Strategies on capturing synergies in acquisitions in the Medical Technology Industry from a resource-based view[1]

Tian Wei[2], Mike Gregory, Institute for Manufacturing, University of Cambridge, UK

Abstract

This paper explores strategies for identification and capture of synergies in acquisitions in the Medical Technology Industry from a resource-based view. M&As have been considered as a primary strategy for larger and mature companies to exploit their established routes to market and start-ups and smaller companies to develop worldwide markets and returns for Venture Capital investment in Medical Technology Industry. However, these activities appear to deliver little financial benefit to shareholders of acquiring firms. The research approach is essentially exploratory, developing a framework to indicate the activities to achieve synergies and the results of these activities for different resources building on in-depth case studies. The conclusion includes a novel taxonomy of acquisition strategies in terms of integration and value changes in acquisition process from a resource-based view.
Key words: synergies, acquisitions, resource-based view, the Medical Technology Industry

1 Introduction

Over the past 20 years, the Medical Technology Industry developed a distinct character which distinguished it from other industries. In the UK, 85% of the medical device companies had less than £5 million per year in sales revenue (ABHI3, 2003). In total, these small companies accounted for only 13% of the value of the sector. Start-up and smaller companies face a formidable challenge in developing and maintaining routes to worldwide markets. Larger, mature companies seek to exploit their established routes to market by increasing the range of products that they can offer. The acquisition strategy of these giants has large impact on the life of other companies and industry structure.

The last two decades witnessed the surge in the Medical Technology Industry both in volume and value. However, after the financial crisis, MNCs are more careful in making acquisitions because of the shortage of funding and uncertain business environment. As such, success in capturing synergies in acquisitions becomes more critical to shareholders of acquiring firms than ever before.

[1] The research is funded by EPSRC (Engineering and Physical Sciences Research Council)
[2] Corresponding author. Tel: +44 (0)1223 766141; fax: +44 (0)1223 464217; E-mail address: tw314@cam.ac.uk

[3] ABHI: Association of British Healthcare Industries

The identification and capture of synergies has been widely discussed for a long time since the awareness of the limited benefits to the shareholders of acquiring firms in a great number of acquisitions (Chatterjee, 1986; Capron, 1999; Teerujabgas and Very, 2006; Sankaran and Vishwanath, 2008). There have been several attempts to explore frameworks and test their theories for identifying and capturing synergies in acquisition. First, finance studies focus on the relationship between issues related to the market for corporate control, especially its competitiveness (e.g. mode of payment, type of transaction, and number of bidders) and shareholder gains (Jarrell, Brickley, and Netter, 1988). Second, organizational behavior studies investigate culture impact (organizational culture, national culture and other types of culture) on the acquisition performance (Schweiger and Walsh, 1990; Schoenberg, 2006; Teerikangas and Very, 2006). Finally, strategic management researchers focus on how issues that arise during the integration of acquisitions contribute to poor acquisition performance and the implications of "strategic fit" and "organizational fit" on synergies (Singh and Montgomery, 1987; Haspeslagh and Jemison, 1991; Datta, 1991; Pablo, 1994). A strategic management perspective considers the acquisitions as a whole and identifies the nature of synergies at the level of decision makers.

Generally, there are three groups to study relationships between strategy and capture of synergies. The primary work of the first group was done by several strategic management scholars in 1980s on factors which influence the long-term benefits (Lubatkin, 1983; Singh and Montgomery, 1987; Fowler and Schmidt, 1989). The second group of studies employed a transaction cost economics (TCE) framework or agency theory to examine the factors which influence the abnormal returns to the acquirers (Morck and Yeung, 1992, Dunning, 1993; Hennart and Reddy, 1997; Pan and Tse, 2000; Brouthers, 2002). The third group of researchers studied acquisition performance from a resource-based view in strategic management (Barney, 1991; Seth, 1990; Srivastava et al., 1998; Capron, 1999; Capron et al, 2002).

The resource-based view provides an approach that regards the firm as a set of resources and capabilities that are considered to be the strengths which are supported and should guide the firm's strategy (Grant, 1991). Five main categories of business resources stand out as: (1) R&D, (2) Manufacturing, (3) Marketing, (4) Managerial, (5) Financial resources (Capron et al., 1998). Seth (1990) provides a conceptual framework to assess the relative importance of different sources of value creation in acquisitions and the results are discussed in related and unrelated acquisitions separately. In terms of how value is created, there are two ways of resource handling: "asset divestiture" and "resource deployment" (Capron et al., 1998). He shows the interaction and relationships of resource handling activities, synergies and acquisition performance.

A theme in the resource-based view on synergies in acquisitions literature that seemingly has escaped research attention refers to the subject of the gap between expected synergies and synergies captured. This argument is validated by the fact that synergies expected in the due diligence always cannot be fully achieved in integration (Jemison and Sitkin, 1986; Schweiger and Walsh, 1990; Sirower, 1999; Eccles et al., 1999; Schweizer, 2005). Further, this subject requires investigation into the strategies and activities of acquiring firms to integrate the two firms with intent to capture synergies expected ((Haspeslagh and Jemison, 1991; Pablo, 1994; Grant, 2003; Cording, Christmann and King, 2008). Hence, in this paper, we explore the strategies of the acquiring firms in acquisitions and their relationships with synergies captured in integration.

In order to achieve this objective, literature on the nature and sources of synergies is reviewed to provide the foundations to identify and capture synergies, and a resource-based view on synergies, which are the constructs of the preliminary framework of this study. We argue that different resource possession structures lead to different strategies to integrate the two firms and these strategies directly affect the value of synergies captured in integration. However, previous research finds that it is difficult to do deep analysis and generalize the results to fit all types of mergers and acquisitions in all the industries (Schweizer, 2005). Thus, research in selected industries may provide a comprehensive understanding of acquisitions. Our research question is How do the acquiring firms to capture synergies in Medical Technology Industry from a resource-based view. In the present research, we carry out 8 in-depth case studies of multinational corporations (MNCs) which are mainly headquartered in the Europe and U.S. and limited in three major medical technology sectors with the aim of covering features of the major medical technology market.

This paper is structured as follows. In Section 2, we explore the research background across the dimensions of the nature and sources of synergies, a resource-based view of synergies and characteristics of the Medical Technology industry. It ends up with a preliminary framework for this study. In Section 3, we carefully choose the methodology used in the study and develop an appropriate research approach. In Section 4, we present the data collected and discuss the findings of the study, which are organized under the preliminary framework proposed in Section 3. In Section 5, we summarize this study with highlights on the major findings, analyze the contributions to both academia and practice, and explore research limitations and future study directions.

2 Literature Review and Preliminary Framework

2.1 Nature and sources of synergies

Synergy is a term from finance. Its operational definition is this: Synergy is the increase in performance of the combined firm over what the two firms are already expected or required to accomplish as independent firms (Sirower, 1997). For the acquiring firm, value is achieved where the combination of acquirer and target firms, less the anticipated costs (the premium and the costs of integration), exceeds the value of both firms operate separately. The extra value is called synergy (Angwin, 2007). Generally, the failure of the acquisitions refers to the abnormal return to shareholders of acquiring firms, which are the gains to the acquirer. Many studies in strategic management and finance show that acquisitions cannot bring benefits to shareholders of acquiring firms, even when they create synergies. Empirical research finds that average returns to successful bidders are null, while the synergistic benefits of acquisitions usually transit to the shareholders of targets (Jensen and Ruback, 1983; Bradley, Desai and Kim, 1988). From the explanation of origins of synergies, the increase of synergistic benefits to the shareholders of acquiring firms comes from two parts: increase of total premium and fewer premiums paid to the target (Capron and Pistre, 2002). However, research on synergies for shareholders of acquiring firms focus on the value creation in general but haven't examined from these two parts separately, which can be a reason to explain the limited insights on how to achieve positive synergistic benefits to shareholders of acquiring firms.

Traditionally, there are two types of synergies: operational synergies and financial synergies. Operational synergies come in two forms: revenue synergies and cost synergies. Financial synergies refer to the possibility that the cost of capital may be lowered by combining one or more companies (Gaughan, 2007). First, revenue synergies are defined as "a newly created or strengthened product or service that is formulated by the fusion of two distinct attributes of the merger partners and which generates immediate and/or long-term revenue growth." (Gaughan, 2007). There are many potential sources of revenue synergies which vary greatly from deal to deal. Revenue synergies may come from sharing marketing opportunities and expanding product line to achieve market power. Also, it can come from a major brand name or a strong distribution network. Although the sources may be great, revenue synergies are sometimes difficult to achieve. Second, cost synergies are relatively easy to capture and they derive from economies of scope (Panzar and Willig, 1981) and economies of scale (Williamson, 1981). Hence, cost synergies are often highlighted in merger planning. Third, regarding a change in financing decisions, the potential for value creation is based on coinsurance (Higgins and Schall, 1975). The implementation of this potential increase in value requires an increase in leverage after M&A. Also, financial synergies can come from diversification of risk.

Chatterjee (1986) categorizes synergies as financial synergies, operational synergies and collusive synergies. Collusive synergies represent the scarce resources leading to market power. Operational synergies represent the scarce resources leading to production and/or administrative efficiencies. Financial synergies represent the scarce resources which lead to reductions in the cost of capital. Seth (1990) summarizes major five sources of synergies: market power, economies of scale, economies of scope, coinsurance and diversification of risk (Seth, 1990). Further, after broad literature survey, Sankaran (1993) extracts traditional and positioning related synergy sources: Economies of scale, economies of scope, economies due to competitive positioning, economies due to corporate positioning and economies due to financial synergy. Based on previous studies, Sankaran and Vishwanath (2008) make differentiations of these sources of synergies in terms of input activities, process operations and output activities.

Although studies on the nature and sources of synergies have been existed for more than 30 years, the sources of synergies outlined above are rather general and most of the research focuses on the impact of poor integration on overall performance rather than identifying the key variables which impact the capture of synergies. Existing integration research does not appear to adequately address the importance and impacts of strategies in integration on the value of synergies captured or identify links between integration the motives of the acquirer and the types of resources being acquired.

2.2 A resource-based view of synergies

The literature on M&As from a resource-based view can be distinctively divided into three stages. The first stage embraces earliest studies provided by Chatterjee (1986) and Barney (1986, 1988) and focuses on attributes of acquisitions and their importance to firm growth. The second stage emphasizes on reasons of unsuccessful acquisitions from a resource-based view. Finally, the third stage identifies how firms use resources to achieve synergies. Key researchers and findings are summarized in Table 1.

Table 1

Key researchers and key findings in M&As from a resource-based view

Stage	Key findings	Key researchers
First Stage	Strategic relatedness is not a sufficient condition for shareholders of acquiring firms to earn abnormal positive returns	Singh and Montgomery, 1987; Lubatkin, 1987; Barney, 1988; Harrison et al., 1991
	Mergers and acquisitions are a means for restructuring firms to increase their performance	Lubatkin and O'Neill, 1987; Chatterjee, 1992; Bowman and Singh, 1993
Second Stage	Undesirable consequences of acquisition strategies are sources of failure of acquisitions	Hitt et al., 1991, 1996
	Acquisitions allow firms to exchange firm-specific resources that are subject to market failure	Teece, 1987; Hennart and Park, 1993; Mitchell, 1994
Third Stage	Firms use mergers and acquisitions to acquire and redeploy resources so as to enhance their performance	Capron et al., 1998; Capron, 1999; Capron and Pistre, 2002

From Table 1, it is easily found that the resource-based view has the potential to increase and facilitate the understanding of the issues, regarding identification and integration of resources in the M&A process. Therefore, it has been frequently used as a theoretical explanation for motives of M&As which are primarily on resource possesses (e.g. Anand and Singh, 1997; Karim and Mitchell, 2000) and ways to integrate certain resources after acquisitions to achieve synergies which is resource exploitation (e.g. Capron, Dussauge, and Mitchell, 1998; Capron and Hulland, 1999).

Resource possession in pre-deal

Capron (1998) suggests a five-part typology of resources in mergers and acquisitions environment. Five main categories of business resources stand out as: (1) R&D, (2) Manufacturing, (3) Marketing, (4) Managerial, (5) Financial resources. For these five types of resources, marketing and R&D have been widely acknowledged as important contributors to acquisition performance (Mizik and Jacobson 2003; Swaminathan, Murshed and Mulland, 2008).

From a resource-based view, once firms identify gaps in their resources and capabilities, they will determine how these resources can be obtained. Mergers and acquisitions is a major approach (Capron et al., 1998) to get key resources. Eschen and

Bresser (2005) assert that “mergers and acquisitions are an appropriate means for closing resource gaps if the required resources are of high strategic value, possess a high distance to the existing resource base, and if market and technological uncertainties are moderate or low.” In acquisitions, synergies come from the combination of the resources of two firms, which are determined by the resource allocation in the acquiring firms and target firms (Wang and Zajac, 2007). There are two types of resource allocations in mergers and acquisitions: similarity (Rumelt, 1984) and complementarity (Barney, 1986). Controversially, both the similarity and complementarity can bring the economic benefits of resource combination (Tanriverdi and Venkatraman, 2005). Actually, a high level of business relatedness creates value to firms in acquisitions (Seth, 1990; Dyer and Singh, 1998). On the other hand, firms can benefit from complementarity when they combine resources of two firms (Harrison et al., 2001). Swaminathan, Murshed and Mulland (2008) summarize research on resource allocation and point out that relatedness of similarity and complementarity to the performance are contradicted and propose a framework of when and how both similarity and complementarity can contribute to greater value creation.

In sum, the relationships between configuration of resources and acquisition performance are still needed to be explored. Also, the impact of similarity and complementarity of different types of resources on acquisition performance can be a focus for future research.

Resource exploitation in post-deal

The integration process is to combine resources into bundles involves uncertainty and the value of the resources is typically discovered as they are been combined (Denrell et al., 2003). The integration is conducted by resource interactions (King et al., 2008). However, research which empirically examines target and acquiring firm resource interactions on acquisitions performance is still limited (Song et al., 2005). For example, Capron et, al. (1998) show that the process refers to firms to handle resources to achieve synergies. There are two ways of resource handling: “asset divestiture” (Capron et al., 2001) and “resource redeployment” (Capron et, al., 1998). Capron’s studies show the interactions and relationships of resource handling activities, synergies and acquisition performance. Additionally, Larsson and Flinkelstein (1999) indicate that the complementary interactions between resources in two firms can realize synergies. Finally, Uhlenbruck et al. (2006) demonstrate the potential for resource transfers in online firms.

In sum, resources transfer across targets and acquirers hasn’t been discriminated, factors influencing the redeployment in acquisitions haven’t identified and there is a need to develop appropriate resource redeployment process. Finally, it might be a feasible and effective way to combine resource possesses and exploitation together to study the synergies identification and capture from a resource-based view.

2.3 Characteristics of Medical Technology Industry

The medical technology industry provides tools to healthcare practitioners. The term “medical technology” was introduced to encompass a wide range of instruments and equipment which are used by healthcare practitioners and diagnosis, treatment and the continuing provision of care. The definition encompasses devices and their accessories, software, diagnosis and monitoring, prevention and treatment, and prosthetics. In medical technology industry, there are several different sectors. Different sectors have different behaviors and regulations in doing business. Major sectors include cardiovascular devices, orthopedic devices and equipment, diagnostic imaging equipment, radiationtherapy equipment, and device delivery system.

The medical technology industry differentiates itself from other industries as follows. First, the rapid technology innovation requires the significant resources to be spent on R&D, making it very difficult for small firms to compete directly with larger firms on broad based platforms. As a result, small firms generally focus on single or platform product innovations in a specific clinical or therapeutic niche and expect larger firms to recognize its potential. Also, the execution and timing of the technology will be critical to the value of the company. Second, high market barriers make it very difficult for small firms to access sales and distribution channels. Fundamental issues involved in marketing are the relationships between sector practices and patient health, public health and the role of government. These relationships are difficult for small companies to handle. Third, the procurement process for medical technology products is complex and varies significantly among countries and the purchasing decision usually involves many individuals. Forth, regulatory and reimbursement systems vary in major countries and set barriers for start-ups to commercialize and large corporations to expand business. In sum, value creation in the medical technology industry is not an easy task. Only the firms which are able to identify new markets, develop novel technology, obtain regulatory approval, and have reimbursement for their products will have value. Accordingly, the survival of start-ups is more difficult in the medical technology industry than those in other industries. These small firms are prime target for acquisitions by large firms which seek to grow and expand into new areas or increase market share in existing areas. In terms of competitive advantages, small firms drive product development while larger firms excel in manufacturing, marketing and sales.

In sum, because of sector differences, R&D intense, market barrier, complexity of supply chain, different regulatory approval and reimbursement systems, the medical technology industry is representative in M&A activities compared with other industries.

2.4 Preliminary framework

The purpose of the proposed framework is to present sources of synergies from a resource-based view, strategies to integrate these resources and synergies captured under each strategy. It links the resource possession of two firms before the acquisition to the resource exploitation after the acquisition.

The preliminary framework identifies a resource list for potential synergies in the future, which includes five resources identified by Capron et al. (1998). However, financials are not selected as it can seldom create value for shareholders of the acquiring firms. Before the acquisition, resources which are possessed by two firms can be categorized into two types: similarity (Rumelt, 1984) and complementarity (Barney, 1986). Each resource which contributes to synergies has these two attributes. According to resource possession, acquiring firms develop strategies to exploit resources in integration to achieve synergies. Strategies including asset divestiture and resource redeployment are determined by the attributes of each resource. Under every strategy for a particular attribute of each resource, the value of synergies captured is compared with the one expected as three categories: more, similar and less.

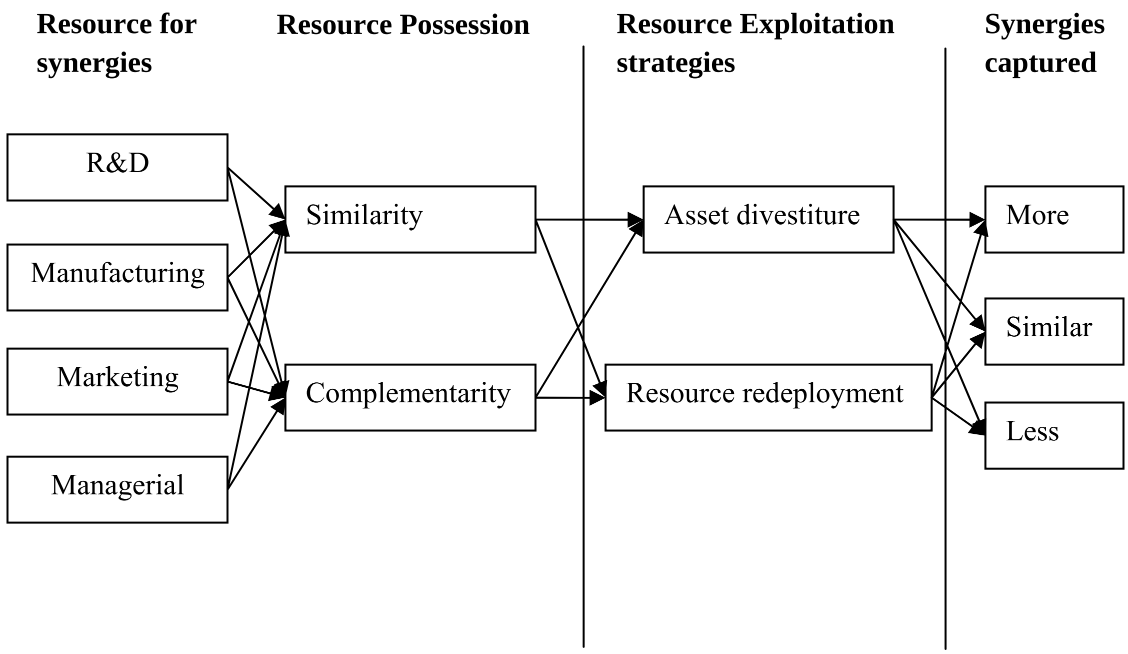

Fig. 1 Preliminary framework

In this preliminary framework, research is combined to explore the process and the nature of capturing synergies from a resource-based view. Clearly, more work is necessary to test the framework, develop each block and demonstrate its utility. However, it can be seen to fill in the research gap of the relationships between strategies in acquisitions and synergies captured in integration. It develops a resource map of two firms before the acquisition and shows the changes of each resource in integration with the effect on the value of synergies achieved. Finally, it offers outlines to support companies to identify useful resources and handle them effectively with the objective of capturing synergies for shareholders of the acquiring firms.

3 Methodology and Research Approach

3.1 The case study approach

Multiple case study approach was selected for three reasons. First, the method is appropriate for answering "how" and "why" questions (Yin, 2009). Second, it offers an opportunity to test and explore the preliminary framework with first-hand data. Third, it facilitates the collection of rich data through multiple case studies to provide a comprehensive understanding of each block in the preliminary framework.

The case study firms were selected on the basis of criterion sampling, a purposeful sampling (Patton, 2002). The selection of cases should meet a set of priori criteria which are important to the research. Specifically, the firms should be: (1) the two companies should not have equity based relationship before the deal. (2) the deal achieved at least some synergies to shareholder of acquiring firms at a period after the deal from the interviewees' perspective. (3) all the business area of acquiring firms involved in acquisitions are from developed countries to reduce the regional impact. (4) all the cases should be in major sectors in the medical technology industry.

With the criterion sampling strategy, 7 cases were selected and spanned in four MNCs. These four companies are in three major sectors: radiationtherapy, orthopedics and delivery systems and all the people involved in acquisitions are based in the UK.

3.2 Data Collection and Analysis

Observing recommendations of Yin (2009), data were collected from a variety of sources, including 30 in-depth personal semi-conducted interviews, archival data in acquisitions, and field visits. About 5 interviews in each case were conducted, amounting to a total of 40 in-depth personal interviews with director of Business Development, Integration leader (Director of Product Managers in most cases) or CFO in the acquiring firms. All these executives were chosen due to their direct experiences of the acquisitions.

Data were collected on the basis of the preliminary framework from three dimensions: resource possession of two companies, strategies in integration, synergies expected and achieved. The data analysis was in six steps. First, fully transcribed the taped interviews as sources of case analysis. Second, conducting within case analysis by summarizing and comparing interviews within one case (Miles and Huberman, 1994). Third, analyzing interviewee's feedback on within case analysis to check the validity of the description. Fourth, comparing the interview findings with the preliminary framework to identify potential modifications and fulfillment to the framework. Fifth, cross-case analysis among all the case to identify similarity and differences to generalize the findings. Sixth, refining the preliminary framework according to both within case analysis and cross case analysis.

3.3 Quality of findings

In order to ensure the quality of the case study findings, numerous practices were used to increase the validity and reliability of the evidence. Specifically, the preliminary framework which is derived from literature was used to structure the list of questions in semi-conducted interviews. Also, the evidence was acquired from three sources of evidence (interviews, archives and field visits) and from different key people in acquisitions (Director of Business Development, Director of Product Development and CFO) to present a thorough view of each case. Further, the data collected were compared across cross-case studies and against to the preliminary framework. In addition, the quality of findings was also safeguarded by organizing the procedures of data collection, the use of a case study protocol throughout the data collection process, and the circulation of case study reports to respondents (Healy & Perry, 2000; Yin, 2009).

4 Discussions

4.1 The sector and firms investigated

With regarding to sampling criterion, four companies in the three medical technology industrial sectors were selected in total of seven cases (Table 2). All the acquiring firms are public companies and the key people in doing acquisitions were involved in the offices in the UK.

Table 2

Descriptions of M&A cases as samples

Case No.	Acquiring firm	Year of foundation	No. of employees	Target firm	Year of foundation	Number of employees	Firm Type	Region	Time of the deal	Deal value	Sector
A1	Firm A	1972	2,000	Target A1	1995	20	Private	Germany	Dec., 2005	€20M in cash and €5M earnout	Radiotherapy
A2	Firm A	1972	2,000	Target A2	1991	26	Private	Italy	Mar., 2007	€10M in cash and €8 earnout	Radiotherapy
B1	Firm B	1886	114,000[4]	Target B1	1895	5,300	Public	UK	July, 1998	$35.00 per share and $3.5 in total	Orthopedics
B2	Firm B	1886	114,000[5]	Target B2	1978	280	Private	UK	Dec., 2009	Undisclosed amount[6]	Orthopedics
C	Firm C	1856	10,000	Target C	2001	830	Private	Switzerland	Mar., 2007	$889M in cash	Orthopedics
D1	Firm D	1940	7,500	Target D1	1998	110	Private	China	Nov., 2008	N/A[7]	Delivery system
D2	Firm D	1940	7,500	Target D2	2001	2000	Private	US	Dec., 2004	$925M in cash	Delivery system

[4] Number of employees in total but not in the medical field

[5] Number of employees in total but not in the medical field

[6] Not revealed by Firm B but were paid in cash

[7] Complicated because of the complex business environment in that country. The amount is difficult to estimate

4.2 Resource list

In the preliminary framework, resources which contribute to synergies are categorized as R&D, manufacturing, marketing and managerial (Capron et al., 1998). However, this categorization is too general to explore the nature of synergies and ways to achieve synergies. Besides, it hasn't shown the importance or the degree of contribution of each resource to the synergies captured. As such, a detailed resource list with the importance of each resource regarding to achieve synergies is developed on collected data (Table 3).

Table 3
Resource list for cases
(The number of ▲ refers to the degree of contribution to synergies captured; Blank refers to the resource in which acquiring firms haven't considered as contributing to synergies)

	Case A1	Case A2	Case B1	Case B2	Case C	Case D1	Case D2
Products	▲▲	▲▲	▲▲	▲▲	▲	▲▲	▲
R&D	▲▲	▲▲	▲▲	▲	▲	▲	▲
R&D Capabilities	▲▲	▲▲	▲▲	▲▲	▲	▲▲	▲
Suppliers	▲	▲	▲▲	▲	▲▲	▲▲	▲▲
Production	▲▲	▲	▲▲	▲	▲▲	▲▲	▲▲
Distributors	▲	▲	▲▲	▲	▲▲	▲▲	▲▲
Direct Sales	▲▲	▲	▲▲	▲	▲▲	▲▲	▲▲
Market access	▲	▲	▲▲	▲	▲▲	▲▲	▲
After-sale service	▲	▲	▲	▲	▲	▲	▲
Support Functions	▲	▲	▲	▲	▲	▲▲	▲
Managerial skills			▲▲			▲▲	

Obviously, three patterns of acquisitions can be seen from Table 3: Product development oriented (including product portfolio, R&D and R&D capabilities), manufacturing network and market access. Some acquisitions (Case A2, Case B2, and Case D2) focus on only one pattern. In Case A2, the objective of Company A in acquisition was to change Target A2 into a "cost centre" by keeping only R&D group because acquiring the products of Target A2 were the primary motive of this acquisition and there were too much overlap on the other resources. Therefore, resources on products, R&D and R&D capabilities contributed most to the synergies in this case. Case B2 was a domestic acquisition in which manufacturing network and market access were relatively less important. The motive of this acquisition was to obtain the innovation capabilities of the R&D group and its corresponding products. To this extent, product development is the pattern of Case B2. The motive of Case D2 was to achieve economies of scale and scope in manufacturing network. Thus, all the resources which were related to manufacturing network account for major synergies in acquisitions.

However, for other cases (Case A1, Case B1, Case C and Case D1), they concentrated on mixed patterns. The target company in Case A1 was a small company but had complementary products and technology to Company A and their market was expected to grow rapidly in the next a few years. Also, Target A1 had manufacturing sites in Germany which are complementary to the sites of Company A in the UK. Hence, product development and manufacturing network contributed most to synergies. Case B1 was an acquisition in which a small business of a large corporation (Company B) acquired another large corporation (Target B1). As the business of Target B1 was much stronger than that small sector of Company B, Company B needs nearly everything from products, R&D, manufacturing to market access to strengthen its weak business sector. In Case C, Company C acquired Target C to build an international image, access market in Europe, and achieve efficiencies in manufacturing network. Therefore, resources regarding to manufacturing network and market access generated most synergies. Case D1 was an acquisition of acquiring a private firm in a developing country. From products, to manufacturing and to market, Target D1 was totally complementary to Company D. In this case, all the resources can be great contributions to synergies.

4.3 Typology of resource possession of two companies

The second block in the preliminary framework is "resource possessions for both companies". Similarity (Rumelt, 1984) and complementarity (Barney, 1986) can both bring economic benefits to the shareholders of the acquiring firms (Tanriverdi and Venkatraman, 2005). However, nearly for all the cases, there is another type of resource possession: overlap, which refers to a situation in which part of the resources are similar but the left part are complementary. In interviews, we asked the interviewees to mark each resource as "Similar", "Overlap" and "Complementary". Details for resource possession for cases are summarized in Table 4.

Table 4 Resource possession for cases
(SI-Similarity, OV-Overlap, CO-Compelementarity)

	Case A1	Case A2	Case B1	Case B2	Case C	Case D1	Case D2
Products	CO	OV	OV	OV	SI	CO	CO
R&D	OV	OV	OV	OV	SI	CO	CO
R&D Capabilities	CO	OV	CO	CO	SI	CO	CO
Suppliers	CO	SI	CO	SI	CO	CO	OV
Production	CO	SI	OV	SI	CO	CO	OV
Distributors	CO	SI	CO	SI	CO	CO	OV
Direct Sales	CO	OV	CO	SI	CO	CO	OV
Market access	CO	CO	CO	OV	CO	CO	OV
After-sale service	CO	OV	OV	OV	OV	CO	CO
Support Functions	SI	SI	OV	SI	OV	OV	OV

Managerial skills	CO	CO

Reviewing Table 4 independently, it is easily to identify that the situation of complementary and overlap resources are much more than that of resources of similarity. As such, for most cases in the medical technology industry, the motivation of acquiring firms is to get complementary assets and capabilities but not from the similarity as a pure consolidation. Also, similar resources are always in product development pattern and manufacturing network pattern. It is difficult to have similarity in market access in acquisitions. One possible explanation is that market access includes market for different products and different regions but two primary motives of acquisitions are to fulfill product portfolio and expand market in geography.

Compared with Table 3, if relating contribution of each resource to synergies to its situation of resource possession of two firms, it comes to a conclusion that resources which are overlap and complementary contribute most to the synergies in the medical technology industry. It is reasonable as the medical technology industry is not a mature industry and diversification is still a major strategy for companies to maintain their competitive advantages.

4.4 Themes of strategies in integration

The third part of preliminary framework is strategies to integrate the two businesses. Resource interactions take a key role to capture synergies in integration (King et al., 2008). Capron et, al. (1998, 2001) proposed the concept of “asset divesture” and “resource redeployment”. They are two methods to change resources of two firms to obtain synergies in general. However, because of different possession of each resource in two firms, the strategy to integrate cannot fit into the two methods.

In the interviews, we reviewed a series of activities which acquiring firms took to integrate resources and explored four strategies underlying.

- Keep
  Acquiring firms kept the resource of the target without changes.
- Divest
  The resource of acquiring firms or target firms is divested thoroughly.
- Rationalization
  Mixed strategy improves efficiency by reduce duplication and transfer resources
- Develop
  Not simply combine the two businesses but try to develop competitive advantage of the new firm based on the integrated resources

Table 5

Strategies for each resource in integration for cases
(Keep -KP, Divest-DT, Rationalization-RN, Develop-DP)

	Case A1	Case A2	Case B1	Case B2	Case C	Case D1	Case D2
Products	KP	RN	RN	RN	RN	KP	KP
R&D	RN	RN	RN	RN	RN	DP	KP

R&D Capabilities	KP	KP	KP	KP	RN	DP	KP
Suppliers	KP	DT	RN	RN	KP	KP	RN
Production	KP	DT	DT[8]	DT	KP	KP	RN
Distributors	RN	RN	RN	RN	RN	KP	RN
Direct Sales	RN	RN	KP	RN	RN	KP	RN
Market access	KP	KP	DP	DP	DP	DP	RN
After-sale service	RN	RN	RN	RN	RN	DP	RN
Support Functions	DT	DT	RN	DT	RN	RN	RN
Managerial skills			DP			DP	

Compared Table 5 with Table 4, it is obviously that strategies have a close relationship with resource possession, attributes of resources and size of the target company. For example, in the resource of products, acquiring firms tend to use “Keep” strategy for complementary products, and “Rationalization” for products with overlap. However, for Case C, the size of Target C was not small and it was an acquisition with median deal value. Therefore, some products of Target C were even stronger than products of Company C and it is rational to use “Rationalization” rather than simply “Divest”.

4.5 Differences between synergies expected and achieved

After implementing different strategies to resources, the synergy gap is described based on comparing the expected synergies with captured synergies, which is a primary reason for the failure to bring benefits to shareholders of acquiring firms.

In interviews, interviewees differentiated “More”, “Similar” and “less” to show differences between synergies in expectation and capture based on their knowledge and understanding of the acquisition (Table 6).

Table 6

Synergies captured compared with expected for each resource

(More, Similar, Less)

	Case A1	Case A2	Case B1	Case B2	Case C	Case D1	Case D2
Products	Similar	Less	Similar	Similar	Similar	Similar	Similar
R&D	Similar	Similar	Similar	Similar	Similar	More	Similar
R&D Capabilities	Similar	Similar	Similar	Similar	Similar	More	Similar

[8] Divest the production lines of the Company B because they were much less stronger

Suppliers	Similar	Similar	Similar	Similar	Similar	Similar	Similar
Production	Similar	Similar	Similar	Similar	Similar	Similar	Similar
Distributors	Less	Similar	Similar	Similar	Less	Similar	Similar
Direct Sales	Less	Less	Similar	Similar	Less	Similar	Similar
Market access	Similar	Less	Similar	Similar	Less	Similar	Similar
After-sales service	Similar	Similar	Similar	Similar	Similar	Similar	Similar
Support Functions	Similar	Similar	Similar	Similar	Similar	Similar	Similar
Managerial skills			Less			Less	

From Table 6, four trends are identified. First, it is difficult to capture relating to market access and sales related (Case A1, Case A2, and Case C). In Case A1, the captured synergies in distributors and direct sales were less than expected. Both of these resources were related to sales (Distributors are indirect sales). There were two possible reasons for this. First, internal-selling. After acquisition, the products of Target A1 became party products, which were supposed to be sold to Company A with an internal discount. This hadn't been expected. Second, cross-selling. It took time for customers to accept products from another part of the new combined entity. Compared with Case A1, Case A2 lost synergies both in market access and sales. A drop in synergies from sales had similar reasons with Case A1. One possible reason for Case A2 to lose part of synergies from market access was that major customers of Target A2 were competitors of Company A. They could not accept their suppliers became part of their competitor and didn't believe Company A would continuously supply them. The failure of Case C in capturing synergies in both market access and sales was because Company C didn't expect that Target C had a compliance issue on relationships with surgeons.

Second, synergies from managerial skills were difficult to capture even though not many case concern this (Case B1, Case D1). Both acquiring companies in Case B1 and Case D1 had high expectations on benefits derived from managerial skills from the target companies. However, because of the culture conflicts, the acquiring firms felt difficult to absorb these soft skills. In Case B1, Company B failed in keep key people from Target B1. In Case D1, although Company D worked hard to get used to local culture but still felt lack of competency in understanding and learning managerial skills in local businesses.

Third, synergies from products could be a problem (Case A2). Normally, synergies from products are relatively easy to capture compared with other resources. However, for Case A2, Target A2 was using a different regulation system which is different from Company A. Company A thought they could implement their regulations directly after acquisition. But it didn't work in integration.

Forth, synergies sometimes were underestimated in R&D and R&D capabilities (Case D1). In Case D1, Target D1 was in China and had strong R&D capabilities in developing products with low cost and good enough quality. Company D didn't have a reasonable estimation on synergies from R&D and R&D capabilities and wrongly underestimated it.

Two years after acquisition, Company D made it into a global R&D low cost centre to design products for developing countries and it brought much more synergies than expected.

4.6 New framework

If integrating the four tables (Table 3, Table 4, Table 5 and Table 6) together, the preliminary framework is revised into Table 7. In order to visualize the results, three colors are used to show the gaps between synergies captured and expected. “Yellow” is used to the situation when the captured synergies are more than expected synergies. “Green” indicates the two values are equal and “Red” means not all the expected synergies are achieved in integration.

Table 7 Strategies in capturing synergies in acquisitions from a resource-based view
(More- Yellow; Similar – Green; Less- Red)

Resources	Possession	Resource Exploitation			
		Keep	Divest	Rationalization	Develop
Products	Similar				
	Overlap				
	Complementary				
R&D	Similar				
	Overlap				
	Complementary				
R&D Capabilities	Similar				
	Overlap				
	Complementary				
Suppliers	Similar				
	Overlap				
	Complementary				
Production	Similar				
	Overlap				
	Complementary				
Distributors	Similar				
	Overlap				
	Complementary				
Direct sales	Similar				
	Overlap				
	Complementary				
Market access	Overlap				
	Complementary				
After-sale service	Overlap				
	Complementary				
Support functions	Similar				
	Overlap				
Managerial skills	Complementary				

If reviewing Table 7 in row, several features can be derived. First, three strategies are commonly successfully used in integrating similar resources: Keep, Divest and Rationalization. Acquiring companies using these three strategies to integrate similar resources can have accurate estimation on synergies. Second, acquiring firms with overlap in assets (products, R&D, suppliers, production, distributors, direct sales, market access, after-sale service and support functions) mostly choose rationalization or divest as primary strategies and can have successful estimation. However, sometimes, in market access, acquiring companies may develop the integrated business but with a high risk in achieving synergies. If overlap is in R&D capabilities, acquiring firms prefer to keep the capability of the target as the medical technology industry is still a technology intensive industry. Third, three strategies on complementary resources are commonly used but result in quite complicated situations. It seems that rationalization of complementary resources doesn't bring a problem for failure of acquisitions. However, "Keep" and

“Develop” are not only risks but also opportunity for acquiring firms to obtain synergies in acquisitions. It can bring more synergies than expected but also not achieve all the expected synergies.

If reviewing Table 7 in column, “Rationalization” is most popular used in acquisitions in the medical technology industry. “Divest” is a safe strategy as it can let the acquiring companies has an accurate estimation on synergies achieved but it only used when two companies have similar resources and the size of one company is relatively very small compared with the other. Failure in capturing synergies is likely to be in products, sales related, market access and managerial skills. There might be more synergies captured under the strategies of “Keep” and “Develop”. Also, some strategies derive complicated results in capture of synergies. Some cases achieved expected synergies for complementary market access by “Keep” but some cases failed to get expected synergies in the same strategy. Similar phenomenon also happens in the strategies of “Rationalization” and “Develop”.

5 Conclusions

This paper explores the strategies to integrate two companies and compares the expected synergies with captured synergies under each strategy in acquisitions in the medical technology industry from a resource-based view. First, it starts with developing a full resource list to show details of resources which can contribute to synergies in acquisitions and mark each resource with the degree of contributions. This resource list is tailored to the medical technology industry and fulfills details in the resource typology in literature. Second, based on the two types of resource possession, a third resource possession type “Overlap” is proposed to describe when part of the resource of two companies are similar but part is complementary. Third, four strategies in integration are developed as “Keep”, “Divest”, “Rationalization” and “Develop”, which reflect the strategies of integration much better than “asset divesture” and “resource redeployment” developed in the literature. The results of capturing synergies under each strategy for each resource are also summarized. Finally, an integrated framework which shows the relationships among resources, strategies and capture of synergies is developed based on the preliminary framework. This framework firstly link resource, strategy and synergies together to reveal the nature of capture of synergies from a strategic management perspective.

It is important to recognize that findings based on only seven cases cannot provide robust validation of the framework and further work is undoubtedly needed to test issues in discussion to develop a more validated framework. Also, the work of this study is encouraged to be test in other industries without only being limited in the medical technology industry. Nevertheless some initial steps have been taken in providing a structure and framework for mergers and acquisitions in the medical technology industry from the strategic management perspective by using a robust resource-based theory. The framework also offers the opportunity to develop tools to support more systematic and comprehensive selection and execution of mergers and acquisitions.

References

Anand J, & Singh H. (1997). Asset redeployment, acquisitions and corporate strategy in

declining industries. *Strategic Management Journal*, Summer Special Issue 18, 99–118.
Angwin, D. (2007). *Mergers and Acquisitions*. Oxford: Blackwell Publishing.
Barney, J. B. (1986). Organizational culture: Can it be a source of sustained competitive advantage? *Academy of Management Review*, 11, 791-800.
Barney, J. B. (1988). Returns to bidding firms in mergers and acquisitions: Reconsidering the relatedness hypothesis. *Strategic Management Journal*, 9, 71-78.
Barney, J.B. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17, 99-120.
Bowman, E. H., & Singh, H. (1993). Corporate restructuring: Reconfiguring the firm. *Strategic Management Journal*, 14(S1), 5-14.
Bradley, M., Desai, A. & Kim, E.H. (1988). Synergistic gains from corporate acquisitions and their division between the stockholders of target and acquiring firms. *Journal of Financial Economics*, 21, 3-40.
Brouthers, K.D. (2002). Institutional, cultural and transaction cost influences on entry mode choice and performance. *Journal of International Business Studies*. 33, 203–221.
Carpon, L. (1999). The long-term performance of horizontal acquisitions, *Strategic Management Journal*, 20, 987-1018.
Capron L, & Hulland J. (1999). Redeployment of brands, sales forces and general marketing expertise following horizontal acquisitions. *Journal of Marketing*, 63, 41–54.
Capron, L. & Pistre, N. (2002). When Do Acquirers Earn Abnormal Returns?. *Strategic Management Journal*, 23, 781–794.
Capron, L., Dussauge, P., & Mitchell, W. (1998). Resource redeployment following horizontal acquisitions in Europe and North America, 1988-1992. *Strategic Management Journal*, 19, 631-661.
Chatterjee, S. (1986). Types of synergy and economic value: the impact of acquisitions on merging and rival firms'. *Strategic Management Journal*, 7, 119-139.
Chatterjee, S. (1992). Sources of value in takeovers: Synergy or restructuring implications for target and bidder firms'. *Strategic Management Journal*, 13(4), 267-286.
Cording, M., Christmann, P., & King, D. R. (2008). Reducing Causal Ambiguity in Acquisition Integration: Intermediate Goals as Mediators of Integration Decisions and Acquisition Performance. *Academy of Management Journal*, 51(4), 744-767.
Datta, D. K. (1991). Organizational fit and acquisition performance. Effects of post-acquisition integration. *Strategic Management Journal*, 12, 281-297.
Denrell, J., Fang, C., & Winter, S.G. (2003). The economics of strategic opportunity. *Strategic Management Journal*, 24, 977–990.
Dyer, J., & Singh, H. (1998). The relational view: cooperative strategy and sources of interorganizational competitive advantage. *Academy of Management Review*, 23, 660-679.
Eccles, R. G., Lanes K. L., & Wilson T. C. (1999). *Are you paying too much for that acquisition?* Boston: Harvard Business Press.
Eschen, E. & Bresser, R. K. F. (2005). Closing resource gaps: towards a resource-based theory of advantageous mergers and acquisitions. *European Management Review*, 2(3), 167-178.
Fowler, K.L., & Schmidt, D.R. (1989). Determinants of tender offer post-acquisition financial performance. *Strategic Management Journal*, 10(4): 339-350.

Gaughan, P. A. (2007). *Mergers. Acquisitions, and Corporate Restructuring*. Hoboken, New Jersey: John Wiley & Sons.
Grant, R. M. (1991). The resource-based theory of competitive advantage. *California Management Review*, 33(3), 114-135.
Grant, R. M. (2003). Strategic planning in a turbulent environment: evidence from the oil majors. *Strategic Management Journal*, 24(6), 491-517.
Harrison, J., Hitt, M., Hoskisson, R., & Ireland, R. (1991). Synergies and post-acquisition performance: Differences versus similarities in resource allocations. *Journal of Management*, 17(1), 173-190.
Harrison J, Hitt M, Hoskisson R, Ireland R. (2001). Resource complementarity in business combinations: extending the logic to organizational alliances. *Journal of Management*, 27: 679-690.
Haspeslagh, P. & Jemison, D. (1991). *Managing Acquisitions: Creating value Through Corpora Renewal*. New York: Free Press.
Hennart, J. F. (1988). A transaction costs theory of equity joint ventures. *Strategic Management Journal*, 9, 361-374.
Hennart, J. F., & Park, Y. R. (1993). Greenfield vs. acquisition: The strategy of Japanese manufacturing investment in the United States. *Management Science*, 39, 1054-1070.
Higgins, R. C. & Schall, L. D. (1975). Corporate bankruptcy and conglomerate mergers. *Journal of Finance*, 30, 93-113.
Hitt, M. A., Hoskisson, R. E., Ireland, R. D. & Harrison, J. S. (1991). Effects of Acquisitions on R&D Inputs and Out- puts. *Academy of Management Journal*, 34, 693-706.
Hitt, M. A., Hoskisson, R. E., Johnson, R. A. & Moesel, D. D. (1996). The Market for Corporate Control and Firm Innovation. *Academy of Management Journal*, 39, 1084-1119.
Jarrell, G. A.. J. A. Brickley. & J. M. Netter. (1988). The market for corporate control: The empirical evidence since 1980. *Journal of Economic Perspectives*. 2, 49-68.
Jemison, D. G., & Sitkin, S. B. (1986). Acquisitions: The process can be a problem. *Harvard Business Review*, 64(2), 107-116.
Jensen, M. C. and Ruback, R. S. (1983). The market for corporate control. *Journal of Financial Economics*, 11(1), 5-50.
Karim, S., & Mitchell, W. (2000). Path-dependent and path-breaking change: reconfiguring business resources following acquisitions in the U.S. medical sector, 1978-1995. *Strategic Management Journal*, 21(10-11), 1061-1081.
King, D. R., Slotegraaf, R. J., & Kesner, I. (2008). Performance Implications of Firm Resource Interactions in the Acquisition of R&D-Intensive Firms. *Organization Science*, 19(2), 327-340.
Larsson, R., & Finkelstein, S. (1999). Resource Perspectives on Mergers and Acquisitions : A Case Survey of Synergy Realization. *Organization*, 10(1), 1-26.
Lubatkin, M. (1983). Mergers and the Performance of the Acquiring Firm. *Academy of Management Review*, 8(2), 218.
Lubatkin, M. & O"Neill, H. M. (1987). Merger strategies and capital market risk. *Academy of Management Journal*. 30, 665-684.
Mitchell, W. (1994). The dynamics of evolving markets: The effects of business sales and age dissolutions and divestitures. *Administrative Science Quarterly*, 39, 575–602.

Mizik, N., & Jacobson, R. (2003). Trading Off Between Value Creation and Value Appropriation: The Financial Implications of Shifts in Strategic Emphasis. *Journal of Marketing*, 67 (January), 63–76.
Morck, R., Shleifer, A., & Vishny, R. W. (1990). Do managerial objectives drive bad acquisitions. *Journal of Finance*, XLV (1), 31-48.
Pablo, A. L. (1994). Determinants of acquisition integration level: A decision-making perspective. *Academy of Management Journal*. 37, 803-836.
Pan, Y., Tse, D.K. (2000). The hierarchical model of market entry modes. *Journal of International Business Studies*. 31, 535–554.
Panzar, J. C. & Willis, R. D. (1981). Economies of scope. *American Economic Review*, 71 (2), 268-272.
Rumelt, R. P. (1984). Toward a strategic theory of the firm. In R. Lamb (ed.), *Competitive strategic management*: 556-570. Englewood Cliffs: NJ: Prentice-Hall.
Sankaran, K. (1993). *Synergy in Mergers and Acquisitions: Cluster-analytically Derived Diversification Strategy Archetypes and Performance Implications*. Unpublished PhD Dissertation, Ohio: Kent State University.
Sankaran, K. & Vishwanath, S. R. (2008). Diversification via Acquisition. In Chandrashekar Krishnamurti, & Vishwanath, S. R. (ed). *Mergers, acquisitions and corporate restructuring*. Sage Publications, 1-22.
Schoenberg, R. (2006). Measuring the Performance of Corporate Acquisitions: An Empirical Comparison of Alternative Metrics. *British Journal of Management*, 17(4), 361-370.
Schweizer, L. (2005). Organizational Integration of Acquired Biotechnology Companies into Pharmaceutical Companies: The Need for a Hybrid Approach. *Academy of Management Journal*, 48(6), 1051.
Schweiger, D. M. & Walsh, J. P. (1990). Mergers and Acquisitions: An Interdisciplinary View. In B. B. Shaw and J. E. Beck (eds.), *Research in Personnel and Human Resources Management*, 8. JAI Press, Greenwich CT.
Seth, A. (1990). Sources of value creation in acquisitions: An empirical investigation. *Strategic Management Journal*, 11(6), 431-446.
Singh. H., & Montgomery, C. A. (1987). Corporate acquisition strategies and economic performance. *Strategic Management Journal*, 8, 377-386.
Sirower, M. L. (1997). *The Synergy Trap: How Companies Lose the Acquisition Game*. Free Press: New York.
Song, X. M., Cornelia, D., Sangphet, H., and Roger, C. (2005). Marketing and Technology Resources Complementarity: An Analysis of Their Interaction Effect in Two Environmental Contexts. *Strategic Management Journal*, 26 (March), 259–76.
Srivastava, R. K., Tasadduq, A. S., and Liam, F. (1998). Market-Based Assets and Shareholder Value: A Framework for Analysis. *Journal of Marketing*, 62 (January), 2–18.
Swaminathan, V., Murshed, F., & Hulland, J. (2008). Value Creation Following Merger and Acquisition Announcements: The Role of Strategic Emphasis Alignment. *Journal of Marketing Research*, 45(1), 33-47.
Tanriverdi, H., & Venkatraman, N. (2005). Knowledge relatedness and the performance of multibusiness firms. *Strategic Management Journal*. 26, 97–119.
Teece, D. J. (1987). Technological Change and the Nature of the Firm. In D. Teece (ed.),

The Competitive Challenge. Harper & Row: New York, 256–281.
Teerikangas, S., & Very, P. (2006). The Culture-Performance Relationship in M&A: From Yes/No to How. *British Journal of Management*, 17(S1), S31-S48.
Uhlenbruck, K., Hitt, M., & Semadeni, M. (2006). Market value effects of acquisitions involving Internet firms: A resource-based analysis. *Strategic Management Journal*, 27, 899–913.
Wang, L. & Zajac, E.J. (2007). Alliance or acquisition? A dyadic perspective on interfirm resource combinations. *Strategic Management Journal*, 28(13), 1291–1317.
Williamson, O. E. (1981). The modern corporation: Origins, evolution and attributes. *Journal of Economic Literature*, 19(December), 1537-1568.