

The Effects of IT Resource Alignment and Organizational Dynamism on Alliance Performance in Hemodialysis Centers

Yu-An Huang

*Department of International Business Studies, National Chi Nan University
470 University Road, Puli, Nantou 545, Taiwan
yahuang788@gmail.com*

Chad Lin

*Centre for Behavioural Research in Cancer Control, Curtin University
Curtin Health Research Campus, 10 Selby Street, Shenton Park, WA 6008, Australia
elin123au@yahoo.com.au*

Ying Chieh Liu

*Department of Information Management, Chaoyang University of Technology
168, Jifeng E. Rd., Wufeng District, Taichung, 41349, Taiwan
Email: allanliu@cyut.edu.tw*

Mei-Lien Tung

*Department of International Business Studies, National Chi Nan University
470 University Road, Puli, Nantou 545, Taiwan
men326@gmail.com*

Abstract

Alliances has the potential to assist hemodialysis centers in pooling their IT resources to achieve mutually compatible goals such as 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. The purpose of this paper is to examine how supplementary and complementary IT resource alignment affects the commitment and satisfaction of alliances. In addition, the paper examines the resource alignment framework and suggests that alliance success requires the pursuit of partners who not only own complementary IT resources but also possess supplementary resources. The results show that the focal hemodialysis centers are more likely to select partners which own the requisite supplementary and complementary IT resources. The establishment of successful alliances depends not only on partners' ability to contribute unique and performing IT resources but also on the perception of fair dealing in relation to these resources by the focal hemodialysis centers. Finally, the effect of IT resource alignment in relation to alliance performance is likely to be dependent on the level of organizational dynamism existed within the alliance.

Keywords: hemodialysis centers, healthcare, IT resource alignment, alliance.

1. Introduction

Many organizations are turning to alliances as a strategy to confront a competitive environment that is characterized by blurring industry boundaries, fast-changing technologies, and global integration.¹

According to Lambe *et al.*² (p141), the term *alliance* is broadly defined as the “collaborative efforts between two or more organizations in which the organizations pool their resources in an effort to achieve mutually compatible goals that they could not achieve easily alone”. The ability of organizations to choose alliance

partners with compatible IT resource profiles is of great importance.³ The resource fit of partners within alliances is often described as the fit between partners' key IT resources and those needed to be successful in alliances.⁴ For those organizations lacking certain resources, the development of an alliance can increase both their tangible and intangible IT resources.⁵ There are four types of partner resource alignments: supplementary, surplus, complementary, and wasteful; and that resource alignment is related to alliance performance.^{1,6}

However, the relationship between the four types of partner resource alignments and alliance performance remains unclear. Therefore, the key aim of this paper is to examine how supplementary and complementary IT resource alignment affects the commitment and satisfaction of alliances. In other words, this study seeks to examine the effects of IT complementary and supplementary resource alignment on alliance commitment and satisfaction under the resource alignment framework proposed by Das and Teng.⁶ Value generated from alliances is enhanced when partners have different IT resource profiles yet share similarities in their IT resource contributions. These partner characteristics are important since they help in the evaluation of optimum allocations of interpartner IT resources for potential alliances to achieve suitable alliance resource alignments.⁶ The focus of this study is on Taiwanese hemodialysis centers which have often formed alliances to gain business advantages as well as to absorb the regulatory pressure from the government sponsored agency.

2. Background

The socio-technical systems theory (STS) was drawn in this study to the identified issues and problems emerged from the analysis of the case study data. The socio-technical systems theory examines the introduction of innovations (e.g. B2B and IT outsourcing) into organizations from both the social and technical subsystems.¹⁵ The theory allows organizations to understand why results are meaningful and how the integration of the social and technical systems leads to improved results.¹⁶ STS has particular relevance to understand hospitals where social and technical issues have been identified as some of the key issues and problems in the implementation of B2B projects.¹⁷ The

theory provides the foundation for an investigation of the organizational, social, and technological perspectives (e.g. B2B/IT investment evaluation, B2B/IT outsourcing, user information requirements determination, organizational IT infrastructure and capabilities, environmental uncertainty, and strategic alignment and cultural similarity) that might affect the implementation of B2B and outsourcing projects in hospitals.

2.1. IT Resource Complementarity

Resource complementarity in an alliance has been defined as the extent to which the partners bring valuable and unique competencies to the alliance⁷ and the topic has received considerable attention in the literature.^{8,9} Previous research indicates that resource complementarity is crucial to the alliance success.¹⁰ The utilization of IT resources has the potential to lead to an increased accessibility to service providers, improved work-flow efficiency, a higher quality of services, and decreased scheduling conflicts.^{11,12,13,14} Clearly, one of the reasons for organizations to enter into alliances is because they lack certain resources needed to be successful in a certain area.^{2,15} As noted by Varadarajan and Cunningham,¹⁶ all partners in an alliance have complementary IT resources and each partner is able to focus on one part of the value chain where it can make the biggest contribution.

IT resource complementarity can cover both the uniqueness and symmetry of resources and is related to each partner's resource contribution to the alliance.¹⁷ Uniqueness is the most often mentioned characteristic of complementarity and refers to each partner's unique contribution to the alliance. If the resource contribution from each partner is too similar (overlapping), it will not be able to complement the other's weakness.¹⁸ Resource complementarity can help organizations to negotiate agreements to form alliances.^{19,20} Teece²¹ has argued that emerging organizations within technology-intensive industries are more likely to ensure timely introduction of new products and to marshal a full array of capabilities if they are able to exchange new rent-generating technologies with large established organizations. In essence, IT resource complementarity determines the mix of unique and valuable IT resources available to achieve strategic objectives. It can increase each partner's interdependency as well as collective

strength, and, therefore, enhance the competitive viability of the alliance.¹

Beyond the role of resource complementarity in successful alliances, each partner has to provide equal or balanced (symmetric) resource contributions. This is often referred to as “fair dealing” or “equity”.²² Fair dealing also implies risk sharing,²³ partner perceptions of equal costs and benefits in alliances,²⁴ the presence of power and status balance in an exchange relationship,²⁵ and commitment in sharing both the costs and benefits.⁸ Further implications involve partners jointly showing forbearance and flexibility in response to changing circumstance,⁹ and creating an environment of mutual trust.²² Organizations operating in a context of resource scarcity are likely to perceive other partners’ balanced share of unique IT resources as a precondition of forming an alliance. From this, organizations can determine the balance of shared risk and the costs and benefits within any alliance. A balanced share of unique resources can create a higher commitment between partners and result in increased alliance commitment and satisfaction.

2.2. Resource Alignment and Performance

The benefits of similar resource contributions in alliance formation has not been adequately researched and recognized in the literature.²⁶ Chen (p107)²⁷ has defined resource similarity as “the degree to which two partner organizations contribute resources compatible, in terms of both type and amount, to an alliance”. An understanding of resource similarity is very important because organizations which possess similar resources can potentially be fierce competitors.²⁷ Therefore, forming alliances is one way for organizations which possess similar resources to decrease competition.

Supplementarity in resource alignment between partners is when both the focal and partner organizations contribute equal similar IT resources. This can be a high or low contribution of similar resources by each partner organization. For example, hemodialysis service providers may expect their hospital alliance partners to contribute equally for the procurement of expensive medical equipment. The equal contribution of partners can increase alliance performance. Moreover, the equal share of cost and benefit can also decrease the potential for conflict as well as increase the alliance performance. When the focal organization contributes similar IT resources that are not equally matched by the

partner organization, the alignment is called imbalanced supplementarity. This will often cause conflicts and is likely to result in lower alliance performance. Thus, we draw our hypotheses as follows:

H1 Higher resource supplementarity leads to higher alliance performance.

Under complementarity alignment, both partners within the alliance contribute a fair share of unique IT resources. When the focal organization provides a high contribution in one particular type of IT resource, the partner organization does not have to follow suit. Instead, the partner organization should provide a relatively higher contribution in another type of IT resource. Similarly, when the focal organization provides a low contribution towards one type of IT resource, the partner organization should follow suit by providing a low contribution in another type of IT resource.

When different IT resources are not comparable or not equally contributed, it is called an imbalanced complementarity alignment. One reason why imbalanced complementarity can happen is because of status dissimilarity. That is, one partner within the alliance contributes more unique resource than the other. Another reason is due to organizations having a general lack of resources. Many organizations may not be able to fulfill the promise of IT resources contribution that was agreed when the alliance was initially established. However, there is also a risk of power and status asymmetry when smaller organizations form alliances with large organizations. Under imbalanced 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 interpartner conflicts, and lower alliance performance. From the discussion above, the following hypotheses are proposed:

H2 Higher resource complementarity leads to higher alliance performance.

2.3. Organizational Dynamism

Information processing theory (IPT) states that organizations are structured around information and information flows in an effort to reduce uncertainty.²⁸ Environmental uncertainty refers to the degree of heterogeneity and dynamism among the environment and is among the primary sources of uncertainty for the organization.²⁸ Organizational dynamism appears to be

a critical dimension of an organization's environment and bearing on the degree of coordination required.²⁹ It relates to the rate and pattern of changes in the organizational IS environments, including changes in end-user information needs, business processes, and organizational structures.²⁹ In an organizational environment characterized by greater dynamism, managers must cope with rapid change of user requirements and uncertainty as well as to determine which are the best long-term IT and business processes to follow, in order to successfully coordinate and execute the required tasks within the organization.³⁰¹ Highly dynamic and variable environment lead to higher uncertainty and generate information processing needs.²⁸ This can result in a high level of information processing requirements to monitor and react changes³¹ as well as a high level of information processing capacities to solve problems.³²

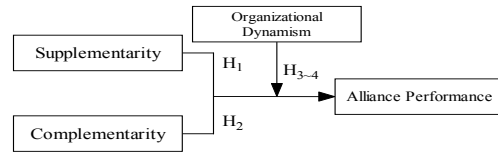
According to the IPT, increased organizational dynamism creates increased uncertainty and this needs to be handled through better formalization of systems and procedures, and through appropriate work division and allocation allowing for greater clarity in execution of task.³¹ This is consistent with past research that suggest that higher level of uncertainty requires more user involvement in processing information,³³ more time and effort to manage information,³⁴ and wider scope of and timely information.³⁵ That is, alliance projects facing higher levels of organizational dynamism may result in higher information processing costs and therefore, organizations need to obtain more information processing capacities via resource alignment. Thus, we hypothesize that:

H3 Organizational dynamism has a positive moderating effect on the relationship between resource supplementarity and alliance performance.

H4 Organizational dynamism has a positive moderating effect on the relationship between resource complementarity and alliance performance.

Figure 1 below depicts the research framework of IT resource alignment and organizational dynamism on alliance performance.

Fig 1. The Research Framework of IT Resource Alignment and Organizational Dynamism on Alliance Performance



3. Research Methodology

3.1. Data Collection

The focus of our study is hemodialysis centers in Taiwan. More than 97% of health care providers in Taiwan are contracted with a government sponsored agency. Due to the financial difficulties within the national health care system in Taiwan, the costs and revenues of these small hemodialysis providers have been closely monitored by the government agency. The government's fixed-budget policy has resulted in reimbursements at lower rates. As a result, the payments to these hemodialysis centers have been decreasing markedly each year while, at the same time, their costs have been increasing rapidly. In order to survive, many of these hemodialysis centers have resorted to forming alliances with hospitals or other healthcare service providers. It has been increasingly popular for several nephrologists to set up small hemodialysis centers as joint ventures. In recent years, most of these hemodialysis centers have realized that they can only compete with major hospitals through alliances.

Prior to determining the sample size for the survey, a pilot survey of ten industry executives was conducted. The survey was subsequently modified. A list of 368 hemodialysis centers was obtained from the Taiwan National Kidney Foundation database. Through the help of a healthcare provider, 135 hemodialysis centers were identified that had formed joint ventures or contract-based partnerships with other physicians, hospitals or healthcare providers. These 135 hemodialysis centers were classified to have formed alliances with others. The main questionnaire, accompanied by a covering letter to explain briefly the purpose and aim of the survey and a reply-paid return envelope was then sent to owner/manager of these 135 hemodialysis centers. The questionnaire asked the owner/manager or persons who were capable of representing the center to complete and

return the questionnaire. The respondents were asked to answer the questions in relation to the cooperative relationship with their most important alliance partner. Additionally, the respondents were promised that their responses and identities would remain strictly confidential in order to maximize the potential response rate.

In total, 75 completed questionnaires were received, giving a net response rate of 56%. The sample size is higher than many other similar studies conducted over the past few years. For example, Sarkar et al.⁹ collected 68 responses from 561 large international contractors sent (a net response rate of 12.1%) in their study of alliances and the role of complementarity, compatibility, relationship capital on alliance performance. Johnson et al.³⁶ obtained 51 samples out of 128 organizations targeted in their study of international joint ventures (IJVs) of the manufacturing organizations in North America.

Non-response bias was tested by comparing the early and late responders on all constructs and no significant difference between the two groups was found.³⁷ A factor analysis was then performed to examine question items in each construct and questions with an item loading below 0.5 being deleted without losing the representation of each of the constructs. Cronbach's alphas for all constructs are all above 0.82 indicating an acceptable reliability of the measures.³⁸

3.2. Sample Characteristics

Most hemodialysis centers surveyed (50 respondents, 66.7%) operated independently in hospitals while the remaining 25 hemodialysis centers (33.3%) operated as local medical clinics. In terms of the number of hospital beds, 29 hemodialysis centers (38.7%) had less than 19 beds while the other 32 centers (42.7%) had between 21-30 beds. The remaining 14 hemodialysis centers (18.6%) had more than 30 beds (up to 67 beds). They were not large in terms of number of hospital beds by Taiwanese standards. In terms of the alliance age, 28 respondents (37.3%) had less than 3 years and 32 respondents (42.7%) had between 3 and 5 years. 15 respondents (20.0%) had more than 6 years (the longest was 11 years).

3.3. Measurement

Respondents were asked to indicate their agreement on a seven-point Likert scale (1 for strongly disagree and 7

for strongly agree) with statements concerning four main constructs: (1) alliance performance; (2) organizational dynamism; (3) focal firm's resource contribution - financial, physical and intangible resources; and (4) partner firm's resource contribution - financial, physical and intangible resources. Klein's³⁹ method was adopted for the order of the questions within the questionnaire and the firm cues were randomized for the questionnaire. This was done to reduce any bias that may occur in alliance attitude and firm judgments if respondents were first presented with partner firm image questions. Higher ratings for these questions indicated: (1) greater level of alliance performance; (2) greater level of organizational dynamism; (3) greater level of resource contributions from the focal organizations; and (4) higher resource contributions from the partner organizations.

The *performance* scale was based on Cullen et al.'s⁴⁰ perceptual measure of assessing performance with both the relationship between international joint venture (IJV) partners. The measure addressed whether the alliance met or exceeded expectations concerning profitability, market penetration and growth. Geringer and Hebert⁴¹ found that subjective performance is positively related to the objective measures of IJV performance (i.e. survival, stability and duration). Therefore, in this survey, *performance* was used as an indicator for alliance performance, and measured on a seven-point Likert-type scale (1=strongly disagree; 7=strongly agree).

For *organizational dynamism*, the statements relating to this construct were adapted from a 5-item scale used by Xia and Lee²⁹ and the scale measured the rate and pattern of changes in the IT development organizational environments. That was revised into three statements, in response to the outcome of pilot studies and semi-structured interviews with IT executives.

For *IT resource alignment*, the uniqueness and symmetry in both complementary and supplementary IT resource contribution brought by focal and partner organizations to the alliance were assessed. As suggested by Das and Teng,⁶ a list of three categories of resources comprising a total of ten items was provided. The three categories of resources were financial, physical, and intangible IT resources.⁴² For each of these IT resources, respondents were asked to evaluate the contribution by the focal firm and the partner firm. It was anticipated that respondents were able to estimate

each other's contributions since there was a significantly positive correlation between a parent's perceptual satisfaction with IJV performance and the other partner's perceptual satisfaction.⁴² To measure the resource *supplementarity* versus *imbalanced supplementarity*, the following equation adapted from Johnson et al.⁴³ was used:

$$S = \sum_{i=1}^m \sum_{j=1}^n \sum_{l=1}^n |F_{ij} - P_{il}|$$

Where S = Resource *supplementarity*.

F_{ij} : The resource j in category i is contributed by focal organization to the alliance.

P_{il} : The resource l in category i is contributed by partner organization to the alliance.

A high S value indicates that there is a high degree of imbalance in the contribution of similar resources between the focal organization and the partner organization. This means that the higher the S value the higher the imbalanced supplementarity. On the other hand, a low S value indicates that there is a high degree of balance in the contribution of similar resources between the focal organization and the partner organization. This implies that the lower the S value the higher the supplementarity. Therefore, supplementarity and imbalanced supplementarity were assigned as two end points in a continuum.

To measure the resource complementarity versus imbalanced complementarity, the following equation adapted from Johnson et al.⁴³ was used:

$$C = \sum_{i=1}^m \sum_{j=1}^n \sum_{k=1}^m \sum_{l=1}^n |F_{ij} - P_{kl}| - \sum_{i=1}^m \sum_{j=1}^n \sum_{l=1}^n |F_{ij} - P_{il}|$$

Where C = Resource *complementarity*.

F_{ij} : The resource j in category i is contributed by focal organization to the alliance.

P_{kl} : The resource l in category k is contributed by partner organization to the alliance.

P_{il} : The resource l in category i is contributed by partner organization to the alliance.

A high C value indicates that there is a high degree of imbalance in the contribution of dissimilar IT resources between the focal organization and the partner organization. This means that the higher the C value the higher the imbalanced complementarity. On the other hand, a low C value indicates that there is a high degree of balance in terms of the contribution of dissimilar IT resources between the focal organization and the partner

organization. This implies that the lower the C value the higher the complementarity. Therefore, complementarity and imbalanced complementarity were assigned as two end points in a continuum.

Firm size and alliance age were assigned as the *control variables* and both were applied with a logarithm transformation. Firm size was measured by the number of hospital beds while alliance age was determined by the number of years the alliance had been formed. All measures were analyzed for reliability and validity in accordance with the guidelines set out by Jöreskog and Sörbom.⁴⁴ The reliability of the research constructs for performance and organizational dynamism was evaluated using Cronbach's coefficient alpha (α). The α values for performance and organizational dynamism in sample were 0.84 and 0.94, respectively. According to Nunnally,³⁸ an α value of 0.70 or above indicates a reliable measurement instrument. Confirmatory factor analysis was then used to construct a measurement model composed of the performance and organizational dynamism constructs using maximum likelihood in LISREL. All variables within the model were regarded as separate reflective measures. Overall, the resulting fit indexes indicated that the measurement model fitted the data well: $\chi^2 = 16.34$ (15 degrees of freedom), $p = 0.36$, comparative fit index (CFI) = 0.99, root mean square error of approximation (RMSEA)=0.028, and Goodness-of-Fit Index (GFI) = 0.92. Moreover, the ranges of all factor loadings and the measurement errors were acceptable and significant at alpha = 0.01, which provided evidence of convergent validity.

Furthermore, Churchill⁴⁵ has suggested that convergent and discriminant validities should be examined for construct validity. Therefore, the average variances extracted (AVE) test was conducted for both the performance and organizational dynamism constructs. Their AVE values were 0.78 and 0.66, respectively, and these values provided further evidence of convergent validity.⁴⁶ These AVE values could also be used to assess discriminant validity⁴⁶ which was evident in the results of this study as AVE values for performance and organizational dynamism were higher than the squared pairwise correlation between performance and organizational dynamism (0.189).⁴⁷

4. Results

Table 1 presents the descriptive statistics and Pearson correlation for the variables used in this study. There was no evidence of multicollinearity in the data except of resource alignment. It was found that *supplementarity* and *complementarity* had a multicollinearity problem and, therefore, we adopted principal component analysis to reduce this problem.⁴⁸ *Supplementarity* and *complementarity* were transformed into two independent principal components.

Table 1. Correlation Matrix for Variables

	Mean	S.D.	V1	V2
V1 Size [†]	1.78	1.32	1.00	
V2 Alliance age [†]	1.13	0.54	0.09	1.00
V3 Performance	5.54	1.74	0.01	0.04
V4 Organizational dynamism	4.98	1.56	0.03	0.14
V5 Supplementarity [#]	55.00	22.54	0.01	-0.08
V6 Complementarity [#]	296.00	124.34	-0.11	-0.19 [*]
	V3	V4	V5	V6
V1 Size [†]				
V2 Alliance age [†]				
V3 Performance	1.00			
V4 Organizational dynamism	-0.43***	1.00		
V5 Supplementarity [#]	-0.31+	-0.23*	1.00	
V6 Complementarity [#]	-0.44***	-0.32**	0.00	1.00

⁺p < .10; ^{*}p < .05; ^{**}p < .01; ^{***}p < .001

[†]Both size and alliance age were applied with a logarithm transformation.

[#]*Supplementarity* and *complementarity* were transformed into two independent principal components in order to reduce multicollinearity.

Partial least square (PLS) structural equation modeling (SEM) was used to estimate our theoretical model using the software application SmartPLS. Unlike a covariance-based SEM method such as LISREL, PLS employs a component-based approach for estimation purposes and is particularly appropriate when the model is complex because it does not lead to estimation problems or improper results.⁴⁹

The percentages of explained variance (R-square values) for the alliance performance was 42.4%, indicating that the model explained a substantial amount of variance for alliance performance. Nonparametric bootstrapping procedure (500 subsamples; 75 cases; no sign change) was applied to evaluate the significance of

the path coefficients⁴⁹ and the path estimates are shown in Table 2.

Table 2. Structural parameter estimates for the model

Paths		Estimate	S.E.	t-value
Supplementarity → Performance	H ₁	-0.68	0.23	2.95**
Complementarity → Performance	H ₂	-0.53	0.21	2.32**
Supplementarity*Dynamism → Performance	H ₃	-0.59	0.19	2.76**
Complementarity*Dynamism → Performance	H ₄	-0.44	0.17	2.46**

*p < 0.05; **p < 0.01

Alliance performance depends heavily on the fair dealing of not only dissimilar and complementary resources but also similar and supplementary resources. These hypotheses were tested and both *supplementarity* and *complementarity* were found to have a significant impact on alliance performance (b = -0.68** and -0.53**, respectively). The regression results showed that *supplementarity* and *complementarity* positively and significantly affected performance, and therefore, provided empirical support for H₁ and H₂. The results so far had also signaled that the resource alignment argument proposed by Das and Teng⁶ appeared to hold true within the alliance context.

As suggested by Chin et al.⁵⁰ the constructs of organizational dynamism and supplementarity were then included to test their moderating effect on alliance performance. Although organizational dynamism did not have a significant direct effect on alliance performance, the moderating effect was significant at the 1% significance level (b = -0.59**). To assess the overall effect size (*f*²) of the interaction construct, the difference in the R-square between the model with and without the interaction term was compared. R-square increased from 36.2% to 42.4%, respectively, when the interaction term was included. The overall effect sizes were 0.146. According to Cohen,⁵¹ the thresholds for weak, moderate, and strong moderating effects are 0.02, 0.15, and 0.35, respectively. Results of this study showed that the interaction effect was close to the moderate level. However, this did not suggest that the interaction effect was not important.⁵⁰ Instead, the manner in which the interaction effect affects the relationship between constructs should be concerned. Therefore, H₃ was supported.

The moderating effect of organizational dynamism on the relationship between complementarity and performance was also investigated. It was found that the moderating effect was significant at the 1% significance level ($b=-0.44^{**}$). R-square increased from 31.1% to 42.4%, when the interaction term was included. The overall effect sizes were 0.267. Result of this study revealed that the interaction effect was more than moderate and this implied that the interaction effect was moderately important.^{50,51} Therefore, H_4 was supported.

5. Discussion and Implications

This study has measured resource alignment¹ by examining the alliance partners' contribution in terms of both supplementary and complementary IT resources. The results indicate that alliance partners paid great attention to each other's ability to uniquely and symmetrically contribute both supplementary and complementary IT resources. This has a significant impact on alliance performance. Previous research has concentrated on large organizations and assumed that they paid particular attention to their partners' ability to contribute complementary resources within the alliance, regarding supplementary resources as surplus or slack resources. The measurement proposed by our research has provided the means to evaluate both supplementary and complementary IT resources. Moreover, this research has examined the specific theoretical meaning and role that resource alignment plays within alliances. In particular, the results fully support the six hypotheses and these, in turn, provide several insights for the resource alignment model as a tool for selecting alliance partners.

First, previous research findings suggested that the criteria for complementary resource depended heavily on uniqueness and symmetry of resources.⁴³ In this research, it was found that the criteria could be applied to resource supplementarity. Therefore, the establishment of successful alliances depends not only on partners' ability to contribute unique and performing resources but also on the perception of fair dealing in relation to these resources by the focal organizations. Second, the effect of resource alignment on alliance performance reveals that organizations should invest the required resources for the alliance. The fact that organizational dynamism was found to be a moderating factor of resource alignment on alliances performance is

due to the high requirements of information processing capacities. Therefore, it could be said that successful alliances depend on a partner's willingness to contribute a fair share of the requisite resources. It is fair to say that focal organizations would only willing to fully commit themselves to the alliance when they perceive the fair dealing by their alliance partners. Sincere commitment by all partners would likely result in increased alliance performance.

Third, previous research did not find consistent empirical support for the positive relationship between resource complementarity and alliance performance.⁶ We believe that this has something to do with the measurement of complementarity. Through the use of our measurement, the results indicate that both resources supplementarity and complementarity are positively and significantly related to alliance performance. The regression results not only confirm previous research findings² but also provide the possible means of measuring resource alignment.¹ The results show that the focal organizations are more likely to select partners which own the requisite supplementary and complementary resources. A successful alliance can only be achieved through this type of resource fit.

This study has several managerial implications. First, alliance performance is a critical factor that needs to be carefully managed to avoid the possible negative effects of an asymmetric contribution of specific supplementary and complementary IT resources. The selection of partners who are able to contribute fairly to both the requisite complementary and supplementary IT resources is of great importance. This will ensure the fair share of any future benefits by all partners and this will ultimately lead to alliance performance and success. Second, the results show the relative importance of key factors in choosing appropriate alliance partners. The results from this study indicate that organizations should be careful in selecting their alliance partners and in evaluating the amount of complementary and supplementary IT resources the partners are prepared to contribute to the alliance. Instead of focusing only on complementary IT resources, it is vital to estimate the amount of supplementary IT resources the partners are able to bring to the alliance. An insufficient contribution of supplementary resources to the alliance can often lead to failure. These criteria can guide organizations in the partner selection process and in establishing inter-organizational alliances.

6. Limitations and Future Directions

While the study makes important contributions to the alliance literature, some limitations in our research need to be acknowledged. First, we undertook a cross-sectional approach to data collection and this did not allow the study of the temporal aspects of a relationship. Also, the choice of variables used in this study may not capture the complex nature of the cooperative alliance process of the business environment in which SMEs operate. Second, we collected information from only one side of the dyad. It is possible that only those interested in the research topic are likely to complete and return the questionnaire. Possibly those replying were more likely to be satisfied with their cooperative alliances than the average non-respondent. To what extent perceptions would have converged is unknown.

Third, we have used subjective measurements (i.e. performance). Although several studies have found that subjective measurements were significantly positive with the objective performance,⁴¹ 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 amongst alliance partners.⁵² For example, the evaluations of subjective performance measurements may actually reflect different levels of actual profits. Fourth, the concern for generalizability is also brought about by the relatively small sample size of this study although the sample represents possibly 40.8% of all existing small hemodialysis centers that have formed alliances with others in Taiwan. The 75 valid responses obtained in this study is comparable with sample sizes of 51³⁶ and 68⁹ reported in previous cooperative alliance studies that have looked at IJVs. Finally, further research could be conducted to see if the measurement is applicable to other industry settings. Alternatively, our study could be replicated in a few years' time to examine how alliance performance and experience required would be affected by resource alignment.

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