

HOW INFORMATION TECHNOLOGY GOVERNANCE MECHANISMS AND STRATEGIC ALIGNMENT INFLUENCE ORGANIZATIONAL PERFORMANCE: INSIGHTS FROM A MATCHED SURVEY OF BUSINESS AND IT MANAGERS

Shelly Ping-Ju Wu

Electronic Commerce Research Center, National Sun Yat-Sen University, 70 Lien-Hai Road,
Kaohsiung 804 TAIWAN {ceci.wu@gmail.com} and
Computer Information Systems, Georgia State University, Atlanta, GA 30302 U.S.A.

Detmar W. Straub

Fox School of Business, Temple University, 1801 Liacouras Walk, Philadelphia, PA 19122 U.S.A.
and Korea University Business School, Seoul, KOREA {straubdetmar@gmail.com}

Ting-Peng Liang

Department of Management Information Systems, National Chengchi University, Taipei 11605 TAIWAN
and National Sun-Yat Sen University, Kaohsiung TAIWAN {is.tpliang@gmail.com}

Appendix A

Instrument Items

Part I. IT Governance Mechanisms

For each of the following IT governance practices please choose the most appropriate category according to the implementation degree in your company.

Scale: SD (Strongly Disagree); D (Disagree); N (Neutral); A (Agree); SA (Strongly Agree)

IT Governance Mechanisms		SD	D	N	A	SA
ITM1	Our company has a Steering Committee at Executive or senior management level responsible for determining IT development prioritization.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ITM2	CIO is a full member of the executive committee.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ITM3	Our company has established a formal prioritization process for IT investments and projects in which business and IT is involved.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ITM4*	Our company has established formal processes to control and report upon budgets of IT.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ITM5	Our company has a committee at level of broad of directors to ensure IT is regular agenda item and reporting issue for the board of directors.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ITM6	The CIO or similar role in our company is able to clearly articulate a vision for IT's role in the company.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ITM7	Our company has established formal processes to define and update IT strategies.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ITM8	Our company has a Steering Committee composed of business and IT people focusing on prioritizing and managing IT projects.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ITM9	CIO has a direct reporting line to the CEO and/or COO.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ITM10	Our company has established formal processes to govern and manage IT projects.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Note: *ITM4 was dropped because (1) its concept of control IT budgets overlaps with ITM3 (prioritization for IT investment) and (2) control and report involve two dimensions, which could confuse the respondents when answering this question.

Part II. Strategic Alignment

For each of the following statements, please choose the most appropriate category regarding to the strategic alignment of your company.

Scale: SD (Strongly Disagree); D (Disagree); N (Neutral); A (Agree); SA (Strongly Agree)

Business Strategy		SD	D	N	A	SA
B1*	We attempt to be ahead of our competitors by cheaper pricing of our products.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B2	We attempt to be ahead of our competitors by quality products rather than price.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B3	We attempt to be ahead of our competitors by ensuring that our products are distinctively different from our competitors.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B4	We attempt to be ahead of our competitors in introducing new products.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B5	We attempt to be ahead of our competitors by offering a wide range of products.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B6	We constantly to improve the efficiency of our production process.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B7	We attempt to be ahead of our competitors by providing quality service to our customers.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B8	We attempt to be ahead of our competitors by intensive marketing of our products.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B9	We attempt to achieve growth by expanding into new markets.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
IT Strategy						
IT1*	Our current systems assist in reducing our costs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
IT2	Our current systems help us to distinguish our products from those of competitors.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
IT3	Our current systems allow us to improve the quality of our products.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
IT4	Our current systems enable us to introduce new products earlier than our competitors.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
IT5	Our current systems help in improving the efficiency of our production process.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
IT6	Our current systems enable our company to diversify our products.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
IT7	Our current systems enable our company to provide quality customer service.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
IT8	Our current systems enable us to embark on an intensive marketing of our products.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
IT9	Our current systems assist us in identifying new markets.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Note: Paired items B1* and IT1* were deleted because, based on expert opinion, the IT strategy of reducing costs is not actually aligned with cheaper pricing of products. IT strategy should be able to assist in decreasing what customers are charged.

Part III. Organizational Performance

For each of the following statements, please choose the most appropriate category regarding to the organizational performance of your company.

Scale: SD (Strongly Disagree); D (Disagree); N (Neutral); A (Agree); SA (Strongly Agree)

Financial Returns		SD	D	N	A	SA
OP1	Our company's return on investment (ROI) is better compared to other companies in the same industry.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OP2	Our company's return on equity (ROE) is better compared to other companies in the same industry.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OP3	Our company's return on asset (ROA) is better compared to other companies in the same industry.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Customer Perspective						
OP4	Customers perceive our company's quality of products and services is better compared to other companies in the same industry.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OP5	Our company has higher customer satisfaction compared to other companies in the same industry.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OP6	Our company has better firm image compared to other companies in the same industry.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Operational Excellence						
OP7	Our company has better productivity improvements compared to other companies in the same industry.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OP8	Our company has better timeline of customer service compared to other companies in the same industry.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OP9	Our company has better production cycle time compared to other companies in the same industry.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Appendix B

Sample Characteristics (N = 131)

	Frequency	Percent
Revenues		
Less than \$ 16.5 million	6	4.6
\$ 16.5 million - \$ 165 million	33	25.2
\$ 165 million - \$ 330 million	23	17.6
\$ 330 million - \$ 1.6 billion	28	21.4
More than \$ 1.6 billion	41	31.3
Number of Employees		
100 - 500	24	18.3
501 - 1000	15	11.5
1001 - 5000	43	32.8
More than 5001	49	37.4
Industry Group		
Services	35	26.7
Manufacturing	54	41.2
IT	37	28.2
Other	5	3.8

Appendix C

Measurement Validation: Procedures and Tests

Table C1 summarizes the definitions and references for the constructs and subconstructs and the items of indicators associated with each subconstruct. The complete descriptions of measurement items used for each construct are enumerated in Appendix A.

Table C1. Construct Definitions and Measurement				
Construct	Definition	Type	Items	Source or Basis
IT Governance Mechanisms: The degree to which an organization implements critical IT governance best practices.		Formative-2 nd order		Weill and Ross (2004); De Haes and Van Grembergen (2009)
Decision-Making Structure	The degree to which the organization has established organizational units and roles responsible for making IT decisions such as committees.	Formative-1 st order	IT steering committee (ITM1), and strategic information systems planning steering committee (ITM8), and CIO reporting to CEO and/or COO (ITM9).	De Haes and Van Grembergen (2009)
Formal Process	The degree to which the organization has established formal processes to monitor and ensure that IT policies are consistent with business needs.	Formative-1 st order	Formal process for portfolio management (ITM3), formal process for strategic information systems planning (ITM7), and formal process for Project governance (ITM10)	Weill and Ross (2004); De Haes and Van Grembergen (2009)
Communication Approach	The degree to which the organization has established channels to ensure proper communication and disseminate IT governance principles.	Formative-1 st order	CIO on executive committee (ITM2), IT strategy agenda to report and discuss IT issues (ITM5), and CIO or similar role to articulate a vision of IT's role (ITM6).	Weill and Ross (2004)
Strategic Alignment: The degree of coherence between realized business strategy and realized IT strategy.		Formative-2 nd order		Chan (1992)
Product-oriented Strategic Alignment	The alignment between IS strategy and business strategy in product development.	Formative-1 st order	IT strategies supporting new products (B4IT4), products diversification (B5IT6) and differentiation (B3IT2) strategies.	Hussin et al. (2002)
Quality-Oriented Strategic Alignment	The alignment between IS strategy and business strategy in terms of quality and production efficiency.	Formative-1 st order	IT strategies supporting product quality (B2IT3), production efficiency (B6IT5) and service quality (B7IT7) strategies.	Hussin et al. (2002)
Market-Oriented Strategic Alignment	The alignment between IS strategy and business strategy regarding marketing activities.	Formative-1 st order	IT strategies supporting intensive marketing (B8IT8) and new markets (B9IT9) strategies.	Hussin et al. (2002)
Organizational Performance: An organization's aggregate performance relative to its competition.		Formative-2 nd order		Rai et al. (2006)
Financial Returns	The degree to which the organization's performance is better than its competitors in terms of conventional financial measures.	Formative-1 st order	Return on investment (OP1), return on equity (OP2) and return on assets (OP3)	Weill and Ross (2004)
Customer Perspective	The degree to which the organization's performance is better than its competitors from customers' perspective.	Formative-1 st order	Customer's perception of products and services quality (OP4), customer satisfaction (OP5) and firm image (OP6)	Kaplan and Norton (2004)
Operational Excellence	The degree to which the organization's performance is better than its competitors in its responsiveness and generation of productivity improvements.	Formative-1 st order	Productivity improvements (OP7), timeline of customer service (OP8), production cycle time (OP9)	Rai et al. (2006)

The first stage in data analysis evaluates the measurement properties of the instrumentation, which include reliability and construct validity. To validate the formative constructs in our research model, we follow the steps recommended in Petter et al. (2007). Petter et al. pointed out that the conventional criteria to evaluate measurement validation such as construct validity and reliability for reflective constructs cannot be applied to assess formative ones. First, content validity is mandatory for formative measures. We established content validity via literature review and interviews with experts (CIOs and CEOs) with respect to the IT governance items. After data collection, construct validity was accessed by removing the first-order indicators with insignificant weightings (Diamantopoulos and Winklhofer 2001).

To assess the measurement properties of the instrument, we first multiplied item values by their individual PLS weights and summed them up for each first-order indicator, a formulation suggested by Bagozzi and Fornell (1982), and then the second-order variables were measured by creating composite indices based on a weighted sum of the first-order indicators (Diamantopoulos and Winklhofer 2001). The generated composite index values were used as the measures for IS strategic alignment and organizational performance. Finally, we use the VIF (variance inflation factor) statistic to determine whether the formative measures are correlated too highly (Petter et al. 2007). The VIF values of all formative constructs are below the threshold value 3.3 (Diamantopoulos and Siguaaw 2006), which suggests that our measures do not have a multicollinearity problem.

References

- Bagozzi, R. P., and Fornell, C. 1982. "Theoretical Concepts, Measurement, and Meaning," in *A Second Generation of Multivariate Analysis, Volume 2*, C. Fornell (ed.), New York: Praeger, pp. 5-23.
- Chan, Y. E. 1992. *Business Strategy, Information Systems Strategy, and Strategic Fit: Measurement and Performance Impacts*, Unpublished Doctor of Philosophy Thesis, University of Western Ontario.
- De Haes, S., and Van Grembergen, W. 2005. "IT Governance Structures, Processes and Relational Mechanisms: Achieving IT/Business Alignment in a Major Belgian Financial Group," in *Proceedings of the 38th Hawaii International Conference on System Sciences*, Los Alamitos, CA: IEEE Computer Society Press.
- Diamantopoulos, A., and Siguaaw, J. A. 2006. "Formative Versus Reflective Indicators in Organizational Measure Development: A Comparison and Empirical Illustration," *British Journal of Management* (17), pp. 263-282.
- Diamantopoulos, A., and Winklhofer, H. M. 2001. "Index Construction with Formative Indicators: An Alternative to Scale Development," *Journal of Marketing Research* (38), pp. 259-277.
- Hussin, H., King, M., and Cragg, P. 2002. "IT Alignment in Small Firms," *European Journal of Information Systems* (11), pp. 108-127
- Rai, A., Patnayakuni, R., and Seth, N. 2006. "Firm Performance Impacts of Digitally Enabled Supply Chain Integration Capabilities," *MIS Quarterly* (30:2), pp. 225-246.
- Kaplan, R. S., and Norton, D. P. 2004. "Measuring the Strategic Readiness of Intangible Assets," *Harvard Business Review* (82:2), pp. 52-63.
- Petter, S., Straub, D. W., and Rai, A. 2007. "Specifying Formative Constructs in IS Research," *MIS Quarterly* (31:4), pp. 623-656.
- Weill, P., and Ross, J. 2004. *IT Governance: How Top Managers Manage IT Decision Rights for Superior Results*, Boston: Harvard Business School Press.