysis of business value and RL activity relationship, that strategic thinking should be applied to healthcare issues and in the extant literature. A proposed model of theorisation that takes an alternative view of reverse logistics in a hospital setting is illustrated in Fig. 5.9.
This perspective proposes that a RL strategy makes an impact in two ways: a macro level, outward focused strategy and a micro level, inward focused strategy. The former derives from the application of policy, the latter from the application of practice. The former deals with image and marketplace positioning, while the latter concerns efficiency, procedure, routine and operational effectiveness. The model proposes that both elements are essential if the application and implementation of reverse logistics as a strategy is to be effective.
6 CHAPTER SIX : Conclusion

6.1 Introduction

This thesis aimed to develop a better understanding of reverse logistics structures, processes and their characteristics in Thai private hospitals, and to evaluate the strategic importance of reverse logistics to creating business value. Three case study private hospitals in Thailand, Bumrungrad, Vejthani, and Bangkok Pattaya Hospitals were explored in detail. Specifically, this research addressed a single research question:

Main Research Question

- “What strategic roles does the implementation of reverse logistics activities play in private hospitals in Thailand?”

Developing a proper strategy for healthcare reform has become a major concern for many governments, and this need inspired new approaches and models devised by Porter (2010) and Porter and Teisberg (2006). Using interviews with a set of key stakeholder managers and clinical directors and a focus group of experts in similar positions, data was collected and then analysed using hermeneutic cycles of coding and interpretation. There are four key findings of this research project.

The first key finding is that much existing research literature supports a view that adopting reverse logistics, specifically reverse logistics activities in hospitals, can result in added business value (Alshamrani et al. 2007; Dowlatshahi 2010; Shi et al. 2009; Xie et al. 2010; Souza et al. 2006; Gibson 2008; Cottrill 2003; Breen 2006; Liz Ritchie et al. 2000; Pereira et al. 2012; Pappu 2004). This research confirms that view but it questions the simplicity of the relationship proposed in the extant literature. This research demonstrated the complexity of the RL activities used in each hospital and the associated complexity of types of business value created.

The second key finding is that these complex relationships (between RL and business value) are all happening simultaneously, as suggested elsewhere by Breen (2006). The strategy is not a simple one. The RL activities can be considered as an organisational strategy but with
accompanying associated complexity. This research shows that the relationships of RL activities and business value created are varied and different.

The research confirms the importance of strategy in healthcare operations. Strategy is important because it is the direction that companies take to establish and create business value. Strategic management, in all of its variations, tries to understand the enablers for business to develop competitive advantage (Barney 1991, 1993, 2001a, 2001b; Burden & Proctor 2000; Cousins 2005; Fahy 2000; Fahy, Farrelly & Quester 2004; Flint & Van Fleet 2005; King 2007; Liao & Hu 2007; Lin 2003; Ma 1999a, 1999b, 2000, 2004; Peteraf 1993; Porter 1985, 1991; Porter & Kramer 2006; Porter 1981, 1985, 1991, 1993). However, the simplicity inherent in the Porter models shown in Chapter 2 is also questioned because of the different applications of strategies and activities to address the overall strategic direction of the chosen hospitals. The problem the hospitals faced was managing the complexities that resulted from addressing their strategic goals using reverse logistics. Using three different managerial approaches, one internalised and centralised, one internalised but dispersed, and one externally managed, the three hospitals were able to successfully attain their strategic goals using reverse logistics through their supply chain strategy, and create additional business value for the ‘bottom line’, operationally.

The third key finding of this research relates to the use of Goffman’s (1959) interpretation of organisational and operational management processes. Corporate image is what Goffman calls the ‘front stage’, while the operations involved in creating that image are referred to as the ‘back stage’ (Goffman 1959). The ‘front stage’ strategy comprises an articulation of the vision and mission and this research showed that all three case study hospitals concentrated on customers’ satisfaction as their primary goal, stated clearly in their vision statements. The private hospital industry in Thailand is very competitive and image and reputation are considered to be key to the sustainability of market share and having more clients. The research showed that the back stage strategy of operations, the adoption of supply chain strategy and subsequent adoption of reverse logistics activities re-enforces the intent and direction of the front stage focus of each hospital in terms of their ‘image’. Applying the conceptualisations and arguments in Porter’s theory and Porter and Teisberg on the subject of healthcare strategy, to the data in this research highlights the importance of the backstage. This is not only to maintain and sustain the image and improve operational process
efficiencies, but also to create additional business value for each hospital. Porter said (2008, p. xi):

Today organizations in all spheres must compete to deliver value. Value is the ability to meet or exceed the needs of customers, and do so efficiently. Companies have to deliver value to their customers, and countries have to deliver value as business locations. This is now just as true for a hospital delivering health care, or a foundation making charitable contributions, as it is for a company producing a product or service.

This change in focus from earlier strategic goals focuses attention on business value as it drives customer or client satisfaction through attainment of other levels of business value, competitive advantage, cost minimisation, etc. According to Porter and Teisberg (2006) the recent strategy of hospitals, applied in their operation management, should be on the principles of value-based competition. Based on data analysis in this research, in all three case studies the ‘back stage’ strategy operations linked to reverse logistics were, in the opinion of the interviewees at all levels, associated closely with business value creation. It could be argued that adopting RL activities can re-enforce the intent and direction of the ‘front stage’ operations of each hospital.

Finally this research showed that reverse logistics in hospitals was driven by the need to save costs, use resources efficiently and maintain business plans that delivered high quality health services at high prices. Competition is based on image and reputations and that where hospitals get their competitive advantage is by focusing heavily on customers' wants and needs. The data derived in this research showed that affordable operational costs in hospitals must be realised to remain globally competitive in the healthcare industry and this plays a significant factor when setting prices. Porter and Teisberg (2006) and Teisberg 2010 argued that healthcare is about the patient. According to Porter and Teisberg (2006) the business value which the hospital can add can be seen in terms of value-based competition. This research showed that the adoption of reverse logistics in the three hospitals led to competitive advantage, customer satisfaction, cost reduction, profit maximisation and resource efficiency.

The next section is a discussion grounded in the theories (Chapter 2) used to highlight key outcomes of the research and the development of a model which builds on the existing literature.
6.2 Effects of RL activities on the creation of Business Value

Throughout the analysis of the data in this thesis, the types of RL activities adopted were identified for each of the 4 major departments in each of the Thai hospitals. These were then mapped against the business value that each of the hospital’s senior staff had noted were created by those activities. They perceived the importance of that impact ranging from strong influence to a minor one. The summary of this mapping is shown in Fig. 6.1.

Figure 6.1: The Major RL Activities Implemented in the 3 Thai Hospitals and their reported impact on Business Value
This research has shown that the relationships between the main four departments (Out-Patient Department; OPD, In-Patient Department; IPD, Pharmacy Department, and Waste Management Department) and reverse logistics activities used created business value, perceived by the hospital leaders as either competitive advantage, or profit maximisation, or customer satisfaction, or cost reduction, and/or resource efficiency. Generally the adoption of a better return process in the OPDs provided business value in terms of customer satisfaction. The IPDs adopted reuse, refurbish and repair mechanisms that created more than one benefit or advantage (cost reduction and resource efficiency) to the hospitals. Importantly, return and recycling played key roles in the Pharmacy Departments and also provided business value in three forms - cost reduction, profit maximisation and resource efficiency. In the Waste Management Departments the main reverse logistics activities, recycling and incineration, created value in the form of cost reduction and resource efficiency.

The types of reverse logistics used in the three hospitals and their impacts on creating value were shown to be:

- Various RL activities creating several forms of business value;
- Complex relationships between RL activities and business Value being created;
- Recycling is the major RL activity uses in the Thai hospitals;
- The major effect of implementing RL activities of all forms is cost reductions and cost management, with two of the hospitals realising a significant impact on business value of resource efficiency;
- Better efficiencies gained in resource use and cost management structures to create business value; and
- Business value created where profit maximisation and customer satisfaction occurred, but appeared to be less significant than costs and resource efficiency.

This investigation of the nature, patterns and characteristics of interactions between reverse logistics activities and business value creation in the Thai hospitals showed that the patterns of reverse logistics in the three hospitals are very similar, suggesting that when the focus of the organisations are similar at the executive management level, then the focus at the micro level is also similar. This is despite the relationships being complex and reflecting the complexity of the hospital operations and multiple one-to-many and many-to-many
relationships (see Fig. 6.1). The outcome of this complexity was reflected in the comments made by interviewees about their difficulties in integrating and co-ordinating the hospital’s operations and its supply chain. Three different approaches were employed to address this issue. In Bumrungrad Hospital all supply chain and reverse logistics operations were centrally managed within a specific unit. In Vejthani Hospital responsibility for management and administration was devolved to the specific operational units and Bangkok Pattaya Hospital’s supply chain and reverse logistics operations were managed externally by the N Health network and centrally within the hospital itself. All three solutions were considered across the board by interviewees to be financially and operationally successful. All strategies adopted were also recognised to create business value within each hospital.

The research also highlighted both the complexity of the costs involved in these hospitals and therefore the complexity of solutions used throughout the hospital. The research results show that there was considerable variation between the hospitals in terms of what was adopted and the business value that emerged (Fig. 6.1). There is complexity in all domains, i.e. activity, strategy, reasoning and outcomes. This is very important to understand because reducing reverse logistics and business value to a simplified set of activities and circumstances masks the effects of complexity and the desire on the part of managers in these hospitals to use their resources as effectively as possible. They want to control and where possible reduce costs and improve profitability without sacrificing the high quality of service provision that is expected.

In summary, this strategic action represents the operational, or ‘back stage’ actions that drive - in the Thai hospitals - what Porter (2010), Porter and Teisberg (2006) and Teisberg (2010) would claim to be cost leadership and cost differentiation. This micro-economic strategy focused on cost reduction and resource efficiency, coupled with a less significant attempt to use these drivers to support the ‘image’ of excellence in healthcare and a customer focus. This research also investigated why these relationships between reverse logistics activities and the creation of business value happened, and why the pattern complexity emerged.

Rahman and Subramanian (2012) argued that reverse logistics is adopted and implemented for a specific set of reasons. This research assumed that structure for comparison both for each hospital and for each department in the hospitals. The outcome of that analysis is summarised in Table 6.1.
Table 6-1: Reasons for adoption and implementation of various reverse logistics activities

<table>
<thead>
<tr>
<th>Hospital</th>
<th>Department</th>
<th>RL activities used</th>
<th>Focus of Business Value</th>
<th>Reasons for Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bumrungrad</td>
<td>OPD</td>
<td>Recycle, Return</td>
<td>Customer Satisfaction, Competitive Advantage, Cost Reduction</td>
<td>Customer Demand, Incentive, Vision, Mission, Accreditation</td>
</tr>
<tr>
<td></td>
<td>IPD</td>
<td>Reuse, Refurbish, Repair</td>
<td>Cost Reduction, Resource Efficiency</td>
<td>Strategic Cost/Benefit, Accreditation</td>
</tr>
<tr>
<td></td>
<td>PD</td>
<td>Recycle, Reduce</td>
<td>Cost Reduction, Profit Maximization, Resource Efficiency</td>
<td>Strategic Cost/Benefit, Vision, Mission, Resources (Technology)</td>
</tr>
<tr>
<td></td>
<td>WMD</td>
<td>Recycle, Incineration</td>
<td>Cost Reduction, Resource Efficiency</td>
<td>Legislation, Customer Demand, Strategic Cost/Benefit, Environmental Concern</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Accreditation</td>
</tr>
<tr>
<td>Vejthani</td>
<td>OPD</td>
<td>Return</td>
<td>Customer Satisfaction</td>
<td>Customer Demand, Incentive, Vision, Mission, Accreditation</td>
</tr>
<tr>
<td></td>
<td>IPD</td>
<td>Reuse, Refurbish, Repair</td>
<td>Cost Reduction, Resource Efficiency</td>
<td>Strategic Cost/Benefit, Accreditation</td>
</tr>
<tr>
<td></td>
<td>PD</td>
<td>Recycle, Reduce</td>
<td>Cost Reduction, Profit Maximization, Resource Efficiency</td>
<td>Strategic Cost/Benefit, Vision, Mission, Resources (Technology)</td>
</tr>
<tr>
<td></td>
<td>WMD</td>
<td>Recycle, Incineration</td>
<td>Cost Reduction, Resource Efficiency</td>
<td>Legislation, Customer Demand, Strategic Cost/Benefit, Environmental Concern</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Accreditation, Government Policy</td>
</tr>
<tr>
<td>Bangkok Pattaya</td>
<td>OPD</td>
<td>Recycle, Return</td>
<td>Competitive Advantage, Customer Satisfaction</td>
<td>Customer Demand, Incentive, Vision, Mission, Accreditation</td>
</tr>
<tr>
<td></td>
<td>IPD</td>
<td>Reuse, Repair</td>
<td>Cost Reduction, Resource Efficiency</td>
<td>Strategic Cost/Benefit, Accreditation</td>
</tr>
<tr>
<td></td>
<td>PD</td>
<td>Recycle</td>
<td>Competitive Advantage, Profit Maximization, Resource Efficiency</td>
<td>Strategic Cost/Benefit, Vision, Mission, Volume Quality, Integration, Coordination</td>
</tr>
<tr>
<td></td>
<td>WMD</td>
<td>Recycle, Incineration</td>
<td>Cost Reduction, Resource Efficiency</td>
<td>Legislation, Customer Demand, Strategic Cost/Benefit, Environmental Concern</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Accreditation</td>
</tr>
</tbody>
</table>

The strategic role of RL activities applied in the four key departments (OPD, IPD, PM, WMD) in all three case studies is similar but some RL activities differed. This suggests that the reasoning behind the work of Rahman and Subramanian (2012) is too reductionist or general. The analysis of the research data in this study showed that whilst similar certain actions can have the same rationale, their operationalisation can be different. This adds another level of understanding about the causes of the complexity identified in the relationships between reverse logistics activity/strategy implementation and the types of business value that were created.

The research explained the major reasons why reverse logistics was accepted, in terms of mission and vision, government policy. However, using the latest technology in Bumrungrad and Vejthani Hospital was also an important driver. For Bangkok Pattaya Hospital, its
Membership of the N Health network was a key element in the implementation of supply chain and reverse logistics activities. The reverse logistics literature argues that there are distinct benefits arising for their implementation. An analysis of these benefits, derived from this study, is compared to the conclusions in the existing literature in Table 6.2.

Table 6-2: The benefits of Supply Chain resulting from RL implementation

<table>
<thead>
<tr>
<th>Benefits of Supply Chain</th>
<th>Operation Examples</th>
<th>Outcomes</th>
<th>Thai Private Hospitals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improving customer service</td>
<td>Supply Chain Management applied to inventory management in electronic industry.</td>
<td>Increases stock availability and reduces order cycle time</td>
<td>Each of the case study hospitals used computer software (e.g. Peoplesoft) for enhancing efficiency in hospital administration and to manage costs specifically in pharmaceutical stock management and order cycle times. The intent was to improve cost management and improve customer service.</td>
</tr>
<tr>
<td>Reducing costs</td>
<td>Value Stream Mapping (VSM) is a lean process tool for eliminating waste used by Ford Motor Company in Taiwan</td>
<td>Provides a complete visual flow (material and information) to support decision-making Demonstrates the close link between information and material flow</td>
<td>The result of RL application within each of the case studies shows the accrual of business benefits through cost reduction with better management processes and better waste management</td>
</tr>
</tbody>
</table>
| Aiming for resource efficiency | Application of supply chain management so that business partners cooperate in sharing resources such as materials in the food and timber industries. | There is an improvement in using materials more efficiently. | The main finding of all three case studies, but especially for Bangkok Pattaya Hospital, shows that RL implementation can improve using materials more efficiently. 
This was demonstrated with the recycling, repair and return processes operating through the use of RL. 
Each of the hospitals improved their efficiencies across all sectors of the hospitals. |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Improving business process</td>
<td>Applies a supply chain management for creating the relationships among supply chain partners (impacts on firm financial and non-financial performance).</td>
<td>Improves not only operational performance, but also enhances customer satisfaction and financial performance.</td>
<td>The main result and findings of all case studies shows that RL can improve customer satisfaction related to the mission and vision of the company. It also provides better financial performance resulting from having less pharmaceutical waste to deal with, as an example.</td>
</tr>
</tbody>
</table>

Develops a plan to eliminate waste and to achieve continuous improvement. through better planning.
This research has shown that the internal operations of a supply chain and specifically a reverse logistics strategy in these three private hospitals in Thailand reflected a resource management perspective with a focus on costs and demand for medical services. Prices that these hospitals set in the local, regional and global sectors are less competitive, in that they are generally high, reflecting a perception about the high quality of medical services being delivered. These ‘back stage’ operations focused on reverse logistics in practice, operating micro-economically and determining profitability and competition through cost management and resource efficiency. This ‘back stage’ represents the operational perspective of the strategy as policy, reflected in what Porter (2008) and Porter and Teisberg (2006) argue is essential in healthcare and the real attention being paid to client care/patient satisfaction. This research shows that the personnel in these three hospitals were very concerned that reverse logistics did play a role in creating business value through actions/operations that would facilitate high quality patient care and lead to strong patient/client satisfaction with the care delivered.

This micro level of operations in using reverse logistics played a key role in the three Thai hospitals in meeting the ‘image’ growing strategy or external focus of the hospitals. Here they paid attention to advertising the quality of their hospitals, the quality of medical services delivered and their local, regional and global image in the international medical marketplace. The three hospitals have a strategic external focus, or image, intended to attract high-end international patients or locals who can afford to pay the prices charged. Their intent is to promote brand image. Such branding is costly and the infrastructure activities needed to deliver it are also costly. Referring to Goffman (1959) again, this externalisation of brand and image was designed to be the ‘obvious’ or ‘front stage’ form of strategy. To compete in the international delivery of healthcare and health services requires an image together with the actual skills/expertise, that is well known and has global recognition.
The two elements of this strategy - the policy level or external focus and the internally focused practice focus - are essentially interrelated. This research has highlighted that even operationally implementing reverse logistics activities like incineration, recycling, refurbishment, etc., is integral to meeting both micro-economic goals and determination of market demand and meeting more macro strategic policy. There is no doubt from the interview data that without these reverse logistics activities, these hospitals would not be as profitable or in as much demand as they are. It is accepted that the use of reverse logistics is not always obvious to those making decisions about healthcare. In Chapter 6, it was suggested that these outcomes can be modelled (Fig. 6.2).

![RL Strategy](image)

Figure 6.2: RL Strategy (an alternative perspective)

This research shows tentatively that the ‘back stage’ operational stage outcomes are more significant as a result of RL than the ‘front stage’ image strategies in each hospital. Accepting such a conclusion is based on the ‘relative’ statements made by the interviewees could only be verified if ‘in-confidence’ about performance at an activity level was made available and could be analysed.
6.3 Contribution to Theory

The theoretical context of this research relates to an understanding of what reverse logistics is, how RL can be used as a strategy in a hospital context and the role of competition and the economic context of the Thai hospitals. There is a real sense from the data that these hospitals see their ‘image’ as the key focus of their corporate strategy and that operational matters such as reverse logistics are key processes that enable the hospitals to implement their strategy, improve resource use and operational efficiency. These have an impact on costs, investment decisions and ultimately price settings which then drive their marketplace positioning. This theorisation of that process is illustrated in Fig. 6.3. It complements previous work by several scholars (Barney 1991, 2001a, 2001b; Fahy 2000; Mills, Platts & Bourne 2003; Peteraf & Bergen 2003) using the Resources-Based Theory of the Firm. A resources-based view of the firm argues that competitive advantage for a firm originates in their internal resources and the efficient allocation of those resources to the business processes, either reducing costs or rents to facilitate better pricing and improve profitability. Theorising about the impact of reverse logistics in the three case study Thai private hospitals shows their focus on resource use efficiency and the way this is used to determine prices and affect both market positioning and the ‘image’ of each company/hospital.
The second contribution of this research to theorising about reverse logistics emerged in the modelling reported above in the discussion and illustrated in Fig. 6.2. This model suggests the interrelatedness and at the same time differentiation of business strategy as policy and business strategy as practice. The model is a representation whereby reverse logistics can be viewed on the one hand as an operational activity but on the other hand also representing strategy in practice. It becomes integral to the achievement of a firm/business/hospital’s strategy.

### 6.4 Contribution to Practice

According to Rutala and Mayhall (1992), the amount of waste generated in US hospitals is approximately 6.670 tons per day, or about 1% of the 158 million tonnes of municipal solid waste produced annually. It might be implied that reverse logistics in hospitals in Thailand produces similar amounts of waste. The evidence from this research shows that each hospital has introduced practices and policies to deal with all forms of waste, both toxic and non-toxic. Bumrungrad, Vejthani, and Bangkok Pattaya hospitals also treat waste water and reuse
it for other purposes. These practices result from concerns to ensure that the hospitals maintain their ‘green’ image and meet their compliance requirements under both Thai legislation and accreditation requirements. Each hospital offers effective working models for others to use and each of the waste management strategies in operation offer models for others to copy and replicate to meet accreditation and legislative demands as they arise. In addition it can be argued that the models in place in these hospitals also can be used to demonstrate the business value that can possibly be created by treating waste as part of a reverse logistics strategy.

This research supports Blumberg’s (1999) view that reverse logistics should play an important role within a company in to meet its marketplace needs. That study showed that the two critical factors that a company should be most concerned with are reverse logistics and repair services. The discussions in this chapter about the relationships between market positioning and the use of reverse logistics in the Thai hospitals shows that: firstly, reverse logistic can impact on market positioning; and secondly, repairs are an integral part of effective use of reverse logistics.

This study also supports Ritchie et al.’s (2000) view that in the case of the Manchester Royal Infirmary (MRI), recycling pharmaceutical products can lead to better financial performance and operations. Significantly, this research has discovered the proposed RL or strategy at the pharmacy department that enabled each hospital to obtain business value in terms of cost reduction, profit maximisation and resource efficiency. The recycling and return process of pharmaceutical stock can help the company to obtain efficiencies in their inventory, management of stock medicines, and management of pharmacy processes to patients.

Finally, then, it might be concluded that what these Thai private hospitals have implemented in their reverse logistics strategy is an example of a best practice model of reverse logistics which other hospitals can apply. Additionally, it offers other Thai hospitals examples of practice to enhance the competency of the Thai healthcare industry so that Thailand becomes the medical hub for Asia now and in the future.
6.5 Limitations

This research has a number of limitations. The case studies focus only on private hospitals in Thailand - Bumrungrad, Vejthani, and Bangkok Pattaya Hospital – which are giant business concerns. The findings and results may not apply to the public hospitals in Thailand such as Siriraj Hospital and Ramadibordi Hospital. They have a different mission and vision including a policy delivering medical services to everyone at the lowest cost. The public hospitals operate under different policies determined by Thai Ministry of Public Health. The reverse logistics concept is still relatively new in the Thai healthcare industry. Accordingly, mostly participants except executive managers were limited in their understanding of what reverse logistics were but did understand the terms such as repair, recycling, etc.

All participants were interviewed in the Thai language even though English is a language that they understand. They felt more comfortable using the Thai language but using both added complexity to the analysis as some points could have been lost during the translation process. This is one of the dilemmas of language difficulty resulting in the accuracy of results and findings in this study.

Case studies done in specific time periods reflect what is happening over that time and whilst they allow for some changes happening, technology is updated rapidly and these new changes can be added quickly. In these types of hospitals there is a general trend to implement new technologies as soon as possible. This could mean changes to the effectiveness of their activities. The major limitation of this research lies in the actual data used. It is all relational data based on the perceptions and judgements of people. To validate the conclusion made it would be necessary to have access to financial and activity records which at this time is strictly confidential and unavailable because of the highly competitive nature of the marketplace these hospitals operate in.

6.6 Future Study

The research is still limited to a small group of researchers and users especially in the healthcare industry in Thailand. Future studies should examine in greater detail the roles reverse logistics plays in other hospital departments and units employing activity-based accounting processes and financial accounting methods. A detailed analysis is required of the
determination of prices in private hospitals in Thailand. With the development of the Asian Economic Community from 2015, the level of competition will increase significantly for these hospitals and this will impact on their pricing structures. There is a need to model the impact of reverse logistics on the prices set in the private health sector in Thailand. There is currently no research in this area given the relative importance of this industry and the demands of the Royal Thai Government about waste and disposal requirements.

6.7 Conclusion

There are five major outcomes of this research. The first one relates to the complexity of the RL used and complexity of business value created in hospitals. The research showed that there were three different approaches addressing this issue. In Bumrungrad Hospital all supply chain and reverse logistics operations were centrally managed within a specific unit. In Veijthani Hospital responsibility for management and administration was devolved to the specific operational units while Bangkok Pattaya’s supply chain and reverse logistics operations were managed externally by the N Health network, and centrally within the hospital itself. All strategies adopted create business value in each hospital.

The second major outcome is that the strategic roles of RL activities applied across the four main departments (OPD, IPD, PD, WMD) in all three case studies are similar but some activities are different. The analysis of the research data in this study showed that whilst reasons can be similar for certain actions, their operationalisation can vary, adding another level of understanding about the causes of the complexity identified in the relationships between reverse logistics activity/strategy implementation and the types of business value being created.

The third major outcome is how the ‘back stage’ strategy reinforces the intent and direction of the ‘front stage’ focus of each hospital on their image. The internal operations of a supply chain and specifically a reverse logistics strategy in these three private hospitals in Thailand reflected a resource management perspective with a focus on costs and demand for medical services. This research shows that the ‘back stage’ operational stage outcomes are more significant when RL is implemented compared to the ‘front stage’ strategies in each hospital.
The fourth major outcome is that the theoretical context relates to the resources-based view theory of the firm where competitive advantage for a firm is derived from their internal resources and their efficient allocation of to business processes, either reducing costs or rents to facilitate better pricing and improve profitability. Theorising about the impact of reverse logistics in the three Thai private hospitals shows they concentrated on resource use efficiency to govern prices, improve marketplace positioning and ‘image’.

The fifth and final major outcome is that Thai private hospitals have implemented their reverse logistics strategy as an example of a best practice model which other hospitals can apply. It offers other Thai hospitals examples ‘how to do things’ in order to enhance the competency of Thailand’s healthcare industry.
List of References


Babbie, E. (2007), The practice of social research Thomson Wadsworth, Belmont, CA.

Bangkok Hospital, viewed 1 March 2015,
Bangkok Pattaya Hospital, viewed 15 October 2013,  

Bangkok Pattaya Hospital, viewed 15 August 2014,  

Bangkok Pattaya Hospital About, viewed 1 March 2015,  

Bangkok Pattaya Hospital Awards, viewed 1 March 2015,  

Bangkok Pattaya Hospital Diagnostic, viewed 5 March 2015,  

Bangkok Pattaya Hospital Healthcare, viewed 5 March 2015,  

Bangkok Pattaya Hospital Heart Centre, viewed 5 March 2015,  

Bangkok Pattaya Hospital Network, viewed 15 August 2014,  

Bangkok Pattaya Hospital Overview, viewed 1 March 2015,  

Bangkok Pattaya Hospital Services, viewed 1 March 2015,  
Bangkok Pattaya Hospital Technology, viewed 1 March 2015,  

Bangkok Phuket Hospital, viewed 1 March 2015,  


Bumrungrad About, viewed 1 March 2015,

Bumrungrad Business Management, viewed 15 August 2014,

Bumrungrad Hospital, viewed 15 August 2014,


Bumrungrad listed company, viewed 15 August 2014,

Bumrungrad Management,

Bumrungrad Medical Tourism, viewed 15 August 2014,

Bumrungrad Mission and Vision, viewed 15 August 2014,


Competitive Advantage, viewed 2 August 2011,
<http://tutor2u.net/business/strategy/competitive_advantage.htm.>


‘Consumer research welcomes reverse logistics’, viewed 31 September 2011,


Fen, M. (2010), ‘The study on Reverse Logistics for E-Commerce’, Faculty of Management and Economics, Kunming University of Science and Technology, Kunming, China.


Given, L. (2008), *The Sage encyclopedia of qualitative research methods*, vol. 1, Sage Publications,


Kopichy, R.J.; Berg M.J.; Legg L.; Dasappa V. & Maggioni C.,(1993), ‘Reuse and re cycling:reverse logistics opportunities’, Council of Logistics Management, Oak Brook, IL.


Oliver, A. (2008), Combining leadership and incentives to improve health care: the case of the Veterans Health Administration, Health papers, Oxford Policy Institute, Oxford, UK.


Porter, M.E., (2010), *Value-Based Health Care Delivery*, Yale School of Management.


Porter, M.E., & Teisberg, E.O. (2006), Redefining Health Care: Creating Value-Based Competition on Results, Health Information technology Symposium, Massachusetts Institute of Technology.


Schliephake, K., Stevens, G., Clay, S. (2009), ‘Making resources work more efficiently – the importance of supply chain partnerships’, *Journal of Cleaner Production*, 17(14), 1257-1263.


Syam, S., Cote, M.J. (2010), A location–allocation model for service providers with application to not-for-profit health care organizations, Omega 38, 157–166.


Tiwari, G. (2009), Reverse Logistics Management- an Effective Strategy for Revenue Maximization in CPG Industry, Wipro Technologies,


Whittington, R. (2006), Completing the practice turn in strategy research, Organization Studies, 27(5), 613-34.


Appendix A: Interview Documents
College of Business IT and Logistics

SEMI-STRUCTURED INTERVIEW PROTOCOL

Project Title:

EVALUATING STRATEGIC ROLE OF REVERSE LOGISTICS IN PRIVATE HOSPITALS: case studies in Thailand

Investigators:

- Mr. Sorasak Thepsatidvilai (Business IT and Logistics, PhD candidate,
  brian.corbitt@rmit.edu.au, +61-3-99255802)
- Professor Dr Prem Chhetri (Deputy Head, Industry Engagement, School of Business IT and Logistics, RMIT University, prem.chhetri@rmit.edu.au, +61-3-99251392)

Interview Questions:

CEO & COO:

1. Do you have a supply chain strategy in the hospital? Please explain and give details.
2. Can you please describe and explain the supply chain into the hospital?
3. Does the hospital have a policy of Green Logistics? If no, please explain? If yes, what is the policy and how does it work?
4. Does the hospital have a policy of reverse logistics? If so what is the policy? Why has the hospital adopted reverse logistics? If no, can you please explain why not? What happens to waste?
5. What is the strategic role of reverse logistics in the hospital?
6. Who is the person taking the major responsibility for supply chain and logistics operations in your hospital?
7. What are the different components of reverse logistics used in the hospitals?
8. Which reverse logistics activities have been already implemented in your hospital? And in which department? Please explain.

In your institution, do you use reverse logistics activities?
9. What are the benefits in terms of business value creating by having reverse logistics activities in the hospital and within each separate department?

10. What are the reverse logistics activities, if any, that the hospital is intending to implement in the near future?

The next step is to interview the managers or the head of departments relating to the use of Reverse Logistics department.

11. Which reverse activities does this department use?

12. Why have these activities been adopted in this department?

13. How does the adoption of these activities relate to the hospital’s strategy?

14. Who are the people taking the major responsibility and getting involved of reverse logistics operations in this department?

15. How do the activities of reverse logistics assist the operations of the department? Please explain

16. What are the benefits in terms of business value creating by having reverse logistics activities in your department?

17. What would happen if reverse logistics were not in place??

Focus Group

18. In your opinion, how do you think reverse logistics can create business value in your hospital?

19. What are the expected benefits from the use of reverse logistics in your hospital?

20. What are the future plans for further reverse logistics as a strategy in your hospital?

21. What is the future plan for supply chain management in your hospital?

22. This a model of a hospital in Thailand mapping the types of reverse logistics used to the perceived business value that the reverse logistics activity created.

- Do you think that this is a good strategy?
- Why or why not?
- Do you think the operations of reverse logistics shown in this model could be improved?

In the event of any logistics problems that occur, the healthcare logistics staff will use this model to observe and improve the operation:

- In service orientation
- Timely
-顾客满意度
Prescribed Consent Form for Persons Participating in Research Projects Involving Interviews

<table>
<thead>
<tr>
<th>COLLEGE OF SCHOOL/CENTRE OF</th>
<th>Business IT &amp; Logistics</th>
</tr>
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<tbody>
<tr>
<td>Name of Participant:</td>
<td></td>
</tr>
<tr>
<td>Project Title:</td>
<td>Evaluating Strategic Role of Reverse Logistics in Private Hospitals: case studies in Thailand</td>
</tr>
<tr>
<td>Name(s) of Investigators:</td>
<td>(1) Sorosak Thepsatidsilph</td>
</tr>
<tr>
<td>Phone:</td>
<td></td>
</tr>
</tbody>
</table>

1. I have received a statement explaining the interview/questionnaire involved in this project.
2. I consent to participate in the above project, the particulars of which - including details of the interviews or questionnaires - have been explained to me.
3. I authorise the investigator or his or her assistant to interview me or administer a questionnaire.
4. I give my permission to be audio taped:  □ Yes  □ No
5. I give my permission for my name or identity to be used:  □ Yes  □ No
6. I acknowledge that:

   (a) Having read the Plain Language Statement, I agree to the general purpose, methods and demands of the study.
   (b) I have been informed that I am free to withdraw from the project at any time and to withdraw any unprocessed data previously supplied.
   (c) The project is for the purpose of research and/or teaching. It may not be of direct benefit to me.
   (d) The privacy of the information I provide will be safeguarded. However should information of a private nature need to be disclosed for moral, clinical or legal reasons, I will be given an opportunity to negotiate the terms of this disclosure.
   (e) The security of the research data is assured during and after completion of the study. The data collected during the study may be published, and a report of the project outcomes will be provided to RMIT University. Any information which may be used to identify me will not be used unless I have given my permission (see point 5).

Participant’s Consent

Name: _______________________________ Date: ________________________

(Participant)

Name: _______________________________ Date: ________________________

(Witness to signature)

Version #1, 20/9/04, Page 4 of 4
Where participant is under 18 years of age:

I consent to the participation of ____________________________ in the above project.

Signature: (1) ____________________________ (2) ____________________________ Date: ____________________________

(Signatures of parents or guardians)

Name: ____________________________ Date: ____________________________

(Witness to signature)

Participants should be given a photocopy of this consent form after it has been signed.

Any complaints about your participation in this project may be directed to the Chair, Business College Human Ethics Advisory Network, College of Business, RMIT, GPO Box 2476V, Melbourne, 3001. The telephone number is (03) 9925 5598 or email address rdu@rmit.edu.au. Details of the complaints procedure are available from http://www.rmit.edu.au/browse.ID=2jgmb7hnpyo
Business College Human Ethics Advisory Network, College of Business, RMIT, GPO Box 2476V, Melbourne, 3001. The telephone number is +61 - (03) - 9925 5598 or email address rdu@rmit.edu.au. Details of the complaints procedure are available from http://www.rmit.edu.au/browse;ID=2igmrn7hnpyo
INVITATION TO PARTICIPATE IN A RESEARCH PROJECT

Project Title:

Investigators:
- Mr. Sorosak Thepsatidisilph (Business IT and Logistics, PhD candidate,
brian.corbitt@rmit.edu.au, +61-3-99255802)
- Professor Brian Corbitt (Senior Supervisor, PhD FACS CP Professor Mentor,
brian.corbitt@rmit.edu.au, +61-3-99255802)
- Professor Dr Prem Chhetri (Deputy Head, Industry Engagement, School of Business IT and
  Logistics, RMIT University, prem.chhetri@rmit.edu.au, +61-3-99251392)

Dear Participant,

You are invited to participate in a research project being conducted by RMIT University. Please read this sheet carefully and be confident that you understand its contents before deciding whether to participate. If you have any questions about the project, please ask one of the investigators.

Who is involved in this research project? Why is it being conducted?

My name is Sorosak Thepsatidisilph and I am currently a fulltime PhD student from school of Business IT and Logistics, RMIT University. I am conducting my research: the title of this study is Evaluating Strategic Role of Reverse Logistics in Hospitals: case studies in Thailand and is under the supervision of Professor Brian Corbitt and Professor Prem Chhetri. Given the importance of reverse logistics, there is a strong need to ascertain how Reverse Logistics plays a strategic role within organisations particularly in the health care industry. Reverse Logistics refers to the role of logistics in product return, source reduction, recycling, material substation, reuse of materials, waste disposal, and refurbishing, repair and remanufacturing. The business values that reverse logistics create for the health care organizations in an Asian country is inadequately understood and poorly theorised. It is therefore vital to explore the strategic role of Reverse Logistics both across the hospital and in different departments within hospitals to uncover the business value created by the adoption of reverse logistics.
What is the project about? What are the questions being addressed?

The overarching aim of this thesis is to develop a better understanding of reverse logistics structures and processes to evaluate their strategic importance in creating business value in hospital supply chain both across the hospital and in different departments within Thai-hospitals. The following research questions are set out to address this aim. The main research question of this study is: What strategic role does Reverse Logistics play in hospitals in Thailand? The researcher will collect information from hospitals in Bangkok, Thailand. An estimate of 10-12 interviews within 1 hospital officials, employees and Chief Executive Officer (CEO) or Chief Operation Officer (COO) of Hospital will be conducted. The total number of hospital for data collecting is 3 hospitals, for example, Bangkok Hospital, Vejthani Hospital and Bumrungrad Hospital as a TOP-Thai hospital Ranking. The total numbers of interviews are 30 – 36 within 3 hospitals.

If I agree to participate, what will I be required to do?

If you agree to participate in this research project, you will be asked to attend an interview in order to provide insight into the process of Reverse Logistics Operation in your company. You are invited to participate in a one-to-one interview which will last for an approximate of 90 minutes and will be tape-recorded if your permit and will be followed up for unclear information via e-mail or telephone. You are welcome to review completed transcript before it is considered for analysis.

What are the risks or disadvantages associated with participation?

Your participation in this project is entirely voluntary and will have no impact on your work apart from the time taken for the interview. There are no perceived risks associated with participation of this interview. You can examine the interview protocol before deciding whether you want to participate. You are provided with a prescribed consent form. During your interview you have the right to withdraw partially or completely or refuse to answer any further questions or request to stop recording at any stage any time. Moreover, you have the right to ask any questions regarding to my research at any time. If you are concerned about your responses to any of questions or if you find participation in the project distressing, you should contact Professor Brian Corbitt as soon as convenient. Professor Brian Corbitt is my principal supervisor and can be contacted on (+613)
9925 5802, or at brian.corbitt@rmit.edu.au. You may also contact Professor Prem Chhetri, my second supervisor on (+613) 9925 1392, or at prem.chhetri@rmit.edu.au. My supervisors will discuss your concerns with you confidentially and suggest appropriate follow-up, if necessary.

**What are the benefits associated with participation?**

This project will contribute to the understanding of strategic role of reverse logistics Thai hospitals. There is no direct benefit to the participants as a result of their participation. However, I will be delighted to provide you with a copy of the research report upon request as soon as it is published.

**What will happen to the information I provide?**

- The information you provide in the interview will be transcribed and cleaned of any comments that could identify you or your company. The collected interview data will be analysed and aggregated based on the themes of the research project. Your privacy and confidentiality will be strictly maintained in such a manner that you will not be identified.
- Your contact details and data will be kept confidential and only seen and analysed by Sorosak Tepstoidsilph, Professor Brian Corbitt, and Professor Prem Chhetri during the data collection period. Only the researchers will have access to the data.
- Any information that you provide can be disclosed only if (1) it is protect you or others from harm, (2) a court order is produced, or (3) you provide the researchers with written permission.
- The findings of this project will be delivered in an Executive Summary with a report or in my PhD thesis. Subsequently, the findings of this study will be used in academic publications.
- To ensure that data collected is protected, the data will be retained for five years upon completion of the project after which time paper records will be shredded and placed in a security recycle bin and electronic data will be deleted/destroyed in a secure manner. All hard data will be kept in a locked filing cabinet and soft data in a password protected computer in the office of the investigator in the School of Accounting at RMIT University.

**What are my rights as a participant?**

As a participant, you have the rights to:

- Withdraw your participation at any time, without prejudice.
- Have any unprocessed data withdrawn and destroyed, provided it can be reliably identified, and provided that so doing does not increase the risk for you.
• Have any questions about the interview answered at any time.
• Have time to discuss off-topic issues after concluding the interview.
• Choose not to answer any of the interview questions.
• Request that audio recording be terminated at any stage during the interview.

Thank you very much for your contribution to this research.

Sincerely Yours,

Sorasak Thepsatidsliph
PhD Candidate
School of Business IT and Logistics
RMIT University, Level 10, Building 80,
445 Swanston Street, Melbourne
Victoria, Australia

Any complaints about your participation in this project may be directed to the Chair, Business College Human Ethics Advisory Network, College of Business, RMIT, GPO Box 2476V, Melbourne, 3001. The telephone number is (03) 9925 5598 or email address rdu@rmit.edu.au. Details of the complaints procedure are available from http://www.rmit.edu.au/browse/ID=2jrmib7hnpvo
INVITATION TO PARTICIPATE IN A RESEARCH PROJECT

Project Title:
การประเมินบทบาทของกลุ่มด้านการบริการโลจิสติกส์ในโรงพยาบาลเอกชน: กรณีศึกษาในประเทศไทย
(Evaluating Strategic Role of Reverse Logistics in Private Hospitals: case studies in Thailand)

Investigators:
- Mr. Sorasak Thetsapidisilph (Business IT and Logistics, PhD candidate, sorasak.thetsapidisilph@rmit.edu.au, +61-3-99255802)
- Professor Brian Corbitt (Senior Supervisor, PhD FACS CP Professor Mentor, brian.corbitt@rmit.edu.au, +61-3-99255802)
- Professor Prem Chhetri (Deputy Head, Industry Engagement, School of Business IT and Logistics, RMIT University, prem.chhetri@rmit.edu.au, +61-3-99251392)

เรียน ท่านผู้มีเกี่ยวข้องในงานวิจัย,

ท่านได้รับแจ้งให้ทราบว่า RMIT University ขอรับความร่วมมือในการวิจัยถึงกลุ่มด้านการบริการโลจิสติกส์ในโรงพยาบาลเอกชนในประเทศไทย โดยมีวัตถุประสงค์ คือ

1. ประเมินบทบาทของกลุ่มด้านการบริการโลจิสติกส์ในโรงพยาบาลเอกชนในประเทศไทย
2. ศึกษากรณีศึกษาในประเทศไทย

โดยท่านสามารถเข้าร่วมโครงการนี้ได้โดยไม่เสียค่าใช้จ่ายใด ๆ ทั้งสิ้น ท่านจะได้รับการสนับสนุนจากทีมงานวิจัยที่มีความผ่านมาทางด้านการบริการโลจิสติกส์ในโรงพยาบาล

ท่านสามารถเข้าร่วมโครงการนี้ได้โดยไม่เสียค่าใช้จ่ายใด ๆ ทั้งสิ้น ท่านจะได้รับการสนับสนุนจากทีมงานวิจัยที่มีความผ่านมาทางด้านการบริการโลจิสติกส์ในโรงพยาบาล

versions # 1, 26/9/04, Page 4/4
โรงเรียนธุรกิจ

ทำหน้าที่สอนให้เรียนรู้วิชาการวิจัยทางการศึกษาทางการจัดการวิศวกรรมโลจิสติกส์ในองค์กรของแต่ละบัณฑิต ด้านการจัดการวิศวกรรมโลจิสติกส์นั้น ทำให้เข้าใจถึงความต้องการของผู้บริโภค และความต้องการความสุขของผู้บริโภค ตลอดจนการจัดการด้านการจัดการวิศวกรรมโลจิสติกส์เพื่อให้ได้รับผลิตภัณฑ์ที่มีคุณภาพที่ดีที่สุด ทั้งนี้ บริษัทที่ผลิตภัณฑ์

ในการจัดการงานวิจัย ที่มีความสำเร็จหรือเมื่อไหร่

การจัดการงานวิจัย ซึ่งถูกสังเกตจากผลของการที่จะให้บริการการจัดการวิศวกรรมโลจิสติกส์ให้กับผู้บริจัย ที่ทำหน้าที่สอน ทำให้ได้ผลที่ต้องการและผลลัพธ์ที่ดีในทางการจัดการวิศวกรรมโลจิสติกส์ เพื่อให้ได้รับผลิตภัณฑ์ที่มีคุณภาพที่ดีที่สุด

ในการสานสิ่งแวดล้อมกับการวิจัย นั้น ให้ประโยชน์หรือ

ผลที่ได้จากการจัดการวิจัยที่ดี ทำให้ได้ประโยชน์ทางการจัดการวิศวกรรมโลจิสติกส์ในองค์กรที่มีความต้องการ ให้ได้ผลลัพธ์ที่ดี และการจัดการวิศวกรรมโลจิสติกส์ ตลอดจนการจัดการวิศวกรรมโลจิสติกส์ที่ดี ทำให้ได้ผลลัพธ์ที่ดีที่สุดในทางการจัดการวิศวกรรมโลจิสติกส์ที่ดีที่สุด ต่อไปนี้คือข้อซักถามที่ได้การจัดการวิศวกรรมโลจิสติกส์บนชั้นสูงที่ต้องการให้ได้ผลลัพธ์ที่ดีที่สุด ที่นี่อยู่ในทางการจัดการวิศวกรรมโลจิสติกส์ที่ดีที่สุด ที่นี่อยู่ในทางการจัดการวิศวกรรมโลจิสติกส์ที่ดีที่สุด
ขอขอบคุณคุณเป็นอย่างสูง ที่ทำให้ความก้าวสำรองอยู่อย่างเป็นประ โฆษณ่าต่อเจ้าหน้าที่

ขอแสดงความนับถือ

นาย สรรค์ เทพเศรษฐิตปิ
นักศึกษาปริญญาตรี สาขาวิชาโลจิสติกส์
RMIT University Level0, Building 80, Swanston Street
Melbourne, VIC AUSTRALIA 3000
Appendix B: Notice of Ethical Approval
Notice of Approval

Date: 4 April 2013
Project number: 1000497
Project title: Evaluating Strategic Role of Reverse Logistics in Hospitals: Case Studies in Thailand
Risk classification: Low Risk
Principal Investigator: Professor Brian Corbitt
Student Investigator: Mr Sorosak Thepsatidilph

Project Approved: From: 28 March 2013 To: 18 November 2015

Terms of approval:

1. Responsibilities of the principal investigator
   It is the responsibility of the principal investigator to ensure that all other investigators and staff on a project are aware of the terms of approval and to ensure that the project is conducted as approved by BCHEAN. Approval is only valid while the investigator holds a position at RMIT University.

2. Amendments
   Approval must be sought from BCHEAN to amend any aspect of a project including approved documents. To apply for an amendment submit a request for amendment form to the BCHEAN secretary. This form is available on the Human Research Ethics Committee (HREC) website. Amendments must not be implemented without first gaining approval from BCHEAN.

3. Adverse events
   You should notify BCHEAN immediately of any serious or unexpected adverse effects on participants or unforeseen events affecting the ethical acceptability of the project.

4. Participant Information and Consent Form (PICF)
   The PICF must be distributed to all research participants, where relevant, and the consent form is to be retained and stored by the investigator. The PICF must contain the RMIT University logo and a complaints clause including the above project number.

5. Annual reports
   Continued approval of this project is dependent on the submission of an annual report.

6. Final report
   A final report must be provided at the conclusion of the project. BCHEAN must be notified if the project is discontinued before the expected date of completion.

7. Monitoring
   Projects may be subject to an audit or any other form of monitoring by BCHEAN at any time.

8. Retention and storage of data
   The investigator is responsible for the storage and retention of original data pertaining to a project for a minimum period of five years.

Regards,

Professor Roslyn Russell
Chairperson
RMIT BCHEAN