A Study of the Evaluation of Dynamic Capability Based on Tacit Knowledge Sharing

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Abstract. Based on Tacit knowledge sharing view, this study focused on dynamic capabilities. Through reviewing the concept and nature of Tacit knowledge sharing, interpreting the existing dynamic capabilities definition, explored the relationship of tacit knowledge sharing and dynamic capability, analyzed the tacit knowledge sharing activities of dynamic capabilities evolution, and then put forward a new dimension constitute frame work of dynamic capabilities based on knowledge view.

Introduction

With continuous development of the society, we have entered into an era of knowledge economy, the development of economic globalization and technology revolution of the industry changed the market system. The environmental uncertainty increased, and the dynamic environment change rapidly, how to evaluate the dynamic capability of enterprise, become a research hotspot of modern enterprise strategic management. From the perspective of tacit knowledge sharing, at the individual level, group level and organizational level we can know that tacit knowledge is effectively shared. Therefore, A study of the evaluation of dynamic capability based on tacit knowledge sharing of enterprises is particularly important.

Review of research on tacit knowledge sharing and dynamic capability

About the definition of tacit knowledge: Nonaka Fujiro thinks tacit knowledge is highly personalized, and limited by the environment of the individual existence [1]. In the path of tacit knowledge sharing analysis: in 1977, Teece firstly proposed the idea of knowledge transfer, he believed that technology transferring can help enterprise to accumulate valuable information[2]. Koskinen believed that by learning and technical innovation can promote the tacit knowledge transformation[3]. Thomas and Heights proposed a way of telling story to achieve and promote sharing tacit knowledge[4]. About the study on factors of tacit knowledge sharing: Szulanski pointed out, knowledge transfer, information source, channel, receiver and the situation are the basic elements of knowledge transfer[5]. Leonard believes that the establishment of knowledge sharing, organizational routines and incentive mechanism, have important role on the sharing of tacit knowledge[6]. Table 1 summarizes the scholars to the dynamic capability evaluation index.

After literature review, we find that, research of the relationship between tacit knowledge and the dynamic capability of the enterprise mostly focused on the essential characteristics. But few quantitative studies from the angle of quantitative analysis. This study is based on the mechanism of tacit knowledge sharing and the dynamic capability of the enterprise's tacit knowledge sharing, and establish an evaluation system of dynamic capability based on tacit knowledge sharing in order to study dynamic capability of enterprise.

Table 1 Comparative analysis on evaluation index of dynamic capabilities

Author	Evaluation index of dynamic capabilities
Iansiti & Clark(1994)	Internal integration; External integration
Bierly & Chakrabarti (1996)	Technology study; Strategic flexibility
Teece (1997)	Process; Position; Path
Tripsas(1997)	External knowledge integration capability; Internal knowledge integration capability
Nelsen(2006)	Knowledge development; Knowledge reintegration; Knowledge communication and sharing
Wang & Ahmed (2007)	Adaptive capacity; Absorptive capacity; Innovation ability
Jiao Hao(2008)	Environmental perception; Technology flexibility; Organization flexibility

The Construction of evaluation system of dynamic capability based on tacit knowledge sharing

The Item Construction of Dynamic Capability Based on Tacit Knowledge Sharing

On the basic of dynamic capability dimensions review of the system, through theoretical analysis, the author thinks that: from the perspective of tacit knowledge sharing, dynamic capability of enterprise can be divided into four dimensions: learning ability, technical ability, knowledge integration ability and innovation ability. This study we designed questionnaire and the questionnaire is based on the scientific principle, systematic principle, objectivity principle, operability and comparability principle and learning ability, finally uses 9 specific measurement index LA1~LA9; technical ability uses 9 specific indicators TSC1~TSC9; knowledge integration ability uses 6 specific indicators of KIC1~KIC6; innovation ability uses 9 specific indicators of IC1~IC9.

Questionnaire Design and Data Sources

This research uses the Likert 5 point scale to design specific items, items scored from 1 to 5 were totally incompatible, ensure the answer can be relatively accurate. The object of study involved tacit knowledge sharing activities of enterprises, and manufacturing industry is the main enterprises, to ensure that the questionnaire has enough understanding to answer the questionnaire.

This empirical questionnaire use paper questionnaires and electronic questionnaire in two ways and 170 staffs join the study, investigation object is served in the mature enterprise, to ensure the effectiveness of quality and data of the questionnaire. The survey of enterprises mainly relates to building materials, electronics, mechanical engineering, food and beverage, financial and insurance industry. Finally, 150 questionnaires were recovered, the recovery rate is 88%. In order to ensure the validity of the questionnaire data, when the questionnaire answers fill rate less than 80% it will be invalid. Through the above standard screening, 10 invalid questionnaires was excluded, the survey of 140 questionnaires were returned, counted for 93% of questionnaire, we put the 140 questionnaire as the basic data of our empirical study. In this study, by using factor analysis method, evaluated with SPSS17.0 software.

Factor Analysis of Dynamic Capability Based on Tacit Knowledge Sharing

This study form the evaluation system of dynamic capability based on tacit knowledge Sharing , gradually analysis each item, then play comprehensive evaluation. Firstly is the examination of KMO and Bartlett, according to the results of SPSS17.0, the four dimensions of KMO values were more than 0.5, shows the results of factor analysis is acceptable, the factor analysis is feasible. The total explained variance and rotated component matrix factor analysis is shown in the table below.

Through the analysis of total statistics, as can be seen from the CITC value, the correlation coefficient of LA8 and the rest items is 0.460, the correlation is low; and from the removed Cronbach's Alpha value, when LA8 deletion, alpha coefficient of the scale add from 0.893 to 0.894, the remaining items scale coefficient is less than 0.893, so we delete LA8, Similarly we also delete IC3.The rest of the correlation coefficients of the original variables are more than 0.5, the correlation is higher; so we do not delete them.

The next step is to determine the main components: First of all, the factor loading matrix obtained in the 2 columns of data entry SPSS, named Al, A2. Then, using Transform-Computer, brings up the computer variable dialog box, enter the equation of Z1=Al/SQRT(5.024), click OK then get the first feature vector with Z1 as a variable name. Once again brings up the computer variable dialog box, in the dialog box to enter the Z2=A2/SQRT (1.430) can get second feature vectors using Z2 as a variable, the eigenvector matrix.

The feature vector matrix of learning ability can be the principal component:

$$Y_1 = 0.13X_1 + 0.17X_2 + 0.16X_3 + 0.15X_4 + 0.18X_5 + 0.15X_6 + 0.17X_7 + 0.13X_9$$
$$Y_2 = 0.43X_1 + 0.28X_2 - 0.25X_3 + 0.30X_4 - 0.12X_5 - 0.11X_6 - 0.19X_7 - 0.31X_9$$

Computational learning ability evaluation formula:

$$F_1 = 0.55825Y_1 + 0.15884Y_2$$

Similarly technical ability of principal component:

$$Y_3 = 0.16X_{10} + 0.15X_{11} + 0.15X_{12} + 0.15X_{13} + 0.14X_{14} + 0.15X_{15} + 0.16X_{16} + 0.12X_{17} + 0.15X_{18}$$
$$Y_4 = 0.15X_{10} - 0.41X_{11} - 0.02X_{12} - 0.29X_{13} - 0.30X_{14} - 0.15X_{15} + 0.35X_{16} + 0.34X_{17} + 0.36X_{18}$$

Computational technical ability evaluation formula:

$$F_2 = 0.55553Y_3 + 0.14685Y_4$$

Similarly Knowledge integration ability of principal component:

$$Y_5 = 0.19X_{19} + 0.19X_{20} + 0.18X_{21} + 0.20X_{22} + 0.17X_{23} + 0.18X_{24}$$
$$Y_6 = -0.22X_{19} - 0.03X_{20} - 0.23X_{21} + 0.04X_{22} + 0.21X_{23} + 0.26X_{24}$$

Computational Knowledge integration ability evaluation formula:

$$F_3 = 0.80492Y_5 + 0.07533Y_6$$

Similarly Innovation ability of principal component:

$$Y_7 = 0.12X_{25} + 0.14X_{26} + 0.14X_{28} + 0.15X_{29} + 0.14X_{30} + 0.14X_{31} + 0.14X_{32} + 0.13X_{33}$$
$$Y_8 = 0.29X_{25} + 0.19X_{26} - 0.02X_{28} - 0.16X_{29} + 0.01X_{30} - 0.16X_{31} + 0.05X_{32} - 0.24X_{33}$$

Computational Innovation ability evaluation formula:

$$F_4 = 0.67299Y_7 + 0.09655Y_8$$

In this paper, the factor analysis of the sample information using the SPSS17.0 statistical software, get the weight of each part (the factor load value) were learning ability (0.893), technical ability (0.894), knowledge integration ability (0.948), innovation ability (0.936). So the dynamic abilities weight matrix is [0.893 0.894 to 0.948 0.936], after standardization we get [0.265 0.265 0.282 0.278]. We get the dynamic ability calculation formula as follows:

$$F = 0.265F_1 + 0.265F_2 + 0.282F_3 + 0.278F_4$$

Table 2 Total variance explained and rotated component matrix

component	Total variance explained									Rotated component matrix	
	Initial eigenvalue			load extraction of square			load rotating square			Component1	Component2
	Total	Variance %	Cumulate	Total	Variance %	Cumulate	Total	Variance %	cumulate		
LA1	5.02	55.825	55.825	3.976	44.179	44.179	3.97	44.179	44.17	.303	.862
LA2	1.43	15.884	71.709	2.478	27.529	71.709	2.47	27.529	71.70	.542	.747
LA3	.821	9.120	80.829							.864	.064
LA4	.591	6.564	87.392							.451	.731
LA5	.360	4.000	91.393							.856	.268
LA6	.288	3.195	94.588							.723	.209
LA7	.207	2.303	96.891							.869	.155
LA8	.172	1.916	98.808							.787	-.084
LA9	.107	1.192	100.00							.303	.862
TSC	5.00	55.553	55.553	3.007	33.415	33.415	3.00	33.415	33.41	.492	.664
TSC	1.32	14.685	70.239	2.795	31.052	64.467	2.79	31.052	64.46	.934	.079
TSC	.898	9.982	80.221							.587	.457
TSC	.706	7.845	88.066							.828	.194
TSC	.479	5.317	93.383							.812	.157
TSC	.225	2.500	95.883							.694	.328
TSC	.206	2.291	98.173							.310	.864
TSC	.116	1.290	99.464							.170	.732
TSC	.048	.536	100.00							.273	.853
KIC	4.83	80.492	80.492	4.829	80.492	80.492	4.82	80.492	80.49	.462	.923
KIC	1.45	7.533	88.025	1.452	7.533	88.025	1.45	7.533	88.02	.765	.486
KIC	.315	5.253	93.277							.483	.868
KIC	.190	3.163	96.441							.675	.479
KIC	.130	2.160	98.601							.725	.325
KIC	.084	1.399	100.00							.427	.753
IC1	6.05	67.299	67.299	6.057	67.299	67.299	6.05	67.299	67.29	.478	.835
IC2	1.86	9.655	76.954	1.869	9.655	76.954	1.86	9.655	76.95	.336	.653
IC3	.785	8.726	85.680							.464	.852
IC4	.499	5.545	91.226							.747	.426
IC5	.293	3.259	94.484							.723	.101
IC6	.197	2.189	96.673							.326	.912
IC7	.174	1.929	98.602							.921	.136
IC8	.082	.908	99.509							.478	.835
IC9	.044	.491	100.00							.336	.653

The Construction of Dynamic Capability Based on Tacit Knowledge Sharing

According to scientific and operational principles, stability and dynamics of combination principle, through the above analysis, we get the construction of dynamic ability based on tacit knowledge sharing.

Table 3 The evaluation system of dynamic ability based on tacit knowledge sharing

	First level	Second level
Dynamic ability	Learning ability	1. Training mechanism
		2. Training effect transformation ability
		3. The ability to obtain external tacit knowledge
		4. The ability to obtain internal tacit knowledge
	Technical ability	1. The efficiency and transmission level with external environment
		2. The transmission level of different enterprise
		3. Monitoring ability of technical information
		4. Leading technology degree
		5. R & D capability
		6. The transforming ability of R & D results
	Knowledge integration ability	1. The ability to integrate external and internal knowledge
		2. The ability to integrate different departments, team or individual knowledge within the enterprise
		3. The ability to integrate different technologies or application domain knowledge
		4. The ability to integrate new and old knowledge
		5. The ability to adjust the internal organization structure
		6. The ability to adjust to external networks
	Innovation ability	1. The ability of innovation resources input
		2. The ability to manage innovation
		3. The ability to encourage innovation
		4. The ability to achieve innovation

Conclusion

Research of enterprises dynamic ability of enterprise is the focus of the strategic management, this research through the model construction, evaluation and practical research the conclusions are as follows.

1. Dynamic capability is not only a kind of update and change ability, also it can use some external factors to explain and research, we explain dynamic capability and the establishment of the corresponding assessment system through four dimensions: learning ability, technological ability, knowledge integration ability and innovation ability, so as to guide the business activities of enterprises.

2. The whole process of organizational structure and the market environment influence the enterprises's dynamic capabilities, enterprise should construct integrated organizational structure in the interior, enriching and sharing the knowledge resources inside; and grasping the external response in the market environment, and make full use of favorable market factors to promote the development of enterprises.

Acknowledgement

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