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A Study on the Effect of Information System on the Internal Factors and Managerial Performance - Focus on Hotel, Company, and Hospital Information System

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Abstract: The purpose of this study is to analyses, through causal relationship, how information system influences on employee satisfaction, strategy, work process, and business results compare with manufacture and service companies, hotels, and hospitals area. Empirical finding of this research suggest that information system a positive effects on employee satisfaction, strategy, and work process three areas. Employee satisfaction and work process have a positive influence business results. However, strategy has an effect on employee satisfaction which is hotels and work process has an effect on manufacture and Service companies.

Keywords: Information system, Hotel Information System, Hospital Information system, Structural Equation Model

1 Introduction

In such fast changing market environment, it is considered a necessary part of securing competitive edge in catering for customers needs. And speedy move to cope with such change is deemed necessary part in achieving set performance.

More and more corporations demand not only external competitiveness such as product quality and productivity, but also internal competitiveness such as information communication, to enhance their overall competitiveness, so that support from Information System is absolutely necessary to proactively meet such environmental change.

With regard to Information System which needs absolute support, the system has become a necessity, not an option anymore, to make best use of fast evolving Information technology in such changing environment [7]. On the other hand, it is Information System that leads key competency of corporations, and the information system changes and coordinates the structure of markets with extended application for global management [5].

Changing environment, on the other hand, is causing many changes to corporate strategy as well. The ultimate goal of corporate strategy is to secure sustainable competitive edge in such changing environment, therefore corporations should development competency to make effective use of assets, technology, knowledge that other competitors cannot easily copy to keep sustainable competitiveness, so that differentiation and decentralization are important in such uncertain corporate, market environments (Prahalad and Hame, 1994). Strategy is a matrix of decision for plan to achieve short-term, long-term goals and for corporate direction [6].

Business process is a very important factor because it not only affects organizational immersion but also contributes to increased customer satisfaction. In recognition of such factor, corporations are making efforts for both the improvement of productivity and the innovation of business process to be a going concern. Corporate managerial innovation, including work process innovation, has something to do with change in work and management method (JMAC: Japanese Management Advisory Consultants, 1989). Reconstitution of process contributes to corporate managerial efficiency, profitability and competitiveness [12].

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The fact that the level of satisfaction of service personnel who are the contact points with customers have come to light through various studies. It is service personnel who hold a key to service innovation for quality service to customers (Cadwallader et al., 2010). In particular in hospitality industry, service personnel play an important role in improving service quality, marketing and customer satisfaction [3][10][15][28].

There have been a great deal of studies on the importance of service personnel the finding of which is that the satisfaction of service personnel plays an important role in achieving organizational goal, thereby emphasizing the role of service personnel, and therefore, the level of satisfaction of service personnel should be improved and it can be done through internal service quality such as job design, working environment, reward, information sharing and dialogue [16].

Building each of these supporting systems and the improvement of the satisfaction of service personnel will ultimately have positive effect on managerial performance of business, thereby helping the business secure sustainable competitive advantage in the mist of rapid changing business environment.

In the study, we look into the characteristics of information system, strategy, business process, service personnel satisfaction and managerial performance of businesses in general, medical institution and Hotel business work process of which is different each other, in such rapid changing environment and evolving IT technology, and what these lead to.

2 Research Background

There is strong demand for change of information system of the past which dwelt on the stability of information provision, to secure competitive edge for business in need of ceaseless change. Information system, which is a constituent of corporate managerial system, is an important part that collects processes and disseminates data to various organizations within the business [24].

Today businesses are testing various efforts to survive through such environment where various rules and regulation are reevaluated the development of business scale develops as a consequence of merger and acquisitions, and to improve their competitiveness as the level of customer expectation increases. Business considers the use of information technology a key in such environment [14].

Key capacity of business not only plays a leading role and restructures the markets, but also expands its application to global management in such drastically changing market environment [5]. The application of information technology is becoming a must, not an option, in corporate management [7]. With strategic use of information system by business, the effect of the application of information technology can be maximized in the realization of competition strategy and planning of new competition strategy, through price cut of products, improvement of the quality of service and products, and advantageous position to enter new markets [13].

Businesses have used various strategies based on such information system and there have been a great number of studies on this subject. Existing studies, however, are based on such various theories so that the definition of strategy, which is key concept of business, isnt in fact even generalized, rendering differences in opinion among researchers due to a great deal of ambiguity. Such ambiguity, however, has given way to Hofer and Schendel(1978) who refined the definition of strategy as basic pattern of interaction with realized or planned environment and the development of resources and this has become the most generalized definition among researchers.

Business environment will affect the selection of strategy by business [20]. That is, a business in uncertain environment will pursue strategy of differentiation rather than low cost strategy [25]. Industrial organization approach and organization sociological approach show such potential. On the other hand, business that pursues differentiation strategy will test various methodologies such as marketing innovation, to this end, which can increase the uncertainty of the environment. After all, strategy and environment has dynamic correlation and it will have positive effect on business performance, depending on their interactive fitness [22].

Today, like any other business, the change and development of managerial environment of medical institutions such as a hospital is taking place internationally as well as domestically and competition among hospitals is intense. Since strategic management was ramified from the disciplines of business administration, to be backbone of profit organization, today strategic management has extended its application to non-profit organization where strategic management is greatly emphasized. In the face new changes and ever intensifying competition among businesses, businesses are making great efforts, such as building information system, to adapt themselves to such new changes through innovation of business process as survival strategy [17].

Diffusion of innovation, organizational innovativeness and process theory were main subjects of attraction in early 2000s. Innovation can be divided into hard innovation and soft innovation, and soft innovation can again be subdivided to hard-soft innovation and soft-soft innovation. For process theory, there have been investigations into the thesis of practicalization and execution process [32].

Business process in practice is to improve productivity by systemizing work process, such as planning, management and improvement [29], and to make use of established process model in real business. After all, business process establishes performance-oriented innovation system to cope with managerial environment of changing knowledge-based society of future and thereby improves responsiveness to

possible daily changes. That is this is a combination of designed structured, measurable activities to produce intended output for specific customer or market [9].

Medical institutions such as hospital are making a great deal of efforts with their work process support, to promote efficient operation and to create new opportunities. In particular, robust researches into expeditious and correct emergency response process with the application of Business Process Management (BPM) in addition to emergency business process of the past, in the case of emergency room where medical staff need to make correct decision for speedy medical treatment for patient [27]. Ultimately, such efficient allocation greatly helps improve the quality of medical service as well as the stability of medical services [31].

Innovation of work process is related as well to job satisfaction of service personnel who are contact points with customers for every business. Customer satisfaction in business management has become very important concept for the survival and prosperity of business in intense market competition. In fact, it has become a necessity for managers to have customer-orientated mind. That is, environment in which a service is provide can have a great effect on customer purchase decision and customer satisfaction [23].

Service personnel are contact points with customer satisfaction, can help maximize service quality and facilitate marketing, and thereby contribute to improved customer satisfaction [3][10][15][28]. In another way, service provision by service personnel who are contact points with customers help improve the achievement of innovation depending on the level of customer satisfaction, by securing competitive edge in a market through customer satisfaction the business pursues [4].

Even though such service personnel satisfaction can be achieved by various provisions from business, it can also be increased by improving internal service quality dialogue and reward system [16][8]. Today where there is increasing demand for customer-orientated managerial mind set, the mind set of health professional is very important in the relationship between medical team and patient who are connect each other with professional knowledge and technology.

In the study, therefore, we look into what effect information system has on business strategy, service personnel satisfaction, work process and managerial performance in the course of continuous competition in the market, by investigating differences between Manufacturing companies, Service companies, Hotels, and Hospitals from the perspective of the cause-and-effect relationship.

3 Research Model and Methodologies

3.1 Research model

Here is research model (see Figure 1).

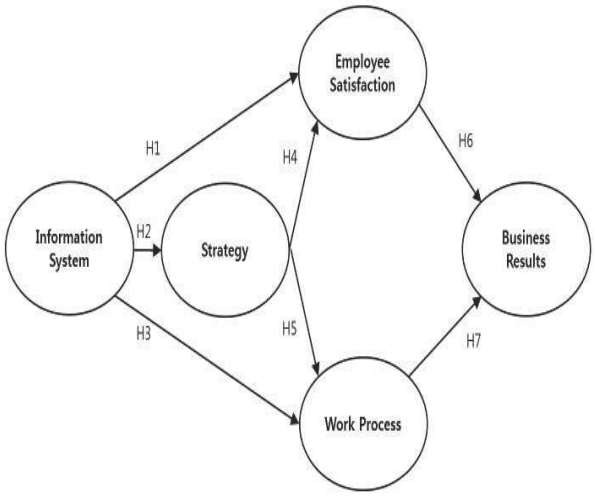

Fig. 1: Research Model

3.2 Research hypotheses

This study attempts to modify the research model with causal relationships among Information System, Strategy, Employee Satisfaction, Work Process, and Business Results (see Figure 1). The hypotheses established for verification in this study are as follows;

H1: Information System has a positive influence on Employee Satisfaction.

H2: Information System has a positive influence on Strategy.

H3: Information System has a positive influence on Work Process.

H4: Strategy has a positive influence on Employee Satisfaction.

H5: Strategy has a positive influence on Work Process.

H6: Employee Satisfaction has a positive influence on Business Results.

H7: Work Process has a positive influence on Business Results.

3.3 Measurement and Sampling

To test this research, an email-based survey was employed who is work for manufacturing and service companies, health care industries, and hotel enterprises. We e-mailed all the enterprises, hospitals, and hotels about 2000 companies, hospitals, and hotels that appeared in the list of Korea Chamber of Commerce and Industry (http://www.korchambiz.net). The data were collected online.

We had collected data from three area one is manufacturing and service companies which collected 248 data, another is health care industries which collected

Table 1: Overall fit statistics for confirmatory factor analysis

Manufacturing and Service companies									
Factor	Initial Items	*Cronbach's* alpha	Final items	x^2	P	GFI	AGFI	NFI	RMR
1.Information System	14	0.952	13	173.838	0.00	0.900	0.854	0.952	0.085
2.Strategy	12	0.977	8	37.867	0.00	0.965	0.933	0.977	0.063
3.Work Process	9	0.925	8	45.089	0.00	0.910	0.889	0.925	0.045
4.Employee Statistics	12	0.953	12	200.548	0.00	0.900	0.865	0.915	0.052
5.Business Results	11	0.952	7	130.252	0.00	0.926	0.887	0.945	0.061
Total	66		48						
Hotels									
Factor	Initial Items	*Cronbach's* alpha	Final items	x^2	P	GFI	AGFI	NFI	RMR
1.Information System	14	0.959	13	173.582	0.00	0.885	0.812	0.910	0.045
2.Strategy	12	0.960	12	94.055	0.00	0.905	0.849	0.943	0.045
3.Work Process	9	0.933	9	55.589	0.00	0.924	0.858	0.949	0.047
4.Employee Statistics	12	0.976	12	346.421	0.00	0.812	0.723	0.896	0.055
5.Business Results	11	0.944	7	366.185	0.00	0.774	0.705	0.885	0.072
Total	66		53						
Hospitals									
Factor	Initial Items	*Cronbach's* alpha	Final items	x^2	P	GFI	AGFI	NFI	RMR
1.Information System	14	0.957	7	124.250	0.00	0.925	0.784	0.925	0.076
2.Strategy	12	0.969	6	74.325	0.00	0.904	0.827	0.962	0.088
3.Work Process	9	0.928	5	84.561	0.00	0.985	0.353	0.992	0.026
4.Employee Statistics	12	0.958	5	66.257	0.00	0.980	0.802	0.954	0.086
5.Business Results	11	0.980	9	22.254	0.00	0.960	0.931	0.980	0.038
Total	66		29						

Table 2: Statistical Tests for Research Model

Hypothesis		Path		FL	T-value	P-value	Hypothesis Supported
H1	H1-1	Information System $->$ Employee Satisfaction	MS	0.856	10.225	0.000	**
	H1-2		H	0.742	8.952	0.000	**
	H1-3		Ho	0.662	16.582	0.000	**
H2	H2-1	Information System $->$ Strategy	MS	0.845	25.814	0.024	*
	H2-2		H	0.698	10.736	0.000	**
	H2-3		Ho	0.742	9.445	0.000	**
H3	H3-1	Information System $->$ Work Process	MS	0.915	15.880	0.000	**
	H3-2		H	0.668	8.472	0.000	**
	H3-3		Ho	0.457	6.284	0.000	**
H4	H4-1	Strategy $->$ Employee Satisfaction	MS	0.117	39.224	0.087	ns
	H4-2		H	0.245	8.882	0.001	**
	H4-3		Ho	-0.055	-0.254	0.552	ns
H5	H5-1	Strategy $->$ Work Process	MS	0.774	10.046	0.000	**
	H5-2		H	0.127	4.258	0.158	ns
	H5-3		Ho	0.221	35.254	0.091	ns
H6	H6-1	Employee Satisfaction $->$ Business Results	MS	0.740	8.220	0.005	**
	H6-2		H	0.247	17.577	0.000	**
	H6-3		Ho	0.288	25.325	0.026	*
H7	H7-1	Work Process $->$ Business Results	MS	0.332	8.204	0.000	**
	H7-2		H	0.420	7.662	0.034	*
	H7-3		Ho	0.133	17.689	0.014	*

613 data, and the other is hotel enterprises which collected 154 data.

4 Results

4.1 Convergent and Discrimination Validity

Using the AMOS 18.0, the Confirmatory Factor Analysis (CFA) was carried out to test the validity of the test tools

on the items that were first tested through the exploratory factor analysis and confidence analysis. First, the fitness of the concepts and measurement variables were tested with the Maximum Likelihood Method.

The purpose of convergent validity is to ensure unidimensionality of the multiple-question constructs and to eliminate unreliable survey questions. The convergent validity is evaluated by investigating the value of standardized factor loadings, standardized residual covariance, and reliability. The survey questions should load at least 0.60 on their respective hypothesized component and all loadings need to be significant ($p <= 0.05, t >= 2.0$) [2]. Reliability for all the survey questions of a construct should be evaluated jointly by investigating composite reliability (CR) and the average variance extracted (AVE). For a construct to possess good reliability, CR should be at least 0.70 and the AVE should be at least 0.50 [30][1][11].

The results of CFA show that manufacturing and service companies are deleted one item from information system and hotels but seven items are deleted from hospitals. Strategy is to delete four items are manufacturing and service companies and six items are deleted from hospitals but hotels are none.

Work process is to delete one item is deleted from manufacturing and service companies and seven items are deleted from hospitals but hotels are none. Employee satisfaction is to delete seven items from hospitals but manufacturing and service companies and hotels are none. Finally, Business results are to delete four items from manufacturing and service companies and hotels but two items are deleted from hospitals the results are summarized in (see Table. 1).

4.2 Structural Equation Model

Using the AMOS Normally, the causal relation is used to find the cause and effects relationship. In the study, therefore, using covariance structure modeling, the causal relationship between Information System, Strategy, Employee Satisfaction, Work Process, and business results compare with manufacturing and service companies, hotels and hospitals. The fit statistics of the manufacturing and service companies indicate that the chi-square of the model is 122.125 with a d.f. of 12. GFI is 0.902, AGFI is 0.865, NFI is 0.921, CFI is 0.932 and RMR is 0.041. All the fit statistics of the initial casual model were accepted.

The fit statistics of the hotels indicate that the chi-square of the model is 4.778 with a d.f. of 4. GFI is 0.988, AGFI is 0.901, NFI is 0.982, CFI is 0.988 and RMR is 0.032. All the fit statistics of the initial casual model were accepted. The fit statistics of the hospitals indicate that the chi-square of the model is 14.778 with a d.f. of 3. GFI is 0.994, AGFI is 0.967, NFI is 0.992, CFI is 0.998 and RMR is 0.009. All the fit statistics of the initial casual model were accepted.

According to the findings of the investigation, Information system appeared to have a positive effect on the employee satisfaction (from H1-1 to H1-3), strategy (from H2-1 to H2-3), and work Process (from H3-1 to H3-3), especially the biggest effect on the work process (H3-1, 0.915) and the next biggest effect on the employee satisfaction (H1-1, 0.856).

The strategy shows to have a positive effect on the employee satisfaction (H4-2) and the work process (H5-1). The employee satisfaction and work process indicate that a positive effect on the business results (From H6-1 to H7-3) (see Table. 2).

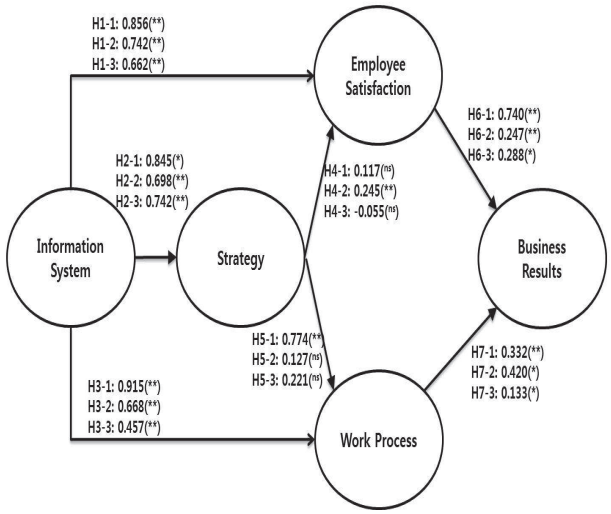

Fig. 2: The Results of Hypotheses

5 Conclusion and limitation

Information system is one of most important factors that reinforce key capacity of business by proactively reacting to various environmental changes and thereby improving internal, external competitiveness, and it can also help secure competitive edge in future market as well as in present market businesses and organizations pursue [5].

In the study therefore, we investigate what effect information system of business has on employee satisfaction and work process, by looking into the role of information system in the three area, manufacturing and service companies, hotels and hospitals.

And the finding of the study is that information system appeared to have internal effect in all the three area, manufacturing and service companies, hotel and hospitals.

First, information system appeared to have positive effect on all the employee satisfaction, strategy and work process. It can be said to help sort-term, long-term

planning by providing the most basic information for the planning of various strategies such as Enterprise resource planning (ERP) and Data mining, in the case of businesses in general. From personal perspective it can improve work efficiency, and from corporate perspective, it can improve business efficiency by obtaining needed information by connecting with IT [21].

A strategy which provides future direction of business appeared to have positive effect on employee satisfaction in the case of Hotel, and on work process in the case of manufacturing and service companies. In the case of Hotel, more contacts with customers take place, compared to other businesses, and most of Hotel strategies have much to do with customers. That is, most of Hotel strategies can be said to provide various services to customers, so that they affects employee satisfaction by minimizing customers complaints, but in the case of work process, manufacturing companies are more complicated than other businesses in general. So that improvement of work process can be said to release the burden of work of employees by reducing their workloads through the simplification of works.

And employee satisfaction and work process appeared to have positive effect on business results for all the three industries. So that it can be said that the maximization of employ satisfaction and improvement of work process can naturally result in improved performance of business regardless its industry.

The limitation of the study, however, is that more efforts are necessary to see what difference is between profit organizations and non-profit organizations by adding public sector in connection with data from the education sector and public sectors as well as from manufacturing and service companies, hotels and hospitals. For the study is limited to mostly businesses and organizations that are profit organizations, the characteristics of information system of non-profit organization need to be investigated for comparative study.

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References

[1] R.P Bagozzi, ACR Fellow speech. Advances in consumer research **21**, 811 (1994).
[2] R.P Bagozzi and Y. Yi, On the evaluation of structural equation models, Journal of the Academy of Marketing Science **16**, 7494 (1998).
[3] L. Berry, Discovering the soul of service, New York: Free Press, 1999.
[4] S. Cadwallader, C.B Jarvis, M.J Bitner, and A.L Ostrom, Frontline employee motivation to participate in service innovation implementation, Journal of the Academy Marketing Science **38**, 219-239 (2010).
[5] Y.E Chan, S.L Huff, D.W Barclay, and D.C Copeland, Business Strategy Orientation Information Systems Strategic Orientation and Strategic Alignment, Information Systems Research **8**, 125-150 (1997).
[6] A.D. Chandler, Strategy and structure: chapters in the history of the industrial enterprise, MIT Press, 1962.
[7] E.K Clemons and S.O Kimbrough, Information Systems, Telecommunications, and their Effects on Industrial Organization, Proceedings of the Seventh International Conference on Information Systems **December**, 99-108 (1986).
[8] V.L Crittenden, L.R Gardiner, and A Stam, Reducing conflict between marketing and manufacturing, Industrial Marketing Management **22**, 299-309 (1993).
[9] T.H. Davenport, Process Innovation: Reengineering Work Through Information Technology, Harvard Business School Press, 1992.
[10] K Gwinner, M.J Bitner, S.W Brown, and A Kumar, Service customization through employee addictiveness, journal of Service Research **8**, 131-148 (2005).
[11] J.F. Hair, R.E. Anderson, R.L. Tatham, and W.C. Black, Multivariate data analysis with readings (4th). Englewood Cliffs, NJ: Prentice-Hall, 1995.
[12] M Hammer, and J Champy, Reengineering the Corporation: A Manifesto for Business Revolution, Harper Collins, London, 1993.
[13] T.H Hannan, and J.M McDowell, The Impact of Technology Adoption on Market Structure, The Review of Economics and Statistics **72**, 164-168 (1990).
[14] R.K. Heldman, Future telecommunication, McGraw-Hill, London, 1992.
[15] T Henning-Thurau, M Groth, M Paul, and Gremler, D.D., Are all smiles created equal? How emotional contagion and emotional labor affect service relationships, Journal of Marketing **70**, 58-73 (2006).
[16] J.L Heskett, W.E Sasser, and L.A Schlesinger, The Service Profit Chain: How Leading Companies Link Profit and Growth to Loyalty, Satisfaction and Value, Free Press, New York, 1997.
[17] H.B Lee, A Comparative Study on the Influence of the Characteristics of the Business Process Innovation on the Organizational Commitment in Korean and Japanese Textile Industries, Korea Industrial Economics Association **15**, 239-256 (2002).
[18] C.W Hofer and D Schendal, Strategy Formulation: Analytical Concept, West Publishing Company, St.Paul.MN, 1978.
[19] Japanese Management Advisory Consultants Co., Ltd. (JMAC), jmac.1989's Reviews and Guides, 1989.
[20] R.W Miles and C.C Snow, Organizational Strategy, Structure and Process, McGraw Hill, New York, 1987.
[21] J.Y Moon, , S.C Lee, Y.S Park, and Y.H Suh, A study on the causal relationships in the Korean National Quality Award model, Total Quality Management and Business Excellence **22**, 705-726 (2011).
[22] [22] Myung Wan. Lee, Wan The study on the effects of Competitive Strategy, Corporate Environment, Organizational Structure, and Culture on the Performance Based on companies, Graduate School of Business administration Yonsei university, 1998.

[23] N Nguyen, and G Leblanc, Contact personnel, physical environment and perceived corporate image of intangible services by new clients, International Journal of Service Industry Management **13**, 242-263 (2002).
[24] J.H OBrien, and G Marakas, Introduction to Information System, Irwin Inc., McGraw-Hill, 2009.
[25] M.E Porter, Competitive strategy, Free Press, New York, 1980.
[26] C.K Prahalad, and G Hamel, Strategy as Field of Study: Why Search for a New Paradigm?, Strategic Management Journal **15**, 5-16 (1994).
[27] A Schatten and J Schiefe, Agile Business Process Management with Sense and Respond, IEEE International Conference on e-Business Engineering, 2007.
[28] J. Singh, Performance productivity and quality of frontline employees in service organizations, Journal of Marketing **64**, 15-34 (2000).
[29] H Smith, and P Fingar, Business Process ManagementThe Third Wave, Meghan-Kiffer Press, 2003.
[30] J.-B.E.M Steenkamp and H.C.Mvan Trijp, The use of LISREL in validating marketing constructs, International Journal of Research in Marketing **8**, 283299 (1991).
[31] S.H Lee, I.S Jung, J.K Kim, J.S Park, S.R Kim, U.G Kang, and Y.H Lee, BPM-based Process Management System for Quick Response in Emergency Room, KSCI review **16**, 107-111 (2008).
[32] R.A Wolfe, Organizational Innovation: Review, critique and suggested research directions, Journal of Management Studies **31**,405-431 (1994).

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