

Improving Alliance Satisfaction: The Resource Alignment of IT Competency in Small Healthcare Centers

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Abstract

Title: Improving Alliance Satisfaction: The Resource Alignment of IT Competency in Small Healthcare Centers

Keywords: e-health, IT competency, alliance performance, health promotion.

Category of paper: Research paper

Purpose of the research/paper: The objective of this research is to establish whether greater deployment of resource alignments leads to more satisfactory alliance. Two research questions are proposed: (1) do organizations which use complementarity alignment more likely to be satisfied with their alliance activities compared with those which have adopted asymmetric complementarity alignment? and (2) do organizations which use complementarity alignment more likely to be satisfied with their alliance activities compared with those which have adopted asymmetric complementarity alignment?

Methodology: Case Study Interviews.

Findings: IT competency can be built into four types of IT resource alignment for cooperative alliance and different types of IT resource alignment can affect alliance performance differently. Moreover, we found that the contribution of symmetric complementary and supplementary IT competency by both the focal and partner firms had a significant positive impact on the degree of satisfaction of the focal firms.

Value of the paper: The paper will be of interest to academics, health professionals, and healthcare managers.

Number of pages: 16

Number of tables/figures: 4

Section headings: Abstract, Introduction, Literature review, Research methodology, Research findings, Discussions, Managerial Implications, Limitation, conclusions, and future directions, References.

Introduction

The development and effective utilization of IT competency as a strategic IT resource in the healthcare industry has the potential to lead to an increased accessibility to healthcare providers, improved work-flow efficiency, a higher quality of healthcare services, decreased scheduling conflicts, reduced patient waiting time, and reduction in healthcare costs and medical errors (Mantzana et al., 2007; Menachemi et al., 2006). The application of IT within the healthcare industry is commonly referred to as health informatics and it deals with the resources, tools, and methods that enable the sharing and adoption of information to deliver healthcare and promote health (UKHiS, 2004). The healthcare industry, which accounts for an important part of the economy, provides particularly complex contexts for IT competency and innovations (Davidson and Heineke, 2007; Wilson and Lankton, 2004). The healthcare industry finds its patients demanding ever-increasing convenience and quality of service (Klein, 2007) as well as faces increasing challenges to fight new infectious diseases and to serve the special needs of aging populations (Wilson and Sloane, 2007). As a result, investments in IT in the healthcare industry are growing at a rapid pace (Chiasson et al., 2007; Currie and Guah, 2006).

However, the healthcare industry has historically lagged behind other industries in the use of IT as well as the development and effective utilization of its IT competency (Carlile and Sefton, 1998; Wilson and Sloane, 2007). Despite high expectations for the value of IT in healthcare, its use remains poorly understood (Bodenheimer and Grumbach, 2003; Davidson and Heslinga, 2007) and is also a relatively under-researched area (Chiasson et al., 2007). Moreover, little is known about why certain healthcare firms have adopted and implemented IT successfully while many others have not (Miller, 2003). For example, Anderson (2000) had reported that 70% of the healthcare systems either fail or do not provide user satisfaction. Additionally, Lorenzi and Riley (2003) had revealed that truly successful healthcare information systems are rare and failures are widespread and costly. Mistakes in implementing IT can have deadlier consequences than in most other sectors as it has been reported that up to 100,000 patient deaths arising from medical errors in the US and Canada each year and similar quality problems in healthcare IT span the globe (Chaisson et al., 2007; Koppel et al., 2005; Wilson and Sloane, 2007).

Indeed, the adoption of IT as well as the development and accumulation of required IT competency in healthcare are difficult, time consuming, and expensive exercises. They may proceed slowly, and difficulties in successful adoption of IT-based healthcare competencies and innovations are well-documented (Brown et al., 2004; Lorenzi and Riley, 2004). These difficulties include: development and effective utilization of IT competency to improve the quality of healthcare processes and reduce medical errors; identifying obstacles to acceptance and continued use of IT in the healthcare industry; adapting patient-centered design principles to healthcare settings; and managing the IT competency and innovations effectively (Carlile and Sefton, 1998; Porter and Teisberg, 2004). Factors contributing to low adoption include high investment costs, productivity loss, and lack of financial incentives (Lin et al., 2005; Lin et al., 2007; Reardon and Davidson, 2007; Standing and Lin, 2007). Another important factor is the inability by these organizations to accurately estimate the business value of their investments in developing and improving their IT competency (Lin et al., 2008; Lin and Pervan, 2003; Tippins and Sohi, 2003).

Given that one key problem facing the healthcare quality is the lack of adequate and appropriate IT competency possessed by healthcare centers to deliver high quality health care to their patients (Carlile and Sefton, 1998), cooperative alliance is one strategy that can be adopted to share important resources such as IT competency among these firms (Lambe et al., 2002; Vlaar et al.,

2004). According to Lambe et al. (2002: 141), alliance is broadly defined as the “collaborative efforts between two or more firms in which the firms pool their resources in an effort to achieve mutually compatible goals that they could not achieve easily alone”. Firms undertaking cooperative alliance need to develop and build their respective IT competency in order to enhance their resource complementarity and supplementarity as well as to gain competitive advantage (Vlaar et al., 2004). Cooperative alliance is often adopted by small and medium-sized enterprises (SMEs) as a competitive strategy and is also an important strategic choice because it allows SMEs to obtain necessary resources and capabilities which they do not possess or control (Venkatraman, 1997) or which they can not develop rapidly or efficiently (Henderson and Subramani, 1999). This is often carried out to overcome the problems of resource scarcity by entering into an alliance with other firms in order to create excess value relative to their value before the pooling by combining all their resources together (Nohria and Garcia-Pont, 1991).

In the context of the healthcare industry, cooperative alliances can be adopted to share IT competency among small healthcare centers as the size of the healthcare centers consistently emerged as the clearest differentiator between adopters and non-adopters (Reardon and Davidson, 2007). This gap in adoption rates is not surprising, because large firms are in general more likely to adopt innovations (Rogers, 1995). To-date, most organizational studies of strategic resources such as IT competency have examined large firms (Reardon and Davidson, 2007) or at the individual level (Blumenthal et al., 2006). Little theoretically motivated research has examined the small healthcare centers at the organizational level of analysis (Davidson and Chiasson, 2005). Needless to say, this is a particularly worrying trend for SMEs which are widely recognized as having important roles to play in emerging economies and are generally characterized by resource constraints (Lee et al., 1999).

Therefore, the ability of firms to choose compatible IT resource profiles of alliance partners is of great importance for SMEs (Medcof, 1997). The resource fit of partners within alliances is often described as fit between partners’ key resources and those needed to be successful in alliances (Chang and Singh, 1999). For those SMEs without much IT resources or capabilities, the formation process of alliance can be partly viewed as a process to increase their tangible and/or intangible resources (Das and Teng, 2002). In such alliances, partner characteristics and IT resource alignment are likely to assume greater prominence as coordinating mechanisms since SMEs are generally facing the problem of resource scarcity. These small healthcare centers must form alliances to obtain these scarce resources such as IT competency. In particular, they do not have the resources of large healthcare firms to be able to form alliances with many partners. In addition, the large healthcare firms are more likely to have staff dedicate to tasks related to IT competency whereas small healthcare centers generally do not (Davidson and Chiasson, 2005). Rather, these small healthcare centers tend to form alliances with a small number of partners and therefore, their dependence on these partners is higher than large firms. On this backdrop, a better understanding of how different types of resource alignment affect the performances of alliances via the use of complementary and supplementary resources may assistance us in the evaluation of optimum allocations of interpartner resources for potential alliances to achieve suitable alliance resource alignments. Hence, this study aims to study the small healthcare centers in Taiwan. These small healthcare centers have formed alliances to confront the fierce competition as well as to absorb the regulatory pressure from the government sponsored agency (Bureau of National Health Insurance (BNHI)).

Literature review

Resource alignment

Four types of partner resource alignments can be derived by looking at the two dimensions of resource similarity and resource symmetry. Das and Teng (2000) argue that resource alignment is related to alliance condition and performance. SMEs are particularly in need of finding suitable partners with the dissimilar resources since they possess a lot less resources than large firms. SMEs require both dissimilar resources and similar resources via equal contribution due to their insufficient slack resources. However, Olk (1997) has pointed out that the benefits of similar resources' contribution in alliances formation have not been adequately researched and recognized in the literature. Chen (1996: p107) has defined resource supplementarity as "the degree to which two partner firms contribute resources compatible, in terms of both type and amount, to an alliance". The understanding of resource supplementarity is very important because the firms which have possessed supplementary resources can potentially be the fierce rivals (Chen, 1996). Therefore, forming alliances is one way for firms which have possessed supplementary resources to decrease interfirm rivalry. According to partner's supplementary and complementary resources contribution level, supposed interpartners only hold two kinds of resources, partner resource alignment can be classified into two types: supplementarity and complementarity (see Table 1) (Das and Teng, 2000).

Table 1: A Matrix of Inter-Partner Resource Alignment

Resource Symmetry	Resource Similarity	
	Supplementary Resource	Complementary Resource
Symmetric Contribution	1 Supplementarity	2 Complementarity
Asymmetric Contribution	3 Asymmetric Supplementarity	4 Asymmetric Complementarity

Resource supplementarity and complementarity

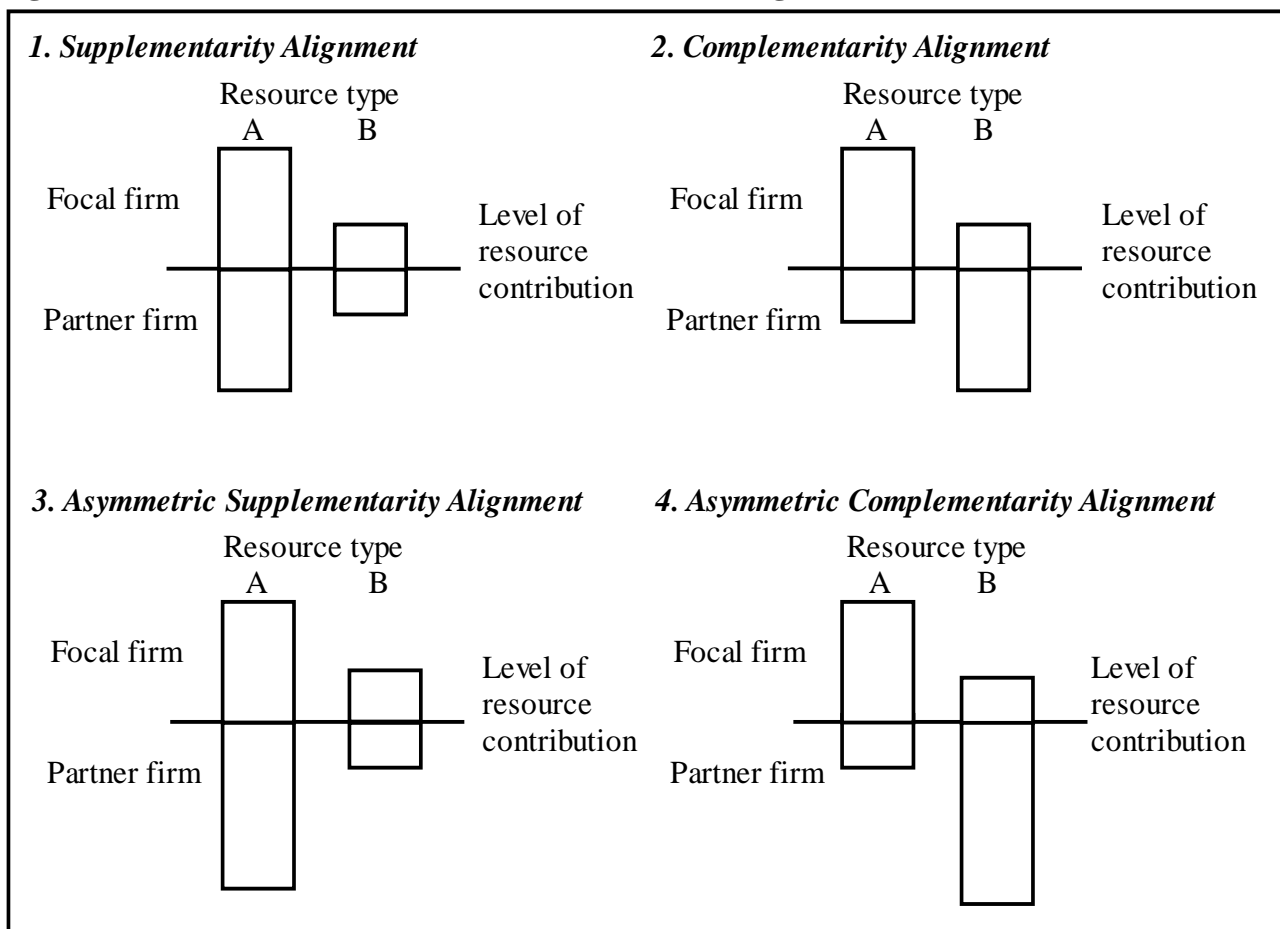
The key to the successful resource alignment of supplementarity and complementarity within an alliance is about not only the inter-partners' contribution of similar and dissimilar resources but also the attention paid by the alliance partners on the symmetric resource contribution. This is because symmetrically similar resource contribution can bring in mutual learning and cultural similarity whereas symmetrically dissimilar resource contribution can lead to similar status and creation of synergy. Thus, the partner resource alignment can be classified into four types: supplementarity, asymmetric supplementarity, complementarity, and asymmetric complementarity (Figure 1).

Supplementarity in resource alignment between partners (see part 1 in Figure 1) arises when the focal firm (the firm under study) and its partner firm contribute similar resources symmetrically. This can be an equally high or equally low contribution of similar resources by each partner firm. For example, healthcare centers may expect their hospital alliance partners to contribute equally for the procurement of expensive medical equipment. Another instance is that healthcare centers may expect to enlarge both in-patients inflow through mutual transfer and introduction of in-patients.

In addition, when the similar resources contribution of focal firm is not equal to the contribution the partner firm, the alignment is called asymmetric supplementarity (see part 3 in Figure 1). This is

often caused by status dissimilarity (Chung et al., 2000: p 4). For example, when the partner firm has greater status or power, the focal firm is often forced to pour in more similar resources to the alliance than the partner firm. In general, the focal firm in this situation tends to be dissatisfied with the amount of resources contributed by the partner firm. Asymmetric supplementarity in resource alignment will result in a lack of understanding of inter-partners' knowledge and culture base. In this situation, the opportunistic behavior and the lack of understanding in inter-partners' knowledge and culture base within an alliance will often cause conflicts. This paper argues that higher resource supplementarity can increase the levels of fairness and interorganizational learning of alliance partners and, therefore increase the alliance satisfaction. On the other hand, lower resource supplementarity (asymmetric supplementarity) can cause conflicts between inter-partners and lead to lower alliance commitment and satisfaction.

Figure 1: A Demonstration of Inter-Partner Resource Alignment



Complementarity alignment (see part 2 in Figure 1) has been the most widely researched and recognized type of resource alignment in alliances (Das and Teng, 2000). Under complementarity alignment, both partners within the alliance contribute a fair share of dissimilar resources. When the focal firm provides a high contribution in one particular type of resource, the partner firm should provide a relatively high contribution in another type of resource. Similarly, when the focal firm provides a low contribution towards one type of resource, the partner firm may follow suit by providing a relatively low contribution in another type of resource. Therefore, higher resource complementarity is likely to lead to higher alliance satisfaction.

On the other hand, when different resources are not comparably or not equally contributed, it is called an asymmetric complementarity alignment (see part 4 in Figure 1). One reason why asymmetric complementarity can happen is because of status dissimilarity (Chung et al., 2000). That is, one partner within the alliance contributes more unique resource than the other. Another reason is due to SMEs having a general lack of resources. Many SMEs may not be able to fulfill the promise of resources contribution that was agreed when the alliance was initially established (Hyder

and Abraha, 2004). This also shows the inability of SMEs to locate the required resources (Prater and Ghosh, 2005). However, there is also a risk of power and status asymmetry when SMEs form alliances with large firms. Under asymmetric complementarity when one or both partners cannot contribute enough unique resources to satisfy the others' needs, there is likely to be higher resource allocation disagreements, greater inter-partner conflicts, and lower alliance satisfaction.

Hence, the objective of this research is to establish whether greater deployment of resource alignments leads to more satisfactory alliance. Two research questions are proposed:

1. Do organizations which use complementarity alignment more likely to be satisfied with their alliance activities compared with those which have adopted asymmetric complementarity alignment?
2. Do organizations which use complementarity alignment more likely to be satisfied with their alliance activities compared with those which have adopted asymmetric complementarity alignment?

Research methodology

The healthcare industry in Taiwan has two main characteristics. First, more than 97% of healthcare providers in Taiwan are contracted with a government sponsored agency, Bureau of National Health Insurance (BNHI). Due to the financial difficulties within the national health care system in Taiwan, the costs and revenue of these small healthcare providers have been closely monitored by BNHI (Lee and Jones, 2004). BNHI's fixed-budget policy has resulted in reimbursements at rates that made these smaller healthcare centers unsustainable. That is, the payments to these small healthcare centers have been decreasing markedly each year while, at the same time, their costs have been increasing rapidly. Second, the supply of doctors, nurses, and healthcare centers, and the demand from the patients have been growing at the steady rate. With the aging of Taiwanese populations, the Taiwanese healthcare system has become flooded with patients suffering from various chronic diseases (e.g. multiple sclerosis, renal disease, cancer, diabetes). However, most patients prefer to go to bigger healthcare centers or hospitals for long-term treatments. In order to survive, many of these small healthcare centers have resorted to form alliances with medium-sized hospitals or large healthcare service providers. It has been increasingly popular for several doctors to set up a small healthcare centers via joint venture. In recent years, most of these small healthcare centers have realized that they can only compete with major healthcare centers and hospitals through cooperative alliances.

Data collection

This research targeted small healthcare centers in Taiwan. The small healthcare centers which agreed to take part in the research had all been trading for more than five years. Their contact details were obtained from the Ministry of Health database. All selected firms had formed at least one cooperative alliance with other healthcare firms in the past. In order to avoid the risks of inadvertent memory, estimation errors or subjective opinions about other firms, this study employed a dyadic analysis method (Gonzalez and Griffin, 1999). Interviews were conducted on both sides of focal-partner dyad and then responses were compared to assess resource similarity and symmetry. Other documents such as annual reports, alliance documents, meeting minutes, and other company documents were also collected during the interview process. Each of the focal firm provided the contact details for one of its key alliance partners. Three senior IT specialists (i.e. CIOs/CTOs, IT managers, and senior IT contract managers) were interviewed from the focal firm and they were from different levels of management to provide different managerial perspectives. One CIOs or IT manager was interviewed for each partner firm. The interview questions for both focal and partner firms were almost identical and were simply reworded to match the participants. The questions asked during the interviews were related to the inter-partners' IT contribution level and types, alliance benefits and satisfaction, and reasons for alliance. Then they were asked to indicate how their partner would respond to the same questions. Both focal and partner firms were notified about the rule that they were not to speak to each other about the interview questions and all agreed. In addition, participants from each of the focal-partner dyad were interviewed within 3 days of each other to minimize the risk of discussing interview questions among participants.

Specifically, the researchers devised a structured questionnaire to elicit the opinions about the level of IT competency contribution between the focal and partner firms. A focal firm was interviewed first with respect to its level of IT competency contribution within the alliance and was asked to evaluate all of its three IT competency categories. Then its partner firm was presented with almost identical questions within three days. Finally, the level of IT competency contribution by each firm was based on an exact match or agreement in the responses provided by the focal firm and its partner firm. When no agreement occurred, the level of IT competency contribution was reassessed and reconsidered by the researchers and an external expert. All the collected data and available evidence regarding the level of IT competency contribution by these dyads were taken into account by researchers and the external expert. Without prior consultation and discussions, the researchers and the external expert came up with their own exact match of IT competency for each firm. Discrepancies for a few of the dyads persisted and were subsequently discarded. In total, 31 dyads or pairs (62 firms) were matched.

IT competency alignment

As mentioned previously in the paper, this study has defined the inter-organizational resource cooperation among the healthcare centers as the unique and valuable IT competency contribution by both the focal and partner firms. According to the resource-based viewpoint, IT competency can be categorized as IT knowledge, IT operations, and IT objects (Tippins and Sohi, 2003). IT knowledge is the extent to which a firm owns a body of technical knowledge to bring desirable changes while IT operations can be considered as the extent to which a firm utilizes its IT methods, skills, and processes to manage market and customer information (Mitcham and Mackey, 1983; Tippins and Sohi, 2003). IT objects can be referred to as computer-based software, hardware, and support staff (Tippins and Sohi, 2003). In accordance with IT competency contribution by both the focal and partner firms, four types of resource alignment have been classified: (1) supplementarity concerns with the arrangement under which both the focal firm (the firm under study) and its partner firm contribute similar IT competency symmetrically; (2) asymmetric supplementarity occurs when similar IT competency contribution of focal firm has not been matched by the contribution from the partner firm; (3) complementarity alignment takes place when both partners within the alliance contribute a fair share of dissimilar IT competency; and (4) asymmetric complementarity alignment refers to the situation where different IT competency are not comparably or not equally contributed. These four types of resource alignment have been depicted in Figure 1.

The *satisfaction* construct assessed the satisfaction with both the relationship and performance between cooperative alliance partners (Cullen et al., 1995). Geringer and Hebert (1991) have found that subjective satisfaction is positively related to the objective measures of alliance performance (i.e. survival, stability and duration). In this study, we have developed a set of structured interview questions to elicit the opinions about the level of alliance performance based on subjective perception of focal firms. Questions included in the structured interview were related to the perception of the focal firm about: (1) the level of its satisfaction with its partner firm; (2) the performance of the alliance (e.g. sales volume and growth); and (3) the overall performance of its partner firm

The case study method was chosen because it enables the researcher to examine the context of the resource alignment and better understand the responses given in the interviews through observation. This serves as a method of triangulation of research data and ensures that the questions and answers are properly understood by repeating or rephrasing the questions and through paraphrasing the responses back to the interviewee (Silverman, 2001). Structured interviews were used as one of the data collection methods for the case study. The case study approach allowed the researchers to interview a range of IT specialists in each focal firm (plus one key IT personnel in each partner firm), observing practice and analyzing company reports.

Extensive notes were also taken during the interviews. Other data collected for this research included organization documents and annual reports. Qualitative content analysis (Miles and Huberman, 1994) was used to analyze the data from the case study using the constructs identified in the literature analysis. These included: IT resource contribution, IT resource type, supplementarity, complementarity, alliance benefits, and overall satisfaction with alliance. Where there were discrepancies in the interpretation of responses to the questions these were resolved by consultation between the researchers and in some cases further explanation from the interviewees.

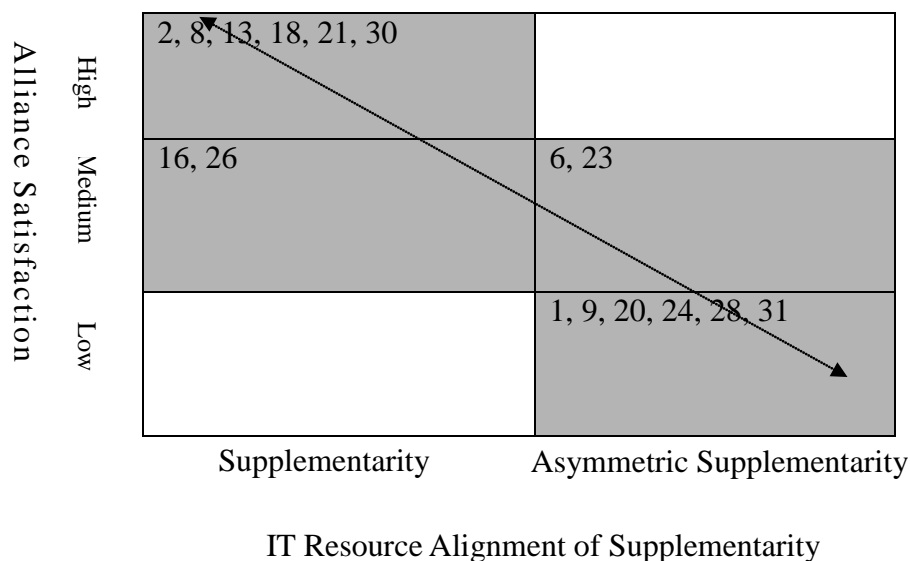
Questions relating to a particular research theme, for example, level of alliance satisfaction, were examined as a cluster. This was done as a form of in-case analysis and to develop general explanations and interpretations. These steps enhance the construct validity, reliability, and overall quality of the research (Yin, 2002). The findings from these information gathering approaches were analyzed iteratively by the researchers on an individual level, differences reconciled and then a judgment made on each of the major constructs. The responses to interview questions were rated by the researchers relative to the pool of responses. For example, interviewees were asked about the satisfaction with their resource alignment in alliance. Their answers were judged in terms of the financial significance of the organization contribution and were then compared with the results for the other organizations resulting in the categories of *low*, *medium* and *high*. Any discrepancies in the ranking of four types of IT competency alignment were resolved by consultation of an external expert. The researchers evaluated the responses from the interviews and classified them according to inter-partner resource alignment diagrams shown in Figure 1.

Research Findings

Research question one:

The first research question relates to the deployment of supplementarity alignment and its relationship with alliance satisfaction (see Figure 2). Better relationships with partners, greater business growth, and improved sales growth are the most often mentioned benefits in relation to the alliance satisfaction. Please note that each dot denotes one organization.

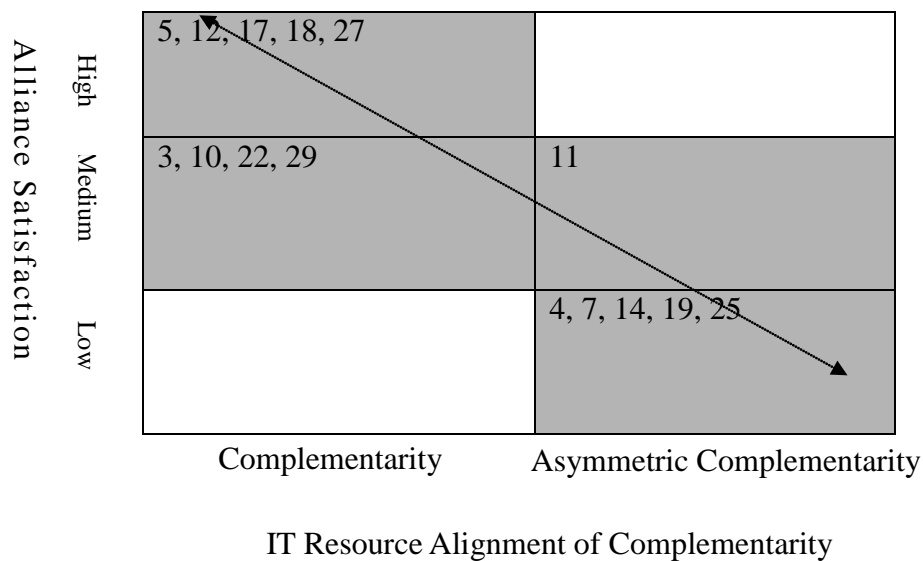
Figure 2: IT Resource Supplementarity versus Alliance Satisfaction



Research question two:

The second research question relates to the deployment of complementarity alignment and its relationship with alliance satisfaction (see Figure 3). Better relationships with partners, greater business growth, and improved sales growth are the most often mentioned benefits in relation to the alliance satisfaction.

Figure 3: IT Resource Complementarity versus Alliance Satisfaction



Discussions

Case studies were conducted and the participants were asked to answer the questions in relation to the cooperative relationship with their most important alliance partner. One contribution of the paper is that the resource alignment concept proposed by Das and Teng (2000) can be applied to the resources in IT. The sharing of IT competency as a strategic IT resource can be beneficial and valuable for the partners undertaking cooperative alliance (Vlaar et al., 2004). Our results have also revealed that contributions of the three types of IT competency (i.e. IT knowledge, IT operations, and IT objects) as suggested by Tippins and Sohi (2003) can be built into four types of IT resource alignment for cooperative alliance and that different types of IT resource alignment can affect alliance performance differently. Moreover, the empirical results have suggested that there is a positive relationship between the contribution of symmetric supplementary and complementary IT competency by the small healthcare firms and alliance satisfaction. However, the contribution of supplementary IT competency alone by the focal healthcare centers has no significant impact on alliance satisfaction.

This research has provided several insights for the IT resource alignment model selected by alliance partners in the healthcare industry. First, the results indicated that both resources supplementarity and complementarity were positively and significantly related to alliance satisfaction. Our results had not only confirmed with previous research findings (Lambe et al., 2002) but also provided the possible means of measuring resource alignment (Das and Teng, 2000; 2002). The results had shown that the small healthcare centers were more likely to select partners which had owned the requisite complementary resources. The success of the alliance can only be achieved through this sort of resource fit. Second, past research findings suggested that the criteria for complementary resource depended heavily on uniqueness and symmetry of IT resources (Johnson et al., 1996). In this research, it was found that the criteria could be applied to resource supplementarity in small healthcare centers. Therefore, the establishment of successful alliance depended not only on partners' ability to contribute unique and performing resources but also on the perception of fair dealing of these resources by the small healthcare centers.

Our findings have also revealed the complementary nature of IT resources contributed by all partners. The fact that there was a negative correlation between the supplementary IT resources provided by both the focal and partner firms indicates that the focal firms do not need supplementary IT resources provided by the partner firms. In terms of complementary IT resources, there was a positive correlation between the IT resources contributed by both the focal and partner

firms. This has showed that the partner firms are able to provide necessary IT resources to satisfy needs of the focal firms. According to Johnson et al. (1996), alliances have succeeded in pooling the required resources for partners. However, the research so far had only concentrated on complementarity in terms of dissimilar resources. This study attempted to measure resource alignment proposed by Das and Teng (2000) by examining the alliance partners' contribution in terms of both supplementary and complementary resources. The results indicated that alliance partners paid much attention on each other's ability to uniquely and symmetrically contribute both similar and dissimilar IT resources in the healthcare industry. This had a significant impact on the alliance satisfaction.

Previous research concentrated on large firms and most research assumed that these large firms paid particular attention on their partners' ability to contribute dissimilar resources (complementarity) within the alliance. These large firms regarded similar resources as the surplus resources or slack. The measurement proposed by this research had provided the means to evaluate complementarity and supplementarity in terms of similar and dissimilar IT resources. The measurement could be applied to both large firms and SMEs in other industries in the future. Finally, the establishment of successful alliance depended not only on partners' ability to contribute unique and performing IT resources but also on the perception of fair dealing of these resources by both focal and partner SMEs in the healthcare industry. This is especially true when both focal and partner firms have perceived that resource alignments have been created by the alliance.

Managerial implications

This study has several managerial implications. First, the results showed the relative importance of various aspects in choosing the appropriate alliance partners. The results from this study indicated that SMEs in the healthcare industry should be careful in selecting their alliance partners as well as in evaluating the amount of complementary and supplementary IT resources the partners are prepared to contribute to the alliance. Insufficient contribution of complementary IT resources to the alliance can often lead to failure. Therefore, these criteria can guide SMEs in their partner selection process as well as in establishing cross-border alliances.

Second, it has been argued that user satisfaction on the use of IT resources is a more accurate reflection of contentment (Scheepers et al., 2006). Clinical workers within these healthcare centers would welcome the utilizing of IT resources as long as it provides direct clinical benefits to their work and ease their work practices (Jensen and Aanestad, 2007). However, they tend to harbor negative reactions towards the IT resources if it implies new mechanisms for administrative control of their work and introduce new tasks previously performed by others (Jensen and Aanestad, 2007). For example, mandatory IT use among doctors has far more implications compared to other professional groups (e.g. nurses and clinicians) because of their traditional autonomy, legitimacy and status (Kohli and Kettinger, 2004). Therefore, it is critical for these healthcare centers undertaking cooperative alliances to implement the IT resources carefully and appropriately.

Intervention programs aimed at assisting small healthcare centers to overcome learning barriers to adopt IT resources may also be needed (Reardon and Davidson, 2007). For example, programs to develop community-based knowledge and IT resources could complement financial incentives programs and might increase their efficacy. A better understanding of the use of such resources may help design better systems, strategies, and programs that are necessary to deliver a higher quality of healthcare services. Finally, it is important to examine the roles played by doctors, nurses and clinicians in the IT resource alignment among healthcare centers as they have the power to hold back the adoption or even lead to system's failure (Mantzana et al., 2007). The decision-making process for such IT resource alignment must be taken into account of these healthcare players' points of view.

Limitations, conclusions, and future directions

While the study makes important contributions to the alliance literature, some limitations in our research need to be acknowledged. First, the choice of variables used in this study may not fully capture the complex nature of the cooperative alliance process of the healthcare environment in which SMEs operate. Second, we have used subjective measurements (i.e. satisfaction). Although several studies have found that subjective measurements were significantly positive with the objective performance (Geringer and Hebert, 1991), the results might be more generalizable with the use of objective measurements. In general, the use of perceptual measures does not present a serious limitation because this study explores different opinions among alliance partners (Gassenheimer et al., 1996). For example, the evaluations of subjective performance measurements may actually reflect different levels of actual profits.

Whatever the benefits for the healthcare industry as a whole, investments in IT resources do not always result in more patients or higher payments for adopters and thus do not always reward them with higher revenues (Davidson and Heineke, 2007). Investments in IT resources are a long term process. It is not clear whether these small healthcare centers can recoup their investment costs in the short-medium term. Unlike larger healthcare providers, it is possible that smaller healthcare centers may experience significant revenue reductions because most of the income depends on the doctor's productivity in patient encounters. The full impact of IT resources in healthcare has not yet been fully realized because of the failure to recognize the importance of cooperative alliances in the healthcare industry. It is critical for small healthcare centers to develop and implement a truly effective strategy to achieve the benefits of IT resources throughout the healthcare system via cooperative alliance (Davidson and Heineke, 2007). Therefore, efficiency in the use of existing IT resources among alliance members is of great importance for the survival of these small healthcare centers.

Finally, despite these overwhelming challenges, real improvements are occurring every day as healthcare centers work to increase the level of health care and control operational costs (Wilson and Sloane, 2007). The future focus of the study should be based on the assumption that how humans interact with technology and organizational context can be changed. This would allow the healthcare centers to extract maximize benefits from the use of IT resources. Looking beyond the healthcare industry, attention should be best directed to improving the health of the general population as a way to reduce the problems occurred at the healthcare system at the national levels in many countries. Similar to other healthcare system in other developed countries, the Taiwanese healthcare system is characterized by worsening chronic medical conditions and skyrocketing healthcare expenditures. In order to reduce the incidence of chronic diseases and control health expenditures, the focus of healthcare needs to be transferred to disease prevention and health promotion. Health promotion depends heavily on behavioral change in which people adapt to behaviors or a lifestyle that help them to maintain an optimal health status (Jalleh et al., 2005). Behavior interventions delivered, for example, via the Internet have been demonstrated to be helpful in facilitating a variety of health-related behavioral changes. Further research could be conducted to see if the healthcare centers can help in promoting healthy lifestyle in addition to deliver high quality of health care to patients through the use of IT resources.

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