EMPIRICAL STUDY FOR IMPACT OF BUSINESS INFORMATION SYSTEM ON DYNAMIC CAPACITY OF FIRM

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ABSTRACT

On base of information systemic theory, this paper studies impact from business information system on dynamic capacity of firm, through data analysis from questionnaire, we get results that business information system(BIS) significantly influence on dynamic capacity(DC), management level of firm takes partial function of mediator when BIS impacts on DC, and study atmosphere takes significantly negative function of moderator both as BIS impacts on management level or DC and management level influences on DC. We find that when use time of business information system and use quality of business information system take function together, use quality of BIS mainly take function on DC yet use quality and use time of BIS have mutual substitution effect. BIS influences on DC limitedly, other factors reduce percentage of impact from BIS on DC (slope) by mean of study atmosphere. All these give insight to BIS and DC of firm and meaningful suggestion to managers.

Keywords: Business information system; Dynamic capacity; System theory; Information theory; Control theory.

INTRODUCTION

Survival and development of enterprise is not independent from core competitiveness, average lifetime of enterprise becomes shorter and shorter (Blue book of Chinese Federation of Industry and Commerce, 2017), it's necessary for firm to deeply study on core competitiveness for survival and development, business information system (BIS) and dynamic capacity (DC) of firm is right the core competitiveness for firms.

Helfat (1997) has pointed out that dynamic capacity of firm, as a part of ability or power, is able to help enterprise to create new products and procedure to meet the needs of changing market. Eisenhardt and Martin (2000) hold that DC of firm can assist enterprise in suit of change market whatever stage of life circle the market is in and serve enterprise at organizing resources to re-distribute. DC of firm is ability of adaption to quick changeable market by integration, reform and redistribution of internal resources and external capacity of firm. Dynamic means key strategies of firm are able to suit, integrate and redistribute the skills, resources and competencies of organization when enterprise faces on outside surrounding changes (Teece et al., 1997). As for enterprises with multiple nationalities, DC is regarded as ability from resources organized and update to create value, aiming at keeping sustained competitiveness in globe market (Luo, 2000). Molin (2001) thinks that DC conception refers to ability that other rivals don't have when facing on the changeable and uncertain market, to keep competition advantage and add value of market. For getting competitive advantage in bad environment, enterprises should demonstrate themselves in immediate reaction capacity, flexible product innovation connected with management and reuse of available internal or external competencies (Teece et al., 1997). There are two key

functions in DC, identifying the opportunities or challenges, and taking chances by organizing resources (Torraco & Lundgren, 2020).

As technology leading more complicated environment and vacillation, DC of firm become more significant than before (Warner & Wäger, 2019). DC importance shows in aspects below: DC impacts on development of firms (Helfat & Peteraf, 2009), impacts on decision making (Teece et al., 1997), on business innovation circle and digital transform (Lundberg et al., 2020), on business model (Zott et al., 2011; Wirtz et al., 2015; Teece, 2018), on organization structure of firm (Zhang, 2019), on achievement of enterprise (Teece, 2007), and succeed of business (Rataul et al., 2018).

Since entering 21th century, business environment has varied greatly. Internet, mobile telecom, block chain technology, 5G and AI have rapidly developed, information economy has entered in big data age of time, style or form of business has concentrated on digital base marketing, business management informatization and many e-commerce models, all of these is unable to independent from support of BIS. Zhang (2019) proposals that modern enterprise has begun its transform to process style and operation system, according to market vary.

Development of E-commerce has sufficiently demonstrated impacts from BIS on customer, employee and manager differently. Such as Alibaba, Huawei and Jingdong company, their BIS assists customers in convenience of purchase and diversification of choice in consumption; As for employee, BIS can be used in lift of professional ability so that enhance the achievement of business; as for manager, BIS is able to observe all kinds of items in right place or not, or measure the management level is high or low, so that to supervise development of firm dynamically. Li (2019) regards that a criterion to judge a company is not simply from achievement of operation, profit earning or stock market value, DC of firm should be taken into consider, even more the performance in getting information, because information system derives not only from enterprise itself, but also outside surrounding of firm.

In spite of sustained enhance of informatization in enterprise of China(Statistics Bureau of China, 2019), there are many problems in connection between BIS and company itself as enterprise facing on varies from markets, the reason lies in three aspects: one is from complication of organization structure, another is from high cost of experiment and the third one is from over dependence on capacity of enterprise itself to obtain and deal with information, with ignoring the varies of market caused by outside environment (Liu, 2020). He (2008) points out that biggest challenge of building a BIS is how to locate itself, including the location between information section and enterprise as well as location between information section and customers.

From survey of questionnaire, under condition of 5 score as highest, mean score of DC of firm and BIS are both lower than 1.9, it shows that DC and BIS level in firms of China are very low, needing deeply research and study. This paper meets the needs of research, aiming at how impacts from BIS on DC of firm.

THEORY BASE, LITERATURE REVIEW, AND HYPOTHESES PROPOSAL

Theory Base

The theory base to discuss how impacts from BIS on DC of firm are system theory, information theory and control theory. From viewpoint of business, theory base should include core competitiveness and Resource-Based View, DC theory derives from static analysis on Resource-Based View in certain degree, yet Wernerfelt (1984) suggested that an enterprise should dynamically manage the resources due to specific resources importance.

Being different from general resources and capacities inside enterprises, DC focuses on study, adapt to vary from market, on dynamic, systemic and structural feature of capacity. DCof firm mainly refers to products quickly entering into market, how to take opportunities in changeable market and how to reform or redistribute resources rapidly in order to keep sustained competitiveness (He et al., 2006). Here the principles of structure-function, feedback of information, self-organization and Auto-control in system theory take significant roles in this paper.

Hypotheses Proposal and Research Framework

The relationship between BIS and DC of firm

System theory holds that this world is consisted of matter, information and energy (three elements), matter, information and energy in system are influenced with one another. If a system wants to achieve its goal, it should be open, exchanging the matter, information and energy between system and environment. From viewpoint of business system, easily knowing that one enterprise wants to develop and achieve its objective, it should be open and exchange the information or matter with environment (including market) or other systems, enhancing dynamic capacity.

Information theory or communication theory regards that as vary of information, self-organization take place through recoil and amplification, to adapt environment and get survival. Facing on process of vary from market, for survival and development, enterprise ought to make decision and adjust structure by feedback mechanism, if we take DC of firm as self-organized power to fit market environment, naturally we get understanding of impacts from BIS on DC of firm. Viable Systemic Approach (VSA) gives new explanation for solid strategies in organization and management model by analysis of sub-system and super-system, sub-system focus on analysis of factors intern enterprise yet super-system focus on relationship among enterprises as well as context relationship among enterprise and other entities.

Many years ago BIS and DC of firm has been studied, yet they two are unable to been connected well in research. In big data age, DC of firm is driven by data, for example, many enterprises take advantage of data base from customer to marketing (Tapp, 2011), digital transform usually combines development of DC of firm, Zhang (2019) thinks that as development of information technology, enterprise is able to get more flexible and flat structure. According to system theory and information theory, there should be positive relationship between BIS and DC of firm. We so proposal hypothesis1 here:

H1: impact from BIS on DC of firm is positive.

Relationship between BIS and management level (ML)

Management level (ML) of a company usually determines the development future and competitiveness forward BIS can influence on convenience and efficiency of management, on strategies and plans of management. Xue (2012) regards that there are four aspects in impacts from BIS on ML: 1. on operation system; 2. on behavior of managers; 3. on structure of organization; 4. on strategies of firm; BIS influences on standardization of management, scientificalization of decision making, and intelligentization of management, BIS can reduce cost of management, and increase efficiency of management. He (2008) holds information system is good at dealing with repeat, mass, regular business andsaving times, so the manager is able to focus on more creative affairs such as special, occasional and irregular managerial

contents in operation (Basiura & Batongbaca, 2002). ML for business can be promoted completely though Business Process Reengineering(BPR) by mean of BIS (Zhang, 2019).

In time of knowledge economy, impacts from BIS on knowledge management of enterprise includes eight aspects: knowledge innovation management, knowledge shift management, application of knowledge management, knowledge organization management, knowledge staff management, knowledge assets management, knowledge technology management and knowledge strategy management (Xue, 2012). As telecom technology and computer tool development, BIS or Management Information System has spread all over the aspects of enterprises and society. Business management, organization governance and government management all rely on services and support of BIS. Naturally we proposal hypothesis2:

H2: BIS influences on ML positively.

ML and DC of firm

During period of survival and development, firms usually face on many challenges and problems from internal or external, management achievement or capacity of firm will be restricted and influenced by outside factors (Pfeffer, 1981). Management of firm aims at adjusting and arranging for problems internal or external firm system, when we talk about management, mainly focus on management internal, especially in a closed system or planed economic age. In time of market economy, DC of firm is a self-organized process adjusted for varies from outside market environment, obviously this kind of self-organization is not independent on management, management means plan, order, control, communication and integration (Robbins & Coulter, 2012), when the goal of management focuson outside market environment and decision-making on it, the result of decision leads enterprise to be more suitable for all kinds of challenge from markets, even to take the opportunities so enhance the DC of firm, because structure of organization is the mean for realize the goal (Robbins & Coulter, 2012), even more in global area, organization structure is almost the same as strategy (Adler, 2008) ,when the strategy tosuit with outside surrounding being carried out, the firm will get the DC and dynamic structure of organization.

Chang (2016) holds as development of economy globalization, if firms want to get opportunities to develop in violent competition of market, should enhance the ML of self, the most urgent task is to perfect the management institution and promote the ML of managers themselves, an excellent firm needs excellent manager and decision maker, which services and supports the firm with intelligence and training excellent employee. Management Level (ML) comprises five aspects: organization, operation, profit, innovation and development, ML of firm will influence on use efficiency of resources, determine the direct of development and sustained time of operation, only well-done of management, should people make the best use of their talents and things. Chen (2019) takes effective management as significant factor to determine survival and development, many firms meet the problem of transform of management from traditional operation style to new scientific organization model, for governance of firm and tofit the market, due to rapid change arising from market. So that we get hypothesis 3 here:

H3: ML positively impacts on DC of firm.

On base of H2 and H3, it is easily to get hypotheses 4

H4: ML takes mediator function when BIS impacts on DC of firm.

As for mediator function of ML is completely or partially, it should be determined by Sobel Test.

Study Atmosphere (SA)

In education, classroom atmosphere or study environment impacts on quality of study (Ofoghi et al., 2016) and study achievement (Malik & Rizvi, 2018). Similarly, Mikkelsen and Grnhaug (1999) thinks atmosphere of organization is a sort of specific nature of organization revaluated by employee, its quality directly influences on organizational performance, naturally, study atmosphere of firm can impact on study result of employee. Certainly study result should impact on DC of firm because DC of firm has included knowledge absorbing and applying (Pavlou & Dimoka, 2006), as environment factor, study atmosphere takes moderator function, a good study atmosphere should enhance impact of BIS on DC of firm, as for it this paper gives hypothesis 5 below:

H5: Study atmosphere takes positive moderator function, enhancing impacts of BIS on DC of firm.

In process of ML impacts on DC of firm, environment and atmosphere play roles of background, because SA impacts on study quality and achievement (Mikkelsen & Grnhaug,1999; Ofoghi et al., 2016; Malik & Rizvi, 2018), background role of SA will more or less change slope of ML impacts on DC. In self-organization theory, on base of self-regulation, Stermann (1994; 2000) points out that in complex dynamic system, people influences on whole self-organized process by feedback of learning, if taking process of self-organization as DC of firm, we easily get hypothesis6 below:

H6: between ML and DC, SA takes positive moderator role on slope of impacts from ML onDC

SA impacts on dynamic system with feedback of learning (Stermann, 1994; 2000), process ofdealing with information is also a process of exploring, analyzing and applying for knowledge, better study atmosphere will impact on quality of training and study of employees, promoting the skills of employee (Robbins & Coulter, 2012) and skills of managers (Hall, 2003), even the results of management of firms (Chang, 2016; Chen, 2019); in knowledge economy time, SA and study quality will impact on understandingof products, objective of firm and work procedure or method (Gustafson, 2005), so that impacts on communication of management in firm, execution of employee and efficiency of work (Robinson et al., 1994) . We can get hypothesis7 on mention above:

H7: SA takes positive moderator role when BIS influences on ML

In light of hypothesis above, research framework comes into being.

Research Framework

Research framework is shown in Figure 1 below:
In Figure 1, variable is Business Information System, recorded as BIS, explained variable is Dynamic Capacity of firm, recorded as DC, mediator is Management Level, recorded as ML and Study Atmosphere is moderator, recorded as SA. From H1 to H7, all are matched hypothesis mentioned above.
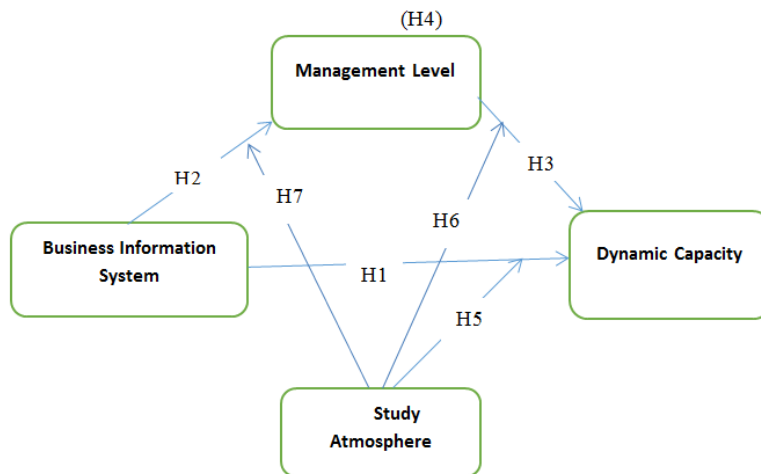
FIGURE 1

RESEARCH FRAMEWORK

METHODOLOGY

From scope of information theory and system theory, this paper proposals hypothesis on base of literature reviews and gives research framework on base of hypothesis. Through questionnaire getting data, this paper empirically studied on positive slope of BIS impacts on DC of firm, ML's function as mediator and SA's function as moderator.

Index System and Questionnaire Design

For guaranteeing reliability and validity of questionnaire, this paper takes advantage of developed scales home and aboard, and adjusts them to meet the needs of research objectives. Definition of BIS, ML, SA and DC of firm and their measure dimension even question items is listed in Table 1 below.

Variables	Dimension	Item
TABLE 1 **INDEX SYSTEM AND QUESTIONNAIRE DESIGN**		
Business information system (BIS)	Time of using of BIS	1. I have used the APP or website of firm I work in for certain times.
		2. I usually use business information system of company I work in.
		3. I feel the website or APP of the firm I work in getting convenience for my life
	Quality of BIS	4. I feel function of APP or website of firm I work in meeting my needs
		5. I think function of business information system in firm I work in is enough.
		6. I think BIS of my company can uplift my work efficiency
Dynamic capacity of firm (DC)	Organization study	7. The firm you work in can rapidly perceive the utility of knowledge
		8. The firm you work in can obtain knowledge from outside or inside of firm
		9. The firm actively put forward the application of new knowledge
	Refactor and integration	10. The firm can redistribute resources and integrate according to vary of environment.
		11. The firm can uplift the efficiency by rapid refactor and integration.

	Organization reform	12. The firm can effectively put forward the organization reform in time
		13. The firm allows breaking the jess and taking innovation.
Managemen tlevel (ML)	Organization management	14. The firm makes the organizational structure flat
		15. The firm can predicate according to vary from information.
	Information management	16. The firm can effectively deal with information obtained.
		17. The firm can effectively guide after dealing with information
		18. Sections of the firm can effectively communicate and cooperate.
	Process management	19. The employees in firm have strong sense to communicate
		20. The firm can create an frank and cooperative atmosphere to communicate
Study atmosphere (SA)	Application style	21. There is a strong atmosphere for employee to input of work
		22. The firm try its best to create an atmosphere to reduce cost of operation
		23. The firm focus on creating a research atmosphere for employees to exchange ideas and explore
	Exploration style	24. The firm is good at creating an exploration atmosphere by improving old methods to get advantage.
		25. The firm prefer creating an exploration style of atmosphere to use new way or new approach

As to BIS, on base of Xue (2012) and doing some adjusting, this paper uses two dimensions to measure variable BIS: using time of BIS and quality of BIS, they are recordedas TBIS and QBIS respectively.

As to DC of firm, this paper uses three dimensions to measure on base of Teece et al. (1997), Pavlou and Dimoka (2006) and Kou (2016): organization learning, refactor and integration, as well as organization reform.

As for measure of ML, on base of study from Egelhoff et al. (1988), this article takes three dimensions as organization management, information management and process management.

As for measure of SA, according to study from March (1991); Floyd and Lane (2000); Rosing et al. (2011); and Hirst (2018), this paper takes two dimensions as applying style of SA and exploring style of SA.

All the question item use Likert Scale with 5 score: from absolutely disagreement (1score)to absolutely agreement (5 score).

Sample of Survey and Data Collecting

This paper aims at studying on influence of BIS on DC of firm, because the normal employeeis unable to answer the question about DC of firm and ML, the questionnaire is sent to manager first, then sent to employees owned business management degree (mainly MBA students or Commerce Academy students graduated) on line, ensuring the data real and valid.

In December 2020, questionnaire was delivered 450, for guaranteeing the data real and reliable, this paper had gotten rid of the invalid questionnaires, which are less answer, omitted answer, obvious conflicts or time is less 42 second (make sure every question item should be answered not less than 1.5 second) and got final questionnaire 408, this number can keep maximum sampling error less than 5% (Evans, 2011).

Reliability and Validity Test for Questionnaire

Reliability test for questionnaire

After withdraw the questionnaires, this paper takes the test of reliability and gets

results listed in Table 2. Each Cronbach's Alpha value of variable (and total) is more than 0.92 shows that questionnaire is stable and consistent.

TABLE 2
RESULTS FOR RELIABILITY TEST

Variables	Cronbach's Alpha	N of Items
BIS	0.923	6
DC	0.944	7
ML	0.923	7
SA	0.921	5
Total	0.972	25

Validity test for questionnaire

Content validity

In process of questionnaire design, dimension of variables and question item is logical and supported by matched literature.

Construct validity

First, KMO and Bartlett's Test in Table 3 shows the questionnaire is able to use factor analysis method.

TABLE 3
KMO AND BARTLETT'S TEST

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.960
Bartlett's Test of Sphericity	Approx. Chi-Square	10887.6
	Df	300
	Sig.	0.000

Second, from Table 4: total variance explained is able to see that when abstract 4 principal components (BIS, ML, SA and DC), cumulative information achieves 77.4%, and principal components analysis method doesn't loss lots of information.

Finally, through Factor load Matrix in Table 5 (Pattern Matrix), values of load factors in black frame for each variable are comparatively greater than others, that means convergent validity is relatively significant. And values in black frames are discriminative obviously with others, it means discriminative validity is comparatively clear, though some values in black frame are low, in total, construct validity is accepted in terms of definition and calculation method.

TABLE 4
TOTAL VARIANCE EXPLAINED

Component	Initial Eigenvalues			Rotation Sums of Squared Loadings[a]
	Total	% of Variance	Cumulative %	Total
1	15.213	60.851	60.851	12.491
2	2.107	8.429	69.280	12.629

3	1.238	4.950	74.231	9.831
4	0.794	3.177	77.408	8.209
5	0.736	2.944	80.352	
6	0.542	2.167	82.519	
7	0.458	1.832	84.351	
8	0.425	1.701	86.051	
9	0.382	1.529	87.581	
10	0.326	1.305	88.886	
……	……	……	……	
24	0.105	0.421	99.632	
25	0.092	0.368	100.000	

Extraction Method: Principal Component Analysis.

[a]When components are correlated, sums of squared loadings cannot be added to obtain a total variance.

Regression Analysis Design

- Index complex method: first to get arithmetic average for all question items in each dimension of variable to form dimension level, and then to combine the dimension level to variable by getting geometric mean for all dimension.
- Multicollinearity test in order to avoid fake regression for sake of deep research.
- Comparing the variable model and dimension model of variable
- Test for moderator and mediator.

Variables	Items	TABLE 5 PATTERN MATRIX[a]			
		Components			
		1	2	3	4
BIS	01	-0.093	0.046	**0.825**	0.017
	02	0.118	-0.043	**0.861**	-0.035
	03	-0.039	-0.099	**0.945**	0.068
	04	-0.144	0.088	**0.889**	0.059
	05	0.093	0.310	**0.612**	-0.064
	06	0.572	0.093	**0.592**	-0.154
	07	-0.066	**0.673**	0.299	0.026
DC	08	-0.038	**0.613**	0.264	0.124
	09	0.437	**0.542**	0.058	-0.116
	10	-0.099	**0.974**	0.057	-0.064
	11	0.380	**0.658**	-0.015	-0.082
	12	0.343	**0.762**	-0.108	-0.157
	13	0.324	**0.788**	-0.106	-0.180
	14	**-0.044**	0.534	0.077	0.343
ML	15	**-0.131**	0.788	-0.015	0.290
	16	**0.008**	0.593	-0.118	0.425
	17	**0.711**	0.071	-0.048	0.152
	18	**0.845**	0.022	-0.001	0.073
	19	**0.965**	-0.114	0.022	0.017
	20	**0.874**	0.125	-0.131	0.039
	21	0.332	-0.101	0.166	**0.626**
SA	22	0.196	-0.049	0.008	**0.805**

	23	0.698	-0.021	0.075	**0.251**
	24	0.704	0.121	0.008	**0.142**
	25	0.630	0.327	-0.053	**0.064**

Extraction Method: Principal Component Analysis; Rotation Method: Promax with Kaiser Normalization.

a. Rotation converged in 7 iterations.

RESULTS AND DISCUSSION

On base of research method, detail discussion and analysis for result of data has been shownbelow:

Descriptive Statistics Analysis for Variables and Correlation Coefficients Matrix

Descriptive statistics and Pearson correlations for variables listed in Table 6: the mean of variables are less than 1.9 score, totally low, illustrates BIS and DC of firm remand to be improved, also importance the topic this paper chosen. From Pearson correlations we know there are linear connects between variables and explained variable, confirming the variables picked up are reasonable, so that make sure to avoid the fake regression problem. As for muticollinearity, however it has been removed by VIF test, in Table 7, all values of VIF are accepted because all are less than 5 (Evans, 2011).

TABLE 6
DESCRIPTIVE STATISTICS AND PEARSON CORRELATIONS (N=408)

	Mean	Std. Deviation	BIS	ML	DC	SA	TBIS	QBIS
BIS	1.8032	0.73119	1					
ML	1.7983	0.68899	0.678^{**}	1				
DC	1.8682	0.77090	0.647^{**}	0.854^{**}	1			
SA	1.7667	0.68292	0.694^{**}	0.859^{**}	0.779^{**}	1		
TBID	1.8162	0.79419	0.961^{**}	0.592^{**}	0.566^{**}	0.611^{**}	1	
QBIS	1.8119	0.74290	0.955^{**}	0.707^{**}	0.680^{**}	0.715^{**}	0.840^{**}	1

**. Correlation is significant at the 0.01 level (2-tailed).

Results of Regression for Data

All the models chosen for this paper are listed below:
Total model:

$$DC = \beta_0 + \beta_1 * BIS + \varepsilon_1 \tag{1}$$

Dimension model:

$$DC = \beta_0' + \beta_1' * TBIS + \beta_1'' * QBIS + \varepsilon_1' \tag{2}$$

Mediator function model:

$$DC = \beta_0 + \beta_1 * BIS + \varepsilon_1$$

$$ML = \alpha_0 + \alpha_1 * BIS + \delta_1 \tag{3}$$

$$DC = \alpha_0 + \alpha_1' * BIS + \alpha_2 * ML + \delta_1' \qquad (4)$$

Moderator function model:

$$DC = \gamma_0 + \gamma_1 * \overline{BIS} + \gamma_1' * \overline{SA} + \gamma_1'' \overline{BIS} * \overline{SA} + \varepsilon_2 \qquad (5)$$

$$DC = \gamma_0' + \gamma_2 * \overline{ML} + \gamma_2' * \overline{SA} + \gamma_2'' \overline{ML} * \overline{SA} + \varepsilon_2' \qquad (6)$$

$$ML = \gamma_0'' + \gamma_3 * \overline{BIS} + \gamma_3' * \overline{SA} + \gamma_3'' \overline{BIS} * \overline{SA} + \varepsilon_2'' \qquad (7)$$

Among these models, DC, ML, SA, BIS, TBIS, QBIS respectively stand for dynamic capacity, management level, study atmosphere, business information system, and time of use business information system and quality of use business information system; BIS, SA, ML in moderator model respectively represents the values of BIS, SA and ML have reduced their matched mean.

The results of regression have been listed in Table 7: model 1 is total model, model 2 is dimension model for variables, model 3 and model 4 (linked with model 1) illustrates the mediator function, and model 5, 6, 7 illustrates moderator function. Values in first and second bracket are respectively standard errors and T statistics. All values of VIF are listed behind T statistics.

From R square values more than 0.3 we can see that all models are accepted in explained force, significant level of F values are all less than 0.01, illustrate all models are significant in statistics, all VIF are less than 5 means there are no muticollinearity in all models, and DW values show there are no autocorrelation in all models (Evans, 2011).

Variable	DC(y)	DC(y)	ML(M1)	DC (y)	DC (y)	DC (y)	ML
	M1	M2	M3	M4	M5	M6	M7
	Total Model	Dimension Model	Mediator Model		Moderator Model		
C	0.638*** (0.078) (8.217)		0.647***(0.067) (9.666)	0.0824 (0.0579) (1.422)	1.952*** (0.026) (75.435)	1.907*** (0.024) (78.939)	1.841*** (0.019) (94.787)
BIS(x)	0.682*** (0.0399) (17.11) VIF=1.00		0.639*** (0.0344) (18058) VIF=1.00	0.134*** (0.0365) (3.671) VIF=1.85	0.249*** (0.043) (5.842) VIF=1.955		0.166*** (0.032) (5.172) VIF=1.955
TBIS (x1)		-0.018 (0.065) (-0.269) VIF=3.391					
QBIS(x2)		0.721*** (0.070) (10.356) VIF=3.391					
ML (M1)				0.859*** (0.0386) (22.16) VIF=1.85		0.795*** (0.055) (14.354) VIF=3.826	

TABLE 7
RESULTS OF REGRESSION ANALYSIS

SA (M2)					0.752*** (0.046) (16.481) VIF=1.953	0.221*** (0.056) (3.915) VIF=3.895	0.773*** (0.034) (22.567) VIF=1.953
BIS * SA					-0.239*** (0.038) (-6.283) VIF=1.091		-0.123*** (0.029) (-4.304) VIF=1.091
ML*SA						-0.095*** (0.035) (-2.695) VIF=1.152	
R square	0.42	0.462	0.46	0.737	0.662	0.741	0.762
ΔR square					0.033	0.007	0.011
Sig. F	0.00	0.00	0.00	0.00	0.000	0.000	0.000
DW	2.037	1.965	1.82	2.197	2.038	2.175	1.795

Note: ***, **, * respectively represents *P<0.01,P<0.05,P<0.1*.

Analysis for Regression Results

We analyze the regression results from total model, dimension model to mediator and moderator function model step by step.

Positive correlation between BIS and DC of firms

From model1 we can see that BIS and DC of firm is positive in 99% confidence level, each BIS adds 1%, DC of firm adds 0.68%, BIS improves DC of firm significantly.

In classification of BIS, there are two classes: one is APP for outside customers; another is internal BIS for employees such as information management system (IMS) and so on. No mater APP for external or IMS for internal, they are all closely linked with users and employee management, by getting matched information, IMS or App can lead enterprises to adjust resources and react rapidly, illustrating a better DC of firm.

From the items of DC mentioned in questionnaire, exist of BIS makes enterprise able to obtain knowledge from outside or inside of firms, to perceive for usage of knowledge, to promote application for new knowledge, to enhance ability of study for organization, forming the DC of firm; from items in questionnaire and results of regression, BIS leads enterprise able to rapidly adjust and redistribute resources according to vary of environment, to integrate resources, lifting efficiency and enhancing DC of firm; because exist of BIS, enterprise is able to put forward organizational reform, to break shackles and jesses, promoting innovation and enhancing DC of firm.

However, we can see from model2 that when TBIS and QBIS taking function together, mainly the QBIS plays the positive role in process BIS impacts on DC, TBIS losses its statistics significance; while, as getting rid of QBIS and only keeping TBIS in model 2, TBIS takes the positive role on DC of firm in 99% confidence level(we can see in Pearson correlations in Table 6), that means there is substitution effect between QBIS and TBIS: shortage for time of using BIS should be replaced by higher quality of BIS, or QBIS shortage may be substituted by adding time of using BIS; from items in questionnaire and regression results, higher quality of BIS, like contents in App or IMS meeting needs of employees or users and so on, can make users or employees more convenient, even enough rich information can be gained from BIS, can make the firm more efficient, so enhancing perfect of DC in firm.

BIS impacts on DC of firm through ML, here ML takes mediator function. One side,

BIS assists in improvement of ML, another side, ML also assists in enhance of DC in firm, here is the detail.

Mediator function of ML when BIS impacting on DC of firm

Through mediator effect testing in models, ML takes mediator role according to regression results. BIS improves ML in one hand, and ML enhances DC of firm in another hand, at the time of enhancing, direct influence from BIS impacts on DC of firm exists still.

In light of regression results, use of BIS assists in uplifting of ML, according to items of questionnaire, in organization management, BIS helps for flat of organizational structure, this kind of flat derives from convenience of communication and reduces or shorten the transmission chain of information. Due to exist of BIS, all sections of firm can communicate and coordinate efficiently by way feedback of information, enterprise can create a cooperative and frank communicative atmosphere by effective information share, if employees in firm have strong consciousness of communication, it's available for enterprise to deal with information efficiently by data research, to predicate for change of information and learning, to guide validly after dealing with information analysis, making process management (including information management itself) effective, so push the ML forward.

After lifting of ML, DC of firm also lifts forward. First, lift of organization management,information management and process management do help for study capacity of section in firm, makes firm to get knowledge from inside and outside of enterprise(see items of questionnaire and regression coefficients), to rapidly perceive the usage of knowledge, actively putting the application of new knowledge forward; Second, lift of ML can improve the integration and redistribution of resources, adjust the matched resources as vary of market surrounding and enhance the DC of firm in rebuilding of organs and sections; At last, ML assists in reform of organization, break of shackles, innovation and reaction for needs of market and technology, lifting the DC of firm through transfer of organization, all of these can been see in items of questionnaire and regression results.

The role of moderator by study atmosphere

Model 5,6,7 illustrate SA takes moderator role negatively among relationships of BIS, ML and DC of firm, that is to say the SA reduces slope of BIS impacting on DC of firm, slope of BIS impacting on ML as well as ML on DC.

This situation occurred is opposite to our hypothesis but easily been understood. As in front of vary from market, technology and environment, there are too many factors influencing on ML and DC, not only the BIS. In spite of help for promotion of ML and DC from BIS, other factors linked or belonged to exploration style of SA and application style of SA, reduce the rate of influence from BIS on ML and from BIS on DC, such as human capital level, leadership, research and development input and so forth, these factors are all significant element impacting on ML and DC in life experiences. In other words, when SA reduces the rate of slope of BIS impacts, SA increases weight of slope of other factors impacting on ML and DC. Through creation of SA, BIS takes role yet can not cover influence from other factors (linked with or belonged to SA, such as HR, R&D) on ML and DC. The same case to SA reducing rate of slope when ML impacting on DC of firm.

In one words, BIS positively significantly impacts on DC of firm, ML takes mediator role when BIS impacting on DC; SA, including exploration style and application style, takes negative moderator role and reduces the slope of both BIS impacting on ML, ML on DC and BIS on DC, lowing the rate or weight of influence from them.

Major Findings of the Study

The study findings in terms of hypothesis results have been summarized in Table 8.

TABLE 8
RESULTS OF STUDY

Hypothesis	Contents	Test results
H1	*Impact from BIS on DC of firm is positive significantly.*	Accepted
H2	*BIS significantly influences on ML positively.*	Accepted
H3	*ML positively impacts on DC of firm significantly.*	Accepted
H4	ML takes mediator function when BIS impacts on DC of firm.	Accepted
H5	SA takes positive moderator function, enhance impacts of BIS on DC	Opposite and refused
H6	SA takes positive moderator role on slope of impacts from ML on DC	Opposite and refused
H7	SA takes positive moderator role when BIS influences on ML	Opposite and refused
Findings	1. When TBIS and QBIS take their function together, mainly the QBIS positively and significantly impacts onDC of firm, there is substitution effect between TBIS and QBIS;	
	2. When BIS impacting on DC of firm, ML takes partial mediator function.	
	3. Apart from BIS, other factors those are not in equation also influence on DC of firm, through SA, they reducethe rate of influence (slope) from BIS on DC of firm.	

CONCLUSION AND SUGGESTION

All results are combined in Table 8, BIS positively influences on DC of firm in significant, MLtakes mediator role as BIS impacting on DC, so hypothesis1,2,3 and 4 are all accepted; yet SA plays a negative role in moderator function as BIS impacting on ML, ML on DC and BIS on DC, the results are opposite to hypothesis5,6 and 7, these hypotheses are all refused.

Again this paper finds that when TBIS and QBIS take their function together, mainly the QBIS positively and significantly impacts on DC of firm, there is substitution effect between TBIS and QBIS; when BIS impacting on DC of firm, ML takes partial mediator function, SA takes negative moderator function due to other factors (linked with or belonged to SA) also influence on DC of firm through SA, they reduce the rate of influence (slope weight) from BIS on DC of firm.

Management suggestions should be taken as listed below:

First, to build and perfect BIS, taking advantage of promotion function of BIS impacting on ML and on DC. TO build and perfect BIS is determined by QBIS, enterprises ought to improve their content of BIS and convenience of operation, making BIS more suitable to satisfy the remand of employees and users, gives them the convenience of life or job, so to uplift their efficiency of work. For these reasons above, enterprises ought to increase input to BIS and improve BIS continuously.

Second, fully takes mediator function of ML as BIS influencing on DC of firm.

To Enhance Information Management

Enterprise should take accurate control and exact management by figure out helpful knowledge through collecting, analyzing and dealing with information. Any information linked with organizational action should be collected in time and transmitted precisely in horizontal path and vertical way, forming clear channel of information transmission inside

firm by information share, learning, study and feedback.

To Promote Process Management

Taking available information as base, to strengthen organizational communication and to create active exchange atmosphere, diagnostically analyzing for process in organizational activity, so that to transfer organization activity to data, internet and model, for sake of cooperation and integration among different sections in firm, leading information to be more suitable for development of firm and provide more chances or opportunities to guide enterprise effectively.

To Improve Structural Inputs to Organization

To improve structural inputs to organization, enterprise should put forward the connection of traditional factors with informational factors by BIS, transform the traditional pyramid construction to plat, soft and intelligent structure, even realize organizational potential through analysis of big data, aiming at all round development in technology, management and industry, enhancing DC of firm by continuously optimize the structure.

Third, enhancing the cultivation of SA, fully taking mediator function of SA, making the rate of influence from other factors (slope) apart from BIS on DC of firm increased, so that fully taking advantage of both exploration style and application style of SA, keeping balance of these two.

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