Study on the Matching Relationship between Information System Resources and Strategy

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Abstract. The effective utilization of information technology by businesses can not only greatly enhance their efficiency and effectiveness, but also have a transformative impact on their business scope, management approaches, supply chains, competitive advantages, spur the emergence of new enterprises, and generate limitless business opportunities. This research introduces a conceptual model for examining the correlation between enterprise information system resources (ISR) and performance, with a focus on Chinese enterprises. Through questionnaire surveys, data is gathered to comprehensively explore the relationship between three ISR types and enterprise operational and market performance. Additionally, the study analyzes the influence of competitive strategy on the connection between ISR and enterprise performance. The findings demonstrate that the three types of ISRs significantly contribute to the enhancement of enterprise performance. Moreover, differences in the relationship between ISRs and performance are observed for enterprises employing different competitive strategies.

Keywords: Information system resources; Information system strategy; Matching; Resource view

1 Introduction

The effective adoption of information technology by enterprises can not only significantly enhance their efficiency and effectiveness, but also bring about changes in their business scope, management methods, supply chain, and competitive advantages, leading to the emergence of new businesses and creating limitless business opportunities [1]. Conversely, it can become a burden for the enterprise, making its operations more challenging. There are numerous examples of unsuccessful implementation of enterprise information systems in practice. Many enterprises make substantial investments in information systems, yet their business goals and returns are unclear, and may even result in a negative return on investment. The primary reason for this outcome is the insufficient integration and alignment between enterprise information system strategy and enterprise strategy, and the inability of information system strategy to dynamically adapt to changes in enterprise strategy within a dynamic environment [2].

M. F. b. Sedon et al. (eds.), *Proceedings of the 2024 3rd International Conference on Social Sciences and Humanities and Arts (SSHA 2024)*, Advances in Social Science, Education and Humanities Research 851,
https://doi.org/10.2991/978-2-38476-259-0_57

Currently, information system resource research largely centers around two key areas: the categorization of information system resources and the assessment of their value. Melville et al. discovered that information system resources not only positively influence process performance, including customer service, inventory management, and information sharing, but also correlate with positive outcomes in areas such as profitability, competitive edge, and market value [3]. Earl initially introduced the concept of information system strategy, which involves enterprises selecting information systems based on business needs and seeking strategic advantages through their application. Additionally, Chan et al. proposed a comprehensive model of high-order information system strategic dimensions, incorporating four key dimensions [4]. While some studies have generalized that enterprises should allocate information system resources in line with their information system strategy (or that the types of information system resources should align with the dimensions of information system strategy), there remains limited research on the specific allocation of information system resources based on various dimensions of information system strategy [5-7].

In light of the limitations observed in empirical research on the link between taxonomy-based ISR and firm performance in existing studies, this paper utilizes a resource-based IS classification to empirically examine the correlation between various types of ISR and firm performance. The empirical analysis conducted in this study reveals that enterprise performance should not be broadly treated as the dependent variable, but can rather be categorized into operational performance and market performance.

2 Data And Methodology

Questionnaires were distributed using two main approaches. The first method involved sending the questionnaire to three contact persons via email, namely government officials from Zhejiang and Jiangsu, and personnel from a consulting company in Shanghai. They used their extensive network to distribute the questionnaire in paper or electronic form to relevant enterprise respondents, who then returned the questionnaire to the author by mail or email. Alternatively, the author directly distributed questionnaires, mainly through email or on-site interviews, to the relevant personnel in the business community for them to fill out. A total of 200 questionnaires were sent out using the first method, resulting in 121 collected (110 from government contacts and 11 from enterprise contacts). A total of 1286 valid responses were received, representing a questionnaire response rate of 60.5% and an effective questionnaire rate of 71.1%. With the second method, 28 questionnaires were sent out and 25 were collected, with 20 being valid. This approach achieved a questionnaire recovery rate of 89.3% and a valid questionnaire rate of 80%.

In order to validate the research hypotheses in the conceptual model of this study, methods such as correlation analysis and multiple linear regression (MLR) were primarily employed. The specific research steps are as follows:

The measured items of each dependent variable and explanatory variable were consolidated into corresponding factors using reliability tests (Eq.(1)) and factor anal-

ysis (Eq.(2)). These factor values were then used as the numeric input for these variables in the linear regression model for subsequent analysis.

$$\alpha = (\frac{k}{k-1})(1-(\sum D^2 / \sum ST^2)) \tag{1}$$

$$KMO = \frac{\sum\sum a_{ij}^2}{\sum\sum a_{ij}^2 + \sum\sum b_{ij}^2} \tag{2}$$

In Eq.(1), α is Cronbach's alpha coefficient, k is item number, SD is standard deviation for each item, ST is total variation for all items. In Eq.(2), KMO is Kaiser-Meyer-Olkin coefficient, which is a measure of whether data is suitable for factor analysis. a_{ij} measures the correlation between i and j. b_{ij} is partial correlation between i and j.

Three types of ISR were used as explanatory variables, and enterprise performance was used as the dependent variable. A linear regression model (regression model 1) was utilized to test hypothesis 1 to hypothesis 3, considering multicollinearity, heteroscedasticity, and serial correlation analysis and processing.

Based on the clustering of strategic identification variables in the sample, the sample was divided into two parts: a low-cost strategy sample and a differentiated strategy sample [8-10]. By examining the relationship between the interaction term of strategy and ISR and corporate performance, the moderating effect of competitive strategy was validated. Additionally, multiple linear regression was conducted on the two subsamples to ascertain whether competitive strategy has a moderating effect on the relationship between ISR and corporate performance.

3 Experiment test

3.1 Regression analysis of enterprise ISR and enterprise performance

This study divides enterprise ISR into externally oriented ISR, internally integrated ISR, and foundational support ISR, and divides enterprise performance into operational performance and market performance. Before conducting the regression, we first conducted a correlation analysis on these variables, as shown in Table 1.

Table 1. Analysis table of the correlation between Is R and corporate performance. "*" indicates the correlation (Corr.) is significant at the 0.05 level, "**" means 0.01 level.

	Statics	Market performance	Operational performance	Internal factors	External factors	Basic factors
Market performance	Corr.	1.0				
	P	0.000				
Operational performance	Corr.	0.0	1.0			
	P	0.500	0.000			

Internal factor	Corr.	0.02	0.164	1.0		
	P	0.417	0.047*	0.000		
External factors	Corr.	0.272	0.245	0.0	1.0	
	P	0.002**	0.006**	0.500	0.000	
Basic factors	Corr.	-0.073	0.415	0.0	0.0	1.0
	P	0.227	0.000**	0.500	0.500	0.000

From the Table 1, it can be seen that there is a positive statistical correlation between externally oriented ISR and the market and operational performance of enterprises, indicating a close relationship between the level of externally oriented ISR and the market and operational performance of enterprises; Internally integrated ISR is positively correlated with operational performance at a significance level of 0.05, while foundational supportive ISR is positively correlated with operational performance.

In order to further verify the hypothesis and analyze the impact of enterprise ISR on corporate performance, this article conducted two regressions with operational performance and market performance as the dependent variables, and three types of ISR as the explanatory variables. Firstly, a regression model was established with operational performance as the dependent variable, and the regression results are shown in Tables 2 and 3.

Table 2. variation analysis. Predictors are internal, basic, and external factors, dependent variable is operational performance.

Model	Sum of squares	Degree freedom	Mean square	F	P
Regression equation	28.18	3	9.123	11.884	0.000
Residual	78.963	103	0.812		
Total	105.124	105			

Table 3. Regression equation coefficient table for operational performance on ISR. Dependent variable is operational performance.

Model	Unstandardized coefficients		Standardized coefficients	t-value	P	Collinearity tolerance	VIF
	B	Std.					
Constant	-7.75E-17	0.086		0.000	1.000		
External factors	0.248	0.086	0.246	2.865	0.005	1.000	1.000
Basic factors	0.421	0.086	0.425	4.862	0.000	1.000	1.000
Internal factors	0.168	0.086	0.168	1.932	0.058	1.000	1.000

From the Tables 2-3, although all three types of ISRs entered the regression equation, external oriented ISRs and basic supportive ISRs have a significant impact on the improvement of enterprise operational performance compared to internal integrated ISRs. The contribution of internal integrated ISRs to enterprise operational performance is not significant, but at a significance level of $p<0.1$, internal integrated ISRs have an impact on enterprise operational performance.

The dimension of business activity support plays a positive moderating role in the correlation between information system human resources, information system relationship resources, and enterprise performance. This implies that a higher level of information system human resources and information system relationship resources should be allocated when considering the business activity support dimension. Typically, the business activity support dimension is the most fundamental and earliest adopted strategic dimension in enterprise information system implementation. In the absence of experience and expertise in information system application, enterprises prioritize the cultivation and development of information system human resources and information system relationship resources while implementing information systems. Moreover, from the perspective of information system applications supported by business activities, enterprises require high-level information system human resource skills and quality information system relationship resources to identify information system requirements, develop or acquire information system technology, operate and support information system operations.

The network embedding support dimension negatively influences the correlation between information system relationship resources and enterprise performance, indicating that there is no need to allocate high-level information system relationship resources under the network embedding support dimension. The rationale behind this is that information system applications supported by network embedding have surpassed organizational and even industry boundaries. Consequently, most external technology suppliers or service providers in China are constrained by their understanding of user enterprise management and knowledge in diverse industries, making it challenging to provide effective cross-organizational and cross-industry solution support. In this context, enhancing the level of relationship resources would not improve efficiency but rather lead to increased costs.

4 Conclusions

Following Wade's (2004) classification of ISRs, this study presents three types of ISRs based on interviews with entrepreneurs and input from academic teams: externally oriented ISRs, internally integrated ISRs, and foundational support ISRs. By conducting correlation and regression analyses, the study confirms the relationship between the three types of ISRs and corporate performance. The conclusion drawn reveals that all three types of ISRs significantly influence the enhancement of corporate performance. Specifically, externally oriented ISRs have a notable impact on the operational and market performance of enterprises, while internally integrated ISRs and foundational support ISRs significantly affect operational performance. Furthermore, the three hypotheses concerning the relationship between ISRs and corporate performance in this article have been validated. On the other hand, network embedding support requires the integration of information systems with partners, and the information systems of different partners are influenced by different external technology suppliers or service providers, resulting in organizational incompatibility and difficulty in information sharing. Therefore, a higher level of relationship resources

will lead to increased technical and transaction costs during information system integration.

The deep engagement of decision-makers in the selection of information system applications or functional modules under business decision support is influenced by the personalization of decision-making and the limited understanding of decision-making by non-decision-makers. This, in turn, reduces the need for business skills among information system personnel. Furthermore, enterprises typically prioritize the implementation of business decision support maintenance once they have established a certain foundation of business activity support maintenance. This is evident in the inclusion of business decision support modules within business activity support maintenance.

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