

Impact of Resource Dependence, Trust and Relationship Commitment among Supply Chain partners on Information System Alignment

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Abstract: The theoretical model of relationship among resource dependence, trust, relationship commitment and information system alignment in a supply chain is proposed and empirically tested using data collected from 141 manufacturing companies in Pearl River Delta. The results show that resource dependence has significant positive impact on trust and relationship commitment, but does not impact information system alignment significantly. Moreover, the results also show that trust among supply chain partners has significant positive impact on relationship commitment and information system alignment. However, relationship commitment has no significant positive impact on information system alignment. These findings can also give some guidelines to managers.

Keywords: Supply Chain, Information System Alignment, Resource Dependence, Trust, Relationship commitment

I. Introduction

As is known to all, information has become one of the most important resources in the era of Internet economy. Whether the supply chain partners can share information effectively has become the key to success in supply chain management. However, information sharing and communication among supply chain partners can not be separated from IT technology and information system support. Organic integration of information system among partners is the bridge to transmit real-time information^[1]. In practice, many companies have already begun to establish information system with their close relationship partners, in order to reach the purpose of information sharing, such as Wal-Mart and IBM.

However, for most companies, they may not have enough enthusiasm to invest in inter-enterprise information systems connection. So, how can we effectively motivate member enterprises to invest in information systems alignment and integration among supply chain partners? What are the factors that will affect information system alignment and integration? Based on that, this study will use empirical research methods to explore the degree of the resource dependence, trust, relationship commitment and other factors which affect information alignment among supply chain partners, and we hope this research can provide practical theoretical basis to information system alignment among supply chain partners in our country.

II. Literature Review

Information system alignment

Information system alignment among supply chain partners is the compatible degree of information systems between enterprise and its supply chain member companies (Wu et al., 2006)^[2], namely, information system of supply chain enterprise members make organic integration through Internet or EDI, it is the bridge to transmit real-time information among partners. Supply chain information system integration is considered to be a key factor in supply chain integration^[3]. In recent years, the vigorous development of Internet technology provides a good platform for supply chain partners to implement information sharing, thereby reaching the purpose of information system alignment^[4].

Relationship commitment and information system alignment

Relationship commitment is often used to describe the psychological contract among partners. For example, Moorman, et al.(1992)^[5] have pointed out that relationship commitment has been involved in the tendency of the continuing valuable relationship in future. Thomas, et al.(1999)^[6] have recognized that relationship commitment is the tendency of developing stable relationship, intends to sacrifice short-term benefit to maintain long-term relationship, and has confidence in relationship stability. Thus, relationship commitment will be one of the most important factors which supply chain partners establishing a stable and lasting partnership.

As we know, information system alignment among supply chain partners can be saw as a strategic equity investment of member enterprises, it has strong asset specificity. Thus, only when the supply chain partners are willing to establish stable and lasting partnership, could the member companies be willing to conduct information system alignment. Relationship commitment among supply chain partners is the precisely expression of the enterprises are willing to establish long-term partnership. So, we have reasons to believe that relationship commitment among supply chain partners has significant positive effect on information system alignment.

Trust, relationship commitment and information system alignment

Relationship of mutual trust among supply chain partners is the soul and foundation of supply chain management [7]. Based on the predecessors' studies, this study suggests that trust among supply chain partners refers to the mutual trust relationship among suppliers, manufactures, wholesalers, retailers and customers; and is the confidence that one side believe their partners are willing and able to complete their obligations and make commitments; it also is the confidence that the two sides believe in that each other is willing to take the responsibility and neither side will take use of the other [7].

Actually, the relationship between trust and relationship commitment are also causality, namely, the level of trust will affect the quality of relationship commitment. Many scholars have given the evidence of trust has a positive effect on relationship commitment, such as Lai, et al.(2007) [8] and Yefei (2009) [7]. Accordingly, we believe in our study trust also has a significant positive effect on relationship commitment. Besides, we know that integration and alignment of cross-organizational information system among supply chain partners is the product of long-term cooperation. Thus, we think the degree of trust among supply chain partners will have a significant positive effect on information system alignment.

Resource dependence, relationship commitment and information system alignment

All of the enterprises are in an opening social environment, enterprises must obtain necessary resource which is used to survive and develop through exchange [9]. Therefore, integration of interdependence resource has become an important motivation for establishing long-term strategic partnership. For example, Holm, et al.(1999) [10] empirical research have found that the resource dependence of the alliance partners would make the two sides have a common interest. The higher the level of interdependence among

supply chain partners is, the more likely partners use the same information systems and application technology to achieve coordination [11]. Therefore, based on resource dependence theory, we can conclude the higher the resource dependence of supply chain enterprises is, the easier they are to establish long-term strategic partnership relationship, therefore impacting on the level of trust and relationship commitment each other; besides that, supply chain companies will be willing to adopt information system alignment and share information resource.

III. Hypotheses

According to resource dependence and the above theoretical analysis, the following hypothesis is developed:

Hypothesis 1: The degree of resource dependence among supply chain partners has a significant positive impact on trust (H1).

Hypothesis 2: The degree of resource dependence among supply chain partners has a significant positive impact on relationship commitment (H2).

Hypothesis 3: The degree of resource dependence among supply chain partners has a significant positive impact on information system alignment (H3).

Hypothesis 4: The degree of trust among supply chain partners has a significant positive impact on the level of relationship commitment (H4).

Hypothesis 5: The degree of trust among supply chain partners has a significant positive impact on information system alignment (H5).

Hypothesis 6: The degree of relationship commitment among supply chain partners has a significant positive impact on information system alignment (H6).

Figure 1 is the theoretical model for this study.

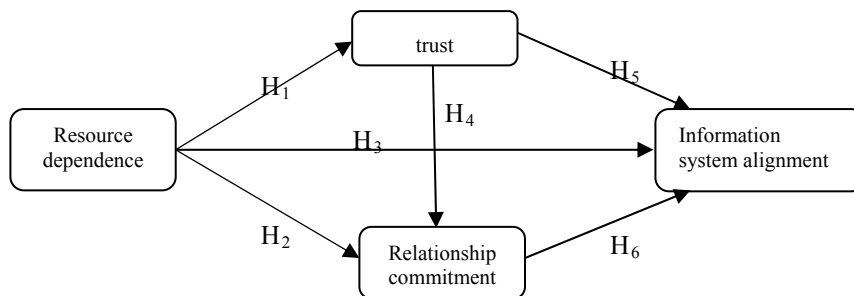


Figure 1 Conceptual model

IV. Empirical Research Design

Questionnaire design

In order to ensure the validity and reliability of measurement tools, this study uses foreign scales as much as possible. In addition, in order to eliminate cultural differences, this paper deletes some question items which

have lower reliability and validity based on small sample pre-test. Measurement scale scoring method is Likert 5 point scale, interviewees are asked to assess according to the companies actual situation from "strongly disagree" to "strongly agree".

Research sample

This paper mainly examines the relationship of resource dependence, trust, relationship commitment and information system alignment among supply chain partners. Thus, this paper focus on the manufacturing industry; and the survey scope is the Pearl River Delta of Guangdong Province. 365 questionnaires are putted out, and 141 questionnaires are reclaimed, available rate is 38.63%.

Reliability and validity test

This paper uses Cronbach's alpha to test the reliability of the related variable. The reliability values of this study are shown in table 1, most of the values of alpha are up or near 0.7, and the results indicate that the study has a very good reliability.

Table 1 Measurement scales and reliability analysis

Variable	Item	Cronbach's α	Variable	Item	Cronbach's α
Resource dependence	3	0.640	Relationship commitment	3	0.642
Trust	4	0.806	Information system alignment	3	0.804

Considered the impact of cross-culture, this paper uses AMOS7.0 software to do confirmation factor analysis; results are shown in table 2. From table 2 we can see the indexes of confirmation factor analysis model, such as $\chi^2 = 207.22$, $df = 125$, $RMSEA = 0.069$, $NNFI = 0.906$, $CFI = 0.923$, $RMR = 0.047$ etc. These indexes indicate the

confirmation factor analysis model is acceptable, it can be use to test the construct validity of all variable.

From table 3 we can see the factor loadings of all items are higher than 0.5, and the T values of all items are much greater than 2.0, these results indicate that all items have very good construct validity. Therefore, the data in this research can be further analyzed.

Table 2 Confirmatory factor analysis model (N=141)

	χ^2	df	χ^2 / df	$RMSEA$	RMR	CFI	IFI	$NNFI$	$PNFI$
Main Fit Index	207.22	125	1.66	0.069	0.047	0.923	0.925	0.906	0.678
Reference	—	—	<3.0	<0.080	<0.050	>0.900	>0.900	>0.90	>0.5

Table 3 Confirmatory factor analysis (CFA) and the validity test

Latent variable	Item	Factor loading	Standard loading(λ)	S.D.	T value	P value
Resource dependence	RD1	1.000	0.548	—	—	—
	RD2	1.127	0.636	.245	4.595	***
	RD3	1.175	0.652	.254	4.631	***
Trust	TR1	1.000	0.683	—	—	—
	TR2	1.352	0.763	.181	7.482	***
	TR3	1.115	0.655	.168	6.632	***
	TR4	1.334	0.756	.179	7.432	***
Commitment	CO1	1.000	0.705	—	—	—
	CO2	1.030	0.588	.210	4.913	***
	CO3	1.080	0.528	.234	4.607	***
Information system alignment	IS1	0.808	0.624	.111	7.279	***
	IS2	1.127	0.869	.123	9.136	***
	IS3	1.000	0.818	—	—	—

Descriptive statistics and correlation analysis

This paper uses SPSS16.0 software to describe statistics and analyze correlation of trust, relationship commitment and information system alignment. The results are shown in table 4. As we can find from the level of information system alignment among supply chain partners is still relatively low, the mean is just about 3.04. Secondly, from the resource

dependence perspective, the mean achieves 3.81, which indicates that most of the interviewees agree with the importance of resource dependence. Besides, from the means of trust and relationship commitment, the mean of relationship commitment is higher than trust obviously. Lastly, from the correlation among all items, all of them have a strong correlation.

Table 4 Descriptive statistics and correlation analysis(N=141)

	Mean	S.D.	(1)	(2)	(3)	(4)
Resource dependence (1)	3.81	0.59	1.000	—	—	—
Trust (2)	3.38	0.62	0.433**	1.000	—	—
Commitment (3)	3.71	0.56	0.347**	0.415**	1.000	—
Information system alignment (4)	3.04	0.68	0.319**	0.474**	0.292**	1.000

V. Structural Equation Analysis and Hypothesis Testing

Construction of structural equation model

This paper uses AMOS7.0 software to test the relationship among resource dependence, trust, relationship commitment and information system alignment. According to the requirements of structural equation model, we firstly need to establish a measurement model about resource dependence, trust, relationship commitment and information system alignment. Specifically shown in Figure 2.

The overall goodness of fit of model

Model fit is used to test the overall model and observe the extent of the data fitting. The overall fit indexes of the model are shown in table 6.

(1) Absolute fit index. The model goodness of fit index (GFI) has reached 0.920; RMS residuals(RMR) of this model is 0.041; RMSEA of is 0.062 which far below the reference value of 0.08; the adjusted goodness of fit index(AGFI) of model is 0.866; and all of the ECVI of this

model have reached the requirement. Thus, from the absolute fit index perspective, this paper has a good level of overall model fitness.

(2) Incremental fit index. The model Comparative fit index (CFI) is up to 0.942; the value of this model incremental fit index(IFI) is 0.944; the normative fit index(NFI) of this model is 0.854; and the model value of NNFI is up to 0.923. which means that the model goodness of fit is very well. Therefore, from the incremental fit index perspective, our research has a good level of overall model fitness.

(3) Parsimony fit index. This model chi-square values and degrees of freedom ratio $\chi^2/df = 1.538$, $PGFI = 0.592 > 0.5$, $PCFI = 0.712 > 0.5$; $PNFI = 0.646 > 0.5$. Thus, all of the parsimony fit indexes are exceed the reference value requirements.

Therefore, together with all indexes, the degree of fitness of the whole theoretical model in this paper is very good, and can be used to test the theoretical assumptions in this research.

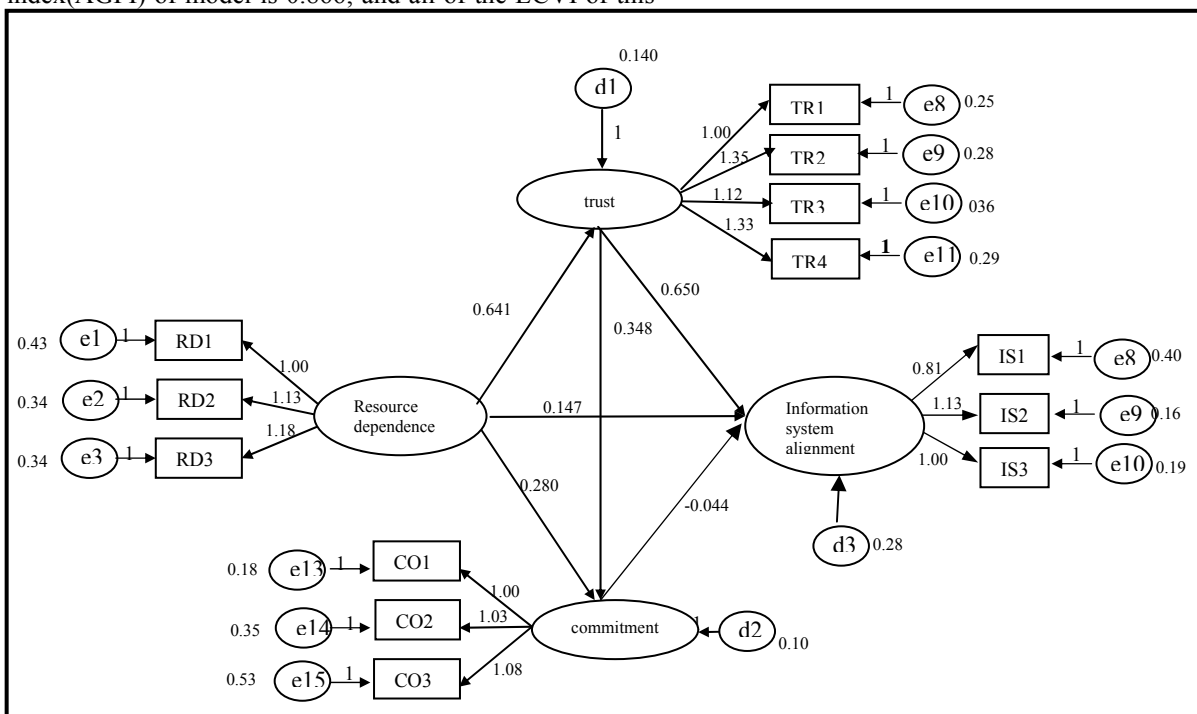


Figure 2 The whole theoretical model

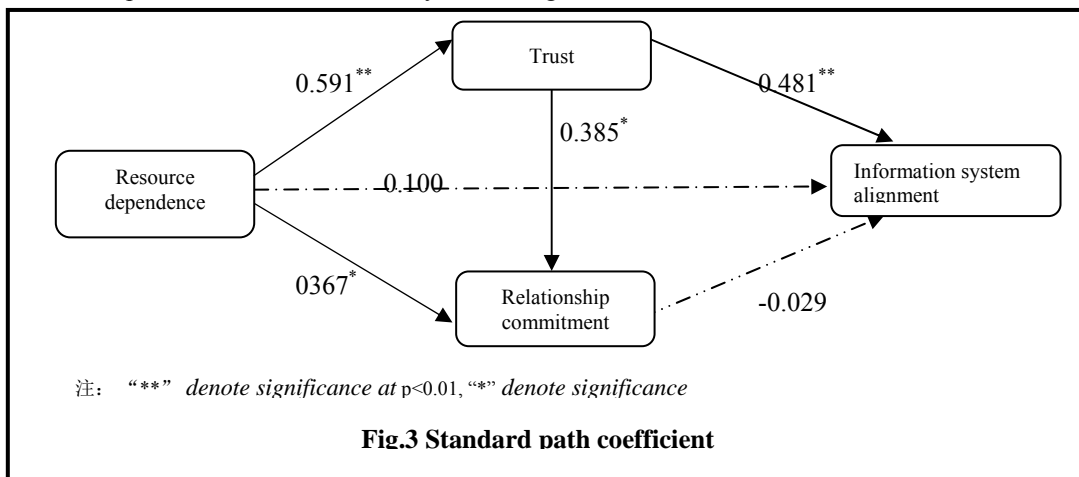
Table 6 The whole theoretical model test

Absolute fit index	$\chi^2(59) = 90.726$, $p = 0.005$, $GFI = 0.920$, $RMR = 0.041$, $RMSEA = 0.062$, $AGFI = 0.866$, $ECVI$ (theoretical model) = 1.105, $ECVI$ (saturated model) = 1.300, $ECVI$ (Independent model) = 4.622
Incremental fit index	$CFI = 0.942$, $IFI = 0.944$, $NFI = 0.854$, $NNFI = 0.923$
Parsimony fit index	$PGFI = 0.592$, $PCFI = 0.712$, $PNFI = 0.646$, $\chi^2/df = 1.538$

Hypothesis test results

After using Amos7.0 software to analyze the overall model, we obtain standard path coefficients shown in Figure 3. We can find that resource dependence among supply chain partners has a significant positive impact on trust and relationship commitment, hypothesis H1 and H2 are supported. However, resource dependence has no significant positive impact on information system alignment,

hypothesis H3 is not supported. Besides, empirical results indicate trust among has a significant positive effect on relationship commitment and information system alignment, hypothesis H4 and H5 are supported. But relationship commitment among supply chain partners has no significant positive effect on information system alignment, hypothesis H6 is not supported.



VI. Discussion and Management Implications

Many scholars believe that resource dependence among the alliance partners can enhance alliance performance or promote the formation of a new strategic alliance (Gulat, 1995; Dyer, 1996; Dyer & Singh, 1998; Jia Sheng-hua etc. 2007; Wu Jian-feng etc. 2007). Being different from previous studies, this study focuses on how the resource dependence among supply chain partners can affect the relationship and information system alignment of partners, rather than discussing the resource dependence impacts on alliance performance directly. The empirical results of this study show that resource dependence among supply chain partners has a significant positive impact on trust and relationship commitment. In addition, our empirical findings do not support the view that resource dependence has a direct influence on information alignment, but it has an indirect influence on information alignment when trust as an intermediary variable.

Secondly, our empirical studies have found that trust among supply chain partners has a significant positive impact on inter-organizations information system alignment. It indicates that enhancing trust among supply chain partners

will promote information systems integration and alignment of inter-organizations. However, the fact that mutual trust degree of most Chinese enterprises is not high which will be an important obstacle of inter-organization information system alignment. The management inspiration of this study is that top managers of Chinese supply chain enterprises should pay much attention to building human relationship network, and expanding the human relationship network can effectively improve the trust level of supply chain partners. In addition, this study has confirmed once again the trust and relationship commitment among supply chain partners have a casual relationship, namely, trust among supply chain partners has a significant positive effect on relationship commitment.

Interestingly, this study has not confirmed that relationship among supply chain partners has a significant positive impact on inter-organizations information system alignment. On the contrary, there is a little negative effect. We think that this may be closely related to our Chinese traditional culture. In our traditional culture, the real relationship of mutual trust among people and deep friendship are often clear, and do not necessarily need for frequent confession. On the contrary, the action often failed to schedule the oral

promise would be scandalous and increase the distrust. Therefore, in our country the relationship commitment among supply chain partners may not be as committed as in Western countries where it can play an effective incentive.

VII. Conclusion and Future Research

In this study, there are 141 manufacturing enterprises in the Pearl River Delta region as the research objects. We discuss the relationships among resource dependence, trust, relationship commitment and information system alignment using structural equation model and variance analysis. In conclusion, this study has found that resource dependence among supply chain partners impact on the inter-organizations information system alignment exists only one path, namely, resource dependence → trust → information system alignment.

Future research of this study: (1) to discuss the mechanism of resource dependence, trust, relationship commitment and information systems alignment of different industries; (2) to consider the characteristics of Chinese traditional culture, for example, from the perspective of interpersonal relationships or social capital, we could discuss the predisposing factor of information system alignment among supply chain partners.

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