IT-business Alignment and Resource-based View of Competitive Advantage: Intangible Assets of Korean SMEs

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Abstract This paper structures and analyzes empirical evidence in IT business value research which is theoretically guided by the intangibility of a firm's resources from the resource-based view (RBV) to find out how different companies' resources affect the IT business value in terms of competitive advantage. The empirical study uses 2,869 SEMs' survey data from the Human Capital Corporate Panel survey of Korea in 2005. Among the variables in the competitive factors, a relationship between "differentiation/diversification and quality /customer," "differentiation/diversification and leadership/reliability," "quality/customer and cost efficient," and "quality/customer and leadership/reliability" are strong, positive and significant. As for IT related variables, there is a positive and significant relationship with "differentiation/diversification" and a significant, strong, but negative relationship with "leadership/reliability."

Keywords Competitive Forces, Assets, IT-business Alignment, SEM

1. Introduction

In the rapidly changing world, every firm's priority is to stay competitive in the market in order to survive and grow. If a firm is implementing a value creating strategy not simultaneously being implemented by any current or potential competitors, it would be said that it has a competitive advantage. If a firm is implementing a value creating strategy not simultaneously being implemented by any current or potential competitors when these other firms are unable to duplicate the benefits of this strategy, the firm would have a sustained competitive advantage [5]. Porter [31] proposed a well-known "Five Forces" framework to analyze industry and development of business strategy. This model focuses on a firm's external threats and opportunities,

as well as a firm's internal strengths and weaknesses, and is mainly based on the structure-conduct-performance paradigm of the theory of industrial organization [3] [26]. A Five Forces model is known as a useful framework to assist in assessing the competition in an industry and determining the relative attractiveness of that industry. The research based view (RBV) has emerged as one of the substantial theories of strategic management in 1980s [4] [37] [45]. The RBV suggests that the resources possessed by a firm are the primary determinants of its performance, which may contribute to a sustainable competitive advantage of the firm (e.g., [16] [45]). According to Barney[5], the concept of resources includes all assets, capabilities, organizational processes, firm attributes, information, knowledge, etc. controlled by a firm that enable the firm to conceive of and implement strategies that improve its efficiency and effectiveness [5] [14]. A research objective of this paper is to structure and analyze empirical evidence in IT business value research which is theoretically guided by the intangibility of a firm's resources from the resource-based view (RBV) to find out how different companies' resources affect the IT business value in terms of a competitive advantage. By doing so, the author will show which companies' resources effect directly IT and the competitive advantage are most investigated. According to Barney [5], the RBV, which is a predictive theory, helps to understand why certain firms can create a competitive advantage. The RBV of the firm is based on the notion that firms are unique and composed of distinct bundles of resources. Resources are defined as the tangible and intangible assets a firm uses to choose and implement its strategies [15] [34]. Examples of such resources are brand names, in-house knowledge of technology, skilled personnel, trade contracts, efficient procedures, etc. [45] [19].

Within a pure RBV framework, internal resources are considered the ultimate source of sustained competitive advantage. Thus, a strategy is primarily concerned with obtaining an alignment, or fit, between the organization's

internal resources and external opportunities. The resource-based view of the firm dominates strategic management literature and has also found use in management information systems literature [34]. Single-business firms can achieve sustainable competitive advantage from such resources as information technology [25] [33]. Meanwhile, RBV stresses the importance of intangible resources as the key to sustainability.

The author tests the association between intangibles and IT-business alignment predicted by RBV in a large sample of Korean small and medium companies (SMEs). This paper is structured as follows: In the next section the author gives a brief overview on the RBV and its adoption in IT. Subsequently, the methods which are used to test the hypotheses are detailed. In the fourth section the results are discussed as well as their implications and limitations.

2. Literature

The resource based view (RBV) asserts that resources that are valuable, rare, inimitable, and cannot be strategically substituted, form the basis of competitive advantage [5] [30] [45]. RBV views firms as a bundle of resources and capabilities, which determine its strengths and weaknesses. There was no explicit distinction between resources and capabilities in the earlier literature. Later, resources are referred as assets that either are owned or controlled by a firm, while capabilities refer to its ability to exploit and combine resources, through organizational routines in order to accomplish its targets [2]. Capabilities are described as the socially complex procedures that determine the efficiency with which organizations are able to transform inputs into outputs [13]. Firms can easily acquire all the resources they need to implement a viable product-market strategy based on a unique configuration of their value activities. Therefore resources are highly mobile, which over time makes competing firms identical in terms of their resource endowment [32]

Various IT related resources are identified as potential sources of competitive advantage based on a resource-based view [7], and some research stated that the proper use of IT would enhance both financial and operational performances [41] [38]. Since resource-based theory provides an understanding of how knowledge sharing can uncover IT-based opportunities and produce superior strategies, it is important to understand strategic IT alignment [21].

Powell and Dent-Micallef [33] investigate linkages

between information technology and firm performance in the retail industry. They found that ITs along did not produce sustainable performance advantages, but that some firms gained advantages by using ITs to leverage intangible, complementary human and business resources such as flexible culture, strategic planning-IT integration, and supplier relationships, which support the resource-based approach.

Wang, et al. [44] investigates whether and how IT skills that an IT department possesses influence the firm's IT capabilities and IT-business alignment. Their empirical data collected from large and medium-sized manufacturing firms in Taiwan. 120 IT directors showed that both soft IT skills and hard IT skills positively affect the three IT capabilities simultaneously; IT adaptability and IT-user collaboration significantly affect the IT-business alignment, and IT-user collaboration has significant effect on IT adaptability. They conclude that their findings confirm the importance of IT-related resources and capabilities possessed by the IT department.

Information systems are being sought to impact the organization in identified five strategies thrusts, such as low cost, differentiation, growth, alliance and innovation [45]. Information system structure is aligned with the organization structure. The resource-based view seems to support that firms tend to diversify in related industries [23] [24] [28]. Related diversification also leads to higher rents than unrelated diversification [35] [36] [43] [27] [29]. Brown and Magill [10] suggest that unrelated diversification and high business-unit autonomy should be aligned with primarily decentralized information systems structures that emphasize efficiency, standardized controls, and integrative architectures. Montgomery and Hariharan [28] show that firms with less flexible excess resources prefer related diversification. On the other hand, firms in industries that need flexible and fungible resources tend to diversify into unrelated industries.

Kearns and Lederer [21] examine how strategic IT alignment can produce enhanced organizational strategies that yield competitive advantage using the perspective of the resource-based view. A survey data of 161 CIOs show that information intensity is an important antecedent to strategic IT alignment, that strategic IT alignment is best explained by multiple constructs which operationalize both process and content measures, and that alignment between the IT plan and the business plan is significantly related to the use of IT for competitive advantage.

Figure 1. A Research Model

3. Research Model and Hypotheses

In this paper, the intangibility of firms' resources from RVB model is adopted and their relationships with IT strategy and competitive strategy as frameworks for analyzing how Korean SMEs view their competitive resources and the role of information technology in competition (see Fig.1).

Since customer and market needs are the primary keys for the maximization of profitability, managers have to develop and apply such strategies that maximize customers' utility. This occurs by differentiated products or by lower cost production. Market demand, besides, reflects customer needs and demonstrates firm's profitability. This is the reason that strategy effects that take into consideration market demand and consequently customers utility, are named otherwise utility effects. However, although utility effects provide the necessary condition for high performance, above industry's average effects, coming from specific unique resources and capabilities, are needed for its sustainability [39].

Four hypotheses have been formed based on the intangibility of RBV framework and their relationships with IT strategy as follows.

H1: There is a significant, positive relationship between differentiation/diversification and IT.

H2: There is a significant, positive relationship between leadership/reliability and IT.

H3: There is a significant, positive relationship between cost efficiency/development and IT.

H4: There is a significant, positive relationship between quality/customer and IT.

4. Data

Data were obtained from the Human Capital Corporate Panel survey, which is officially approved by Korea National Statistical Office. The first survey was completed in 2005, and the fifth survey was completed in 2013. This paper uses 2005 survey data, since it contains IT related questionnaires. The survey population includes corporations employing more than 100 workers and listed in "KIS Corporate Data 2005," published by the Korea Information Service, or those which employs more than 300 workers and unlisted. There are 2,869 valid responses. Most of the questionnaires used a five point scale rating.

A list of variable is shown in Table 1.

A radar chart for the variable mean form the survey on competitive forces is shown in Fig. 2. The radar chart suggests that "Improvement of the defect rate and the production yield" in "Quality/Customer" gained the lowest score among the variables. Relatively, variables in "Quality/Customer" are lower than other competitive forces. The descriptive results imply that those Korean SMEs feel competitive pressure on "Improvement of the defect rate and the production yield," "Quality of the product/service," and "Rapid response to customers' needs."

Table 2 contains the Pearson correlation coefficient between all pairs of sixteen variables for competitive forces with two-tailed significance of these coefficients. Most of the variables correlate fairly well, and none of the correlation coefficients is particularly large; therefore multicollinearity is not a problem for these data.

Table 1. A list of variables

Differenciation/ Diversification	W108_23	Diversitification of products / goods / services
	W108_25	Products/services differentiation
	W108_27	Sufficiently raising new customers' acquisition rate
	W108_31	Improve and manage brand image
	W108_29	Retention rate of major customers
Leadership/ Reliability	W108_07	Leadership of the management team
	W108_01	The overall capacity of the human resources
	W108_05	Building a trust based community
	W108_03	Securing excellent human resources
Cost efficiency/ Development	W108_13	Ensure competitive advantage through cost reduction
	W108_15	Pursuit of economies of scale
	W108_09	The development ability of new products / services
	W108_11	Efficiency and simplification of business procedures
Quality/ Customer	W108_19	Improvement of the defect rate and the production yield
	W108_17	Quality of the product / service
	W108_21	Rapid response to customers' needs
IT	W110_01	Ease of use of the company's information system
	W110_02	Receive needed information
	W110_03	Use of IT enable production dynamism of the process of the new business knowledge and business improvement
	W110_04	Use of IT enhance knowledge and the business performance scheme which are rapidly spreaded within the company
	W110_05	Management obtains higher knowledge level on information system
	W110_06	Management team supports the lavishly information system
	W110_07	Use of IT enhance the creation of knowledge of employees, evaluation and compensation
	W110_08	Higher ability to take advantage of information technology
	W110_09	I easily understand the acquired information
	W110_10	I will participate actively in the knowledge circle

Table 2. Correlations

		Differenciation/Diversification					Leadership/Reliability				Cost efficiency/Development				Quality/Customer		
		W108_23	W108_25	W108_27	W108_31	W108_29	W108_07	W108_01	W108_05	W108_03	W108_13	W108_15	W108_09	W108_11	W108_19	W108_17	W108_21
Differenciation/ Diversification	W108_23	1	.772**	.643**	.621**	.626**	.542**	.527**	.486**	.496**	.503**	.538**	.578**	.430**	.504**	.558**	.632**
	W108_25	.772**	1	.711**	.674**	.675**	.554**	.605**	.579**	.584**	.561**	.575**	.641**	.510**	.619**	.635**	.671**
	W108_27	.643**	.711**	1	.696**	.670**	.509**	.610**	.522**	.588**	.530**	.570**	.578**	.519**	.572**	.547**	.610**
	W108_31	.621**	.674**	.696**	1	.715**	.575**	.604**	.568**	.610**	.574**	.590**	.563**	.520**	.650**	.595**	.636**
	W108_29	.626**	.675**	.670**	.715**	1	.535**	.608**	.534**	.549**	.575**	.596**	.537**	.466**	.636**	.604**	.652**
Leadership/ Reliability	W108_07	.542**	.554**	.509**	.575**	.535**	1	.603**	.672**	.633**	.531**	.509**	.504**	.519**	.565**	.523**	.557**
	W108_01	.527**	.605**	.610**	.604**	.608**	.603**	1	.668**	.785**	.596**	.561**	.589**	.591**	.661**	.569**	.615**
	W108_05	.486**	.579**	.522**	.568**	.534**	.672**	.668**	1	.693**	.606**	.562**	.501**	.542**	.590**	.508**	.560**
	W108_03	.496**	.584**	.588**	.610**	.549**	.633**	.785**	.693**	1	.565**	.546**	.569**	.577**	.571**	.478**	.514**
Cost efficiency/ Development	W108_13	.503**	.561**	.530**	.574**	.575**	.531**	.596**	.606**	.565**	1	.674**	.627**	.640**	.725**	.611**	.582**
	W108_15	.538**	.575**	.570**	.590**	.596**	.509**	.561**	.562**	.546**	.674**	1	.610**	.599**	.684**	.615**	.561**
	W108_09	.578**	.641**	.578**	.563**	.537**	.504**	.589**	.501**	.569**	.627**	.610**	1	.604**	.574**	.631**	.567**
	W108_11	.430**	.510**	.519**	.520**	.466**	.519**	.591**	.542**	.577**	.640**	.599**	.604**	1	.587**	.533**	.519**
Quality/ Customer	W108_19	.504**	.619**	.572**	.650**	.636**	.565**	.661**	.590**	.571**	.725**	.684**	.574**	.587**	1	.800**	.700**
	W108_17	.558**	.635**	.547**	.595**	.604**	.523**	.569**	.508**	.478**	.611**	.615**	.631**	.533**	.800**	1	.684**
	W108_21	.632**	.671**	.610**	.636**	.652**	.557**	.615**	.560**	.514**	.582**	.561**	.567**	.519**	.700**	.684**	1

Figure 2. Radar Chart of Various Competitive Factors

5. Results

Testing the efficacy of the structural equation model was conducted by AMOS 22, and the major results of analysis are shown in Fig. 3. The path diagram highlights the structural relationships. In this diagram, the measured variables are enclosed in boxes, latent variables are circled, and arrows connecting two variables represent relations, and open arrows represent errors.

When SEM is used to verify a theoretical model, a greater goodness of fit is required for SEM analysis[12]; the better the fit, the closer the model matrix and the sample matrix. By means of various goodness-of-fit indexes, including the comparative fit index (CFI) [6], Incremental Fit Index (IFI) [9], and the root mean squared error of approximation (RMSEA)[11], the estimated matrix can be evaluated against the observed sample covariance matrix to determine whether the hypothesized model is an acceptable representation of the data.

In general, fit indexes (i.e., CFI and IFI) above 0.90 signify good model fit. RMSEA values lower than 0.08 signify acceptable model fit, with values lower than 0.05 indicative of good model fit [11]. The research model is shown in figure 3; CFI=0.922, IFI=0.922, RMSEA= 0.075 (see Table 3). The Path Coefficient for both structural models suggested that the regression coefficient for all constructs show significance. Since all of the indexes satisfy the cut-off values, these results are regarded as acceptable. Table 3 summarizes the results of these tests for the research model.

Table 3. Reliability Test

FIT indices	Recommended level	SEM model
CMIN/DF	5.0 [45]~2.0 [40].	17.234
CFI	>0.90 [6]	0.922
IFI	>0.90 [9]	0.922
RMSEA	<0.08[11]	0.075
AIC	Smaller values suggest a good fitting [1]	4852.002
p-value	>0.05	0.000

The followings are results of hypotheses.

H1: There is a significant, positive relationship between differentiation/diversification and IT.

H2: There is a significant, negative relationship between leadership/reliability and IT.

H3: There is not a significant, weak and negative relationship between cost efficiency/ development and IT.

H4: There is not a significant, weak and positive relationship between quality/customer and IT.

Table 4 summarizes the results of the test for the research model

6. Conclusions and Future Scope

Using the perspective of the intangibility of the resource-based view, a model is presented to examine how different companies' resources affect the IT business value in terms of competitive advantage. The empirical study based on 2,869 responses on the survey data from Human Capital Corporate Panel survey of Korea in 2005. The

results of the SEM model show that a relationship between “differentiation/ diversification and quality /customer,” “differentiation/ diversification and leadership/reliability,” “quality/customer and cost efficient,” and “quality/customer and leadership/reliability” are strong, positive and

statistically significant, among the variables in the competitive factors. Companies’ resources which affect IT business value are differentiation/diversification, which show positive and significant relationships.

Figure 3. A Research Model

Table 4. The Path Coefficients of the Research Model

		Std. weight	Unstd. weight	S. E.	C.R. (t-value)	P value
Quality__Customer	<-- Differentiation__Diversificaiton	0.918	1.071	0.028	38.046	***
Leadership__Reliability	<-- Differentiation__Diversificaiton	0.616	0.62	0.062	9.978	***
Leadership__Reliability	<-- Quality__Customer	0.267	0.23	0.053	4.377	***
Cost_efficiency__Development	<-- Quality__Customer	0.597	0.563	0.032	17.835	***
Cost_efficiency__Development	<-- Leadership__Reliability	0.358	0.392	0.035	11.102	***
IT	<-- Differentiation__Diversificaiton	0.304	0.249	0.071	3.498	***
IT	<-- Cost_efficiency__Development	-0.079	-0.058	0.051	-1.151	0.25
IT	<-- Quality__Customer	0.008	0.005	0.069	0.078	0.938
IT	<-- Leadership__Reliability	-0.727	-0.591	0.05	-11.752	***
W108_23	<-- Differentiation__Diversificaiton	0.757	1			
W108_25	<-- Differentiation__Diversificaiton	0.832	1.124	0.019	57.873	***
W108_27	<-- Differentiation__Diversificaiton	0.794	1.037	0.023	45.431	***
W108_31	<-- Differentiation__Diversificaiton	0.823	1.162	0.026	44.293	***
W108_29	<-- Differentiation__Diversificaiton	0.82	1.09	0.025	44.356	***
W108_07	<-- Leadership__Reliability	0.763	1			
W108_01	<-- Leadership__Reliability	0.835	0.986	0.022	45.035	***
W108_05	<-- Leadership__Reliability	0.804	1.023	0.021	48.231	***
W108_03	<-- Leadership__Reliability	0.827	1.047	0.024	44.462	***
W108_13	<-- Cost_efficiency__Development	0.833	1			
W108_15	<-- Cost_efficiency__Development	0.807	1.018	0.021	49.37	***
W108_09	<-- Cost_efficiency__Development	0.799	0.976	0.021	46.34	***
W108_11	<-- Cost_efficiency__Development	0.758	0.8	0.018	45.603	***
W108_19	<-- Quality__Customer	0.859	1			
W108_17	<-- Quality__Customer	0.81	0.94	0.017	54.658	***
W108_21	<-- Quality__Customer	0.822	0.892	0.019	47.778	***
W110_01	<-- IT	0.724	1			
W110_02	<-- IT	0.808	1.203	0.029	41.357	***
W110_03	<-- IT	0.863	1.298	0.03	43.852	***
W110_04	<-- IT	0.794	1.225	0.03	40.711	***
W110_05	<-- IT	0.669	1.025	0.03	34.658	***
W110_06	<-- IT	0.712	1.097	0.03	36.92	***
W110_07	<-- IT	0.639	1.111	0.034	33.076	***
W110_08	<-- IT	0.605	0.772	0.025	31.182	***
W110_09	<-- IT	0.71	0.907	0.025	36.769	***
W110_10	<-- IT	0.559	0.91	0.032	28.741	***

***significant at 0.001

Differentiation was considered as one of the five strategies thrusts in the previous study [46], and this study confirms that importance of differentiation as a company's intangible resource. Diversification is also significantly related to IT; it implies that those firms in this study require more flexible and intangible resources using IT. A company's resource in leadership/reliability affect significantly and negatively on IT business value. The rest of competitive forces are negative and not significantly related to IT. Although a lack of strategic leadership and reliability may find companies losing focus in the long term, national culture (Korean culture, in this case), competitiveness and market development affect strategic leadership [17] [18] [8] [12] [20]. This paper's analysis is based on the 2005 dataset; IT-business alignment in Korea might not so significant then, and we may have a different picture with a recent data. Later, Teece et al.[41] offered a comprehensive framework of dynamic capabilities that

reflect a firm's ability to achieve new and innovative forms of competitive advantage. These encompass organizational and managerial processes (i.e., coordination/integration, learning and reconfiguration), specific asset positions (i.e., technological, financial, reputational etc. assets) and path dependencies (i.e., the firm's history). The author would like to investigate competitive factors further, and their relationships with IT.

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