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Information Systems Resource Contribution in Strategic Alliance by Small Healthcare Centers

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INTRODUCTION

Alliance is 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” (Lambe, Spekman & Hunt, 2002, p. 141). Cooperative alliances allow firms to explore new information technology, enhance a firm’s knowledge foundation, lower development costs, and reduce the capital requirements and risks involved in development of new products and services (Das & Teng, 2000; Scotten, Shirin & Absher, 2006). This approach is often adopted by small and medium-sized enterprises (SMEs) as a competitive strategy to obtain necessary information systems resources in the rapidly changing and high-pressure healthcare industry (Nelson, Galvin, Essien & Levine, 1999; Scotten et al., 2006). However, according to Das and Teng (2000), around 60% of alliances between partners resulted in failure. Hence, the choice of partners and resource fit of alliance partners are of great importance for SMEs (Grant, Preece & Baetz, 1999). For those SMEs without much information systems (IS) resources, the formation process of alliance can be viewed partly as a process to increase both their tangible and intangible IS resources. Value generated from alliances is enhanced when partners have different IS resource profiles and contribute these IS resources to the alliance. These partner characteristics are important since they help in the evaluation of optimum allocations of IS resources for potential alliances to achieve suitable alliance resource alignments.

Thus, the objective of this chapter is to examine how different types of IS resource alignments affect the performance of alliances via the contribution of dissimilar and similar IS resources. The focus of this study is 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. Most of these small healthcare centers in recent years have realized that they can only compete with major healthcare service providers through cooperative alliances, as most of the patients prefer to go to big service providers for long-term treatments. The literature on interorganizational collaborations has been criticized for its relatively narrow concentration on large firms and for ignoring SMEs’ alliances where large firms do not operate in similar ways (Prater & Ghosh, 2005). These cost pressures, together with the general dynamic nature of the healthcare industry, require a significant change in approaches to utilize IS resources by these small healthcare centers. Therefore, these small healthcare centers must form alliances to obtain scarce IS resources. Unlike large firms that own a lot of IS resources to be able to form alliances with many partners, these small healthcare centers tend to form alliances with only a small number of partners, and therefore, their dependence on these partners is higher than large firms (Mambula, 2002). In this regard, these small Taiwanese healthcare centers offer an appropriate context for research.

BACKGROUND

Similar Resource Contribution

SMEs are particularly in need of finding suitable partners with dissimilar or similar resources due to their insufficient slack resources (Huang, Lin & Lin, 2005; Lin, Lin & Tsao, 2005; Srinivasan, Rangaswamy & Lilien, 2005). Formation of alliances is one way for firms that have possessed similar resources to decrease interfirm rivalry. Chen (1996) has defined resource similarity as “the degree to which two partner firms contribute resources compatible, in terms of both type and amount,

to an alliance” (p. 107). The understanding of resource similarity is very important because the firms that have possessed similar resources can potentially be the fierce rivals (Chen, 1996). Moreover, resource similarity can also assist in interorganizational learning among alliance partners. For example, according to Pitts and Lei (1997), alliances formed to learn and absorb tacit knowledge are more difficult to manage among partners that come from different cultural backgrounds than partners from a similar cultural background. In addition, Inkpen (2000) has proposed that the relatedness between interpartners’ knowledge base supported the acquisition of alliance knowledge. Therefore, we argue that IS resource similarity represents smaller knowledge distance and higher cultural similarity between alliance partners. These similarities are likely to assist alliance partners in developing a thorough understanding of their own knowledge and culture, and these can also enhance mutual learning and coordination and ultimately lead to increased alliance performance.

Dissimilar Resource Contribution

On the other hand, the uniquely dissimilar resource contribution is particularly critical to SMEs in their partner selection processes. SMEs are particularly in need of finding suitable partners with dissimilar resources, since it is difficult to produce alliance synergy without dissimilar resource contribution (Harrison, Hitt, Hoskisson & Ireland, 2001). Although potential competitors can easily imitate the research-based synergy from an alliance where the interpartners have strong research orientations, it will be much more difficult for them to acquire the synergy derived from dissimilar resource contribution (Harrison et al., 2001). Therefore, they are less likely to be interested in forming an alliance with firms who are only able to contribute similar IS resources. It is proposed that there is a negative correlation between interpartners on the contribution of similar IS resources. This implies that one party does not require the contribution by the other party on the IS resources they already own. On the other hand, there is a positive correlation between interpartners on the contribution of dissimilar IS resources. Interpartners that possess dissimilar IS resources are able to complement each other within an alliance. Therefore, the following hypotheses are proposed:

- **H1:** There is a negative correlation between the focal firm and the partner firm on the contribution of the similar IS resources.
- **H2:** There is a positive correlation between the focal firm and the partner firm on the contribution of the dissimilar IS resources.
- **H3:** Higher dissimilar IS resource contribution leads to higher alliance sustainable commitment.
- **H4:** Higher dissimilar IS resource contribution leads to higher alliance performance.

RESEARCH METHODOLOGY

Data Collection

In order to test the proposed hypotheses, five in-depth semistructured interviews lasting one hour each and a pilot survey of 10 industry executives were conducted to get insights into industry dynamics and to develop and refine the survey scales. Then, the main survey targeted small healthcare centers, which were classified to have formed alliances with others. This questionnaire asked the owners/directors or persons who were capable of representing their views 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.

A total of 69 questionnaires were received from the small healthcare centers that have formed alliances with others in Taiwan. The sample size is comparable to many other similar studies conducted in the last few years. For example, Sarkar, Echambadi, Cavusgil, and Aulakh (2001) collected 68 responses from 561 large international contractors sent (a net response rate of 12.1%) in their study of alliance on the role of dissimilar resource contribution, compatibility, and relationship capital on alliance performance. Nonresponse bias was tested by comparing the early and late responders on all constructs, and no significant difference between the two groups was found.

Measurement

This study has defined the interorganizational IS resource cooperation among the healthcare centers as the unique and valuable IS resources contribution by both the focal and partner firms. According

to the resource-based viewpoint, IS resources (for a healthcare center) can be categorized as specialized IS support, medical IS support services, and IS management systems (Short, Palmer & Ketchen, 2002). There were 20 questions within the questionnaire, and 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 sustainable commitment; (2) alliance performance; (3) focal firm's IS resource contribution—intangible resource, physical resource, and organizational capabilities; and (4) partner firm's IS resource contribution—intangible resource, physical resource, and organizational capabilities. In addition, we have used focal firm's perceptual sustainable commitment and performance to represent alliance sustainable commitment and performance in accordance with the finding by Geringer and Hebert (1991), in which they found that subjective performance is positively related to the objective measures of international joint venture (IJV) performance (i.e., survival, stability, and duration).

Factor analysis was performed on these measurement items to ensure that all scales were unidimensional and to assess reliability. A factor analysis was then performed to examine question items in each construct, and questions with an item loading below 0.5 were deleted without losing the representation of each of the constructs. Cronbach's alphas for all constructs are all above 0.80, indicating an acceptable reliability of the measures.

The *sustainable commitment* scale was derived from Sarkar, et al. (2001). We revised the scale into a four-item scale, and the alpha value for this scale was 0.94, indicating acceptable values of internal consistency (Nunnally, 1978). This scale measured the focal firm's willingness to invest required IS resources into the alliance.

The *performance* scale was based on Sarkar, et al.'s (2001) perceptual measure of assessing performance with both the relationship and performance between IJV partners. In this survey, performance was used as an indicator for alliance performance and measured on a seven-point Likert-type scale. Moreover, four items on healthcare characteristics were used as control variables. These included individual rating and size of healthcare centers, length of cooperative alliance, and type of cooperative institution (i.e., hospital or other healthcare service provider).

According to Johnson, Cullen, Sakano, and Takenouchi (1996), the resource contributions from both the focal and partner firms are part of the formative measurements, and as such, traditional associational-based validation procedures do not apply. Therefore, the measures for *sustainable commitment* and *performance* were analyzed for reliability and validity in accordance with the guidelines set out by Agarwal and Karahanna (2000). The reliability of the research constructs for sustainable commitment and performance was evaluated using Cronbach's coefficient alpha (α). The α values for *sustainable commitment* and *performance* in the sample were 0.94 and 0.84, respectively.

FINDINGS AND DISCUSSION

Most small healthcare centers surveyed (61%) operated independently within small and medium-sized hospitals, while the remaining small healthcare centers (39%) operated as local medical clinics. In terms of the number of hospital beds, 36% of small healthcare centers had fewer than 19 beds, while the other 39% had between 21 and 30 beds. The remaining 25% small healthcare centers had more than 30 beds. In terms of the alliance age, 38% of the respondents had less than three years, and 36% had between 3 and 5 years. The remaining 26% had more than six years.

Table 1 presents the descriptive statistics and Pearson correlation for the variables used in this study. The statistical software, SPSS 13, was used to analyze the data. Although there were few slightly stronger correlations among some independent variables, the maximum variance inflation factor (VIF) for the independent variables in all models was less than 2.766, and the average VIF was less than 1.754. This indicated that multicollinearity was not unduly influencing the least squares estimates (Neter, Wasserman & Kutner, 1985). Therefore, there was no evidence of multicollinearity in the data.

Table 2 presents the correlation matrix to highlight the relationships between the focal firms and the partner firms within interorganizational IS resources cooperation. The items shown in Table 2 are the types of resources that can be contributed by the partners. The results in Table 2 demonstrated that between the focal firm and the partner firm, there was a negative correlation on the contribution of similar IS resources. On the other hand, there was a positive correlation on

Table 1. Correlation matrix for variables

	Mean	1	2	3	4	5	6	7	8	9	10	11	12	13
Contributed by focal firms														
1. Specialized IS support	5.520	1.000												
2. Medical IS support services	4.955	0.000	1.000											
3. IS management systems	5.561	0.000	0.000	1.000										
Contributed by partner firms														
4. Specialized IS support	4.871	-0.222 [†]	0.260 [†]	0.109	1.000									
5. Medical IS support services	4.120	0.311 [†]	-0.524 ^{**}	0.279 [†]	0.000	1.000								
6. IS management systems	4.876	0.492 ^{**}	0.354 ^{**}	-0.140	0.000	0.000	1.000							
Control variables														
7. Ratings	3.880	-0.211	0.116	-0.071	-0.012	-0.083	-0.112	1.000						
8. Size [†]	1.046	0.023	-0.102	-0.011	0.104	0.119	0.004	-0.440 ^{**}	1.000					
9. Length of cooperation [†]	0.560	0.100	-0.023	0.240 [†]	0.075	0.158	0.112	-0.210 [†]	0.281 [†]	1.000				
10. Hospital [#]	0.373	-0.133	-0.503 ^{**}	0.017	0.095	0.361 [†]	-0.556 ^{**}	-0.197	0.115	0.032	1.000			
11. Healthcare provider [#]	0.392	0.140	0.406 ^{**}	0.067	0.285 [†]	-0.107	0.510 ^{**}	0.096	0.025	-0.196	-0.619 ^{**}	1.000		
12. Performance	5.672	0.119	-0.110	0.178	0.506 ^{**}	0.232 [†]	-0.028	-0.298 [†]	0.405 ^{**}	0.274 [†]	0.177	0.232 [†]	1.000	
13. Commitment	6.304	0.247 [†]	0.522 ^{**}	0.200	0.219	-0.015	0.417 ^{**}	0.029	0.187	0.241 [†]	-0.355 [†]	0.286 [†]	0.000	1.000

[†] Both size and length of cooperation were applied with a logarithm transformation.

[#] Dummy variables.

the contribution of dissimilar IS resources between interpartners. This supported the initial concept of similar/dissimilar IS resource contribution mentioned earlier in the chapter, since most of correlation coefficients were found to be significant. Thus, *H1* and *H2* were supported.

Models 1 and 2 in Table 3 analyzed the relationship between the individual IS resource contribution by both parties and the alliance sustainable commitment. The regression analysis results in Table 3 indicated that the contribution of specialized IS support items and medical IS support services items by the focal firms had significant positive effect on the alliance sustainable commitment. In addition, the results also showed that the contribution of IS management systems items by the partner firms had a positive impact on the alliance sustainable commitment. From these findings, it can be concluded that the contribution of dissimilar IS resources by both the focal and partner firms had a significant positive impact on the alliance sustainable commitment. Thus, *H3* was also supported.

Models 3 and 4 in Table 3 analyzed the relationship between the individual IS resource contribution by both parties and the alliance performance. The regression analysis results in Table 3 showed that the contribution of these three items (i.e., specialized IS support, medical IS support services, and IS management systems) by the focal firms had no significant relationship with the alliance performance. However, there was a positive relationship between the contribution of specialized IS support by the partner firms and the alliance performance. Therefore, as long as the partner firms were able to make significant contributions on other IS resource items, it can still have a positive effect on the alliance performance. Thus, *H4* was supported.

CONCLUSION

These findings have shown the dissimilar nature of IS resources contributed by all partners in the healthcare industry. The fact that there was a negative correlation between the similar IS resources provided by both the focal and partner firms indicates that the focal firms do not need similar IS resources provided by the partner firms. In terms of dissimilar IS resources, there was a positive correlation between the resources contributed by both the focal and partner firms. This has shown that the partner firms were able to provide necessary IS resources to satisfy needs of the focal firms. Moreover, there was a positive relationship between the IS resources contributed by both the focal and partner firms and the alliance sustainable commitment and performance. There are two approaches to establish the relationship between dissimilar IS resource contribution and alliance performance in the healthcare industry. One approach is that as long as the partner firms were able to make significant contributions on some IS resource categories, even when the focal firms failed to contribute significant unique IS resources, it could still have a positive effect on the alliance performance. The other approach to establishing a successful relationship was through both the focal and partner firms contributing unique dissimilar IS resources into the alliance. The implication of the findings is that symmetrically dissimilar IS resource contributions by interpartners within the healthcare industry can increase alliance sustainable commitment. Therefore, it can be said that successful alliance depends on partners' willingness to contribute a symmetric share of the requisite IS resources. Focal SMEs are only willing to fully commit themselves

Table 2. Correlations for the focal and partner firms' resource contribution

		Focal firms		
		Specialized IS support	Medical IS support services	IS management systems
Partner firms	Specialized IS support	-0.222 ⁺	0.260 ⁺	0.109
	Medical IS support services	0.311 [*]	-0.524 ^{**}	0.279 ⁺
	IS management systems	0.492 ^{**}	0.354 [*]	-0.140

⁺*p* < 0.10, ^{*}*p* < 0.05, ^{**}*p* < 0.01, ^{***}*p* < 0.001

Table 3. The effects of IS resource contribution and performance: Unstandardized regression coefficients

	Sustainable Commitment				Performance			
	Model 1		Model 2		Model 3		Model 4	
	Beta	S.D.	Beta	S.D.	Beta	S.D.	Beta	S.D.
Constant	-2.042*	1.001	-1.769	1.162	-2.196*	1.067	-1.216	0.988
Contributed by focal firms								
1. Specialized IS support	0.240+	0.122			0.060	0.130		
2. Medical IS support services	0.492**	0.136			-0.076	0.145		
3. IS management systems	0.159	0.122			0.075	0.130		
Contributed by partner firms								
4. Specialized IS support			0.229	0.151			0.329*	0.128
5. Medical IS support services			0.036	0.149			0.125	0.126
6. IS management systems			0.305+	0.178			-0.165	0.151
Control variables								
7. Ratings	0.152	0.138	0.175	0.154	-0.064	0.147	-0.165	0.131
8. Size [†]	0.941	0.627	0.978	0.568	1.066	0.668	0.822	0.570
9. Length of cooperation [†]	0.873	0.522	0.605	0.580	0.923	0.556	0.872+	0.483
10. Hospital [#]	-0.124	0.327	-0.540	0.444	0.976+	0.346	0.476	0.378
11. Healthcare provider [#]	0.058	0.320	-0.116	0.425	1.211**	0.341	0.877*	0.362
F-value	4.584		2.558		3.797		5.527	
P	0.001***		0.024*		0.002*		0.000***	
Adjusted R ²	0.379		0.206		0.323		0.430	

* $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

[†] Both size and length of cooperation were applied with a logarithm transformation.

[#] Dummy variables.

to the alliance when they perceive fair dealing; that is, each partner has to provide equal or symmetric IS resource contributions in its alliance.

In addition, we further confirm that alliance performance could only be achieved when an interpartner contributed dissimilar IS resources to the alliance in the healthcare industry. Moreover, from the four models in Table 3, we fail to establish a positive relationship between the alliance performance and the overlapping similar IS resources contributed by both the focal and partner firms. Therefore, the results demonstrate that similar IS resource contribution had no impact on alliance performance. Furthermore, Table 3 has shown that the most characteristics of both the focal and partner firms had no direct effect on the alliance performance. Therefore, the dissimilar IS resources contribution was the key success factor for establishing alliances in the healthcare industry. Finally, the measurement proposed by this research had provided the means

to evaluate both similar and dissimilar IS resources in the healthcare industry. The measurement could potentially be applied to both large firms and SMEs in other industries in the future.

FUTURE TRENDS

The future of strategic alliance in the healthcare industry will be based on the quality of the alliance relationships among partners and what they can contribute to the alliances. The results from this study suggest that SMEs should be careful in selecting their alliance partners as well as in evaluating the type and amount of dissimilar IS resources the partners are prepared to contribute to the alliance. Insufficient contribution of dissimilar IS resources to the alliance can potentially lead to failure. In addition, SMEs in the healthcare industry should prepare for the future by engaging in activities that

make it a more attractive potential alliance partner. Moreover, the dedication to the growth and development of the strategic alliance can only be sustained if partners have trust and confidence in each other. Furthermore, there needs to be more than the desire to cooperate within alliances. The alliance partners should not only exchange information but also should share resources, risks, responsibilities, and rewards. Finally, the other two factors that should not be neglected are the strength of the leadership and knowledge of the healthcare industry by the alliance partners.

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KEY TERMS

Alliance: 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.

Alliance Sustainable Commitment: The maximum effort involved in maintaining and prolonging an ongoing relationship between alliance partners.

Resource Dissimilarity: The degree to which two partner firms contribute complementary resources in terms of both type and amount to an alliance.

Resource Similarity: The degree to which two partner firms contribute compatible resources in terms of both type and amount to an alliance.

SMEs: Small to medium-sized enterprises. The European Commission has defined SMEs as organizations that employ fewer than 250 people.

SPSS: A statistical and data management software package for analyzing collected questionnaire data.

Survey Research: A research method using questionnaires to obtain the required information.