The influence of the balanced scorecard implementation and earnings management on financial performance: intellectual capital and customer satisfaction used as the moderators

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Abstract

The main purpose of this research is to understand the influence of the company's implementation of the Balanced Scorecard (BSC) and earnings management on financial performance, and executives of listed electronics companies (above the section chief) in Taiwan were research subjects. This research adopts database of Taiwan Economic Journal (TEJ) and TEAMS for data collection and uses HLM_3 in analyzing the collected data. Research findings indicate the BSC implementation and earnings management by listed electronics companies in Taiwan show significant positive influence on financial performance, while intellectual capital and customer satisfaction have moderating effects.

Keywords: The balanced scorecard (BSC), earnings management, financial performance, intellectual capital, customer satisfaction

Introduction

The past literature indicates that results from multiple univariate HLM analysis for discussion will result in (1) the weakening of statistical power; (2) inflation of type 1 error rate; and (3) failure to compare and explain effects of variables on different dependent variables. While hierarchical multilevel linear model (HMLM) will be the best instrument to solve preceding problems, basic concept and principles of HMLM are the same as that of HLM, but only expand an outcome variable into multiple variables and, in the meantime, estimate the fixed effects of each level of explanatory variables on multiple outcome variables, among which the most

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important is to decompose correlated random effects stored in multiple outcome variables, i.e. variance-covariance matrix of error terms, into between and within aspects that within and between correlation coefficient matrix can be calculated separately. In a word, advantages of HMLM are: (1) decompose variance and covariance matrix of error terms into between/within aspects among outcome variables to delve into between/within correlation, and participants' certain outcome variables display missing values, multi-level analysis can still be conducted satisfactorily; and (2) HMLM can be extended to another research area, and multi-group (or multi-sample) HLM, (MGHLM), i.e. as all participants in the organization can separate several groups based on research theory, while we want to learn if relationships between each level-explanatory variables of each group or macro-level explanatory variables and outcome variables are different, i.e. the so-called moderating effect.

Besides, the semi-conductor industry is capital- and technology-intensive that is one country's key item of economic development, and among the world's main countries of origin for semi-conductors, Taiwan is the only one country implementing vertical separation to construct science parks and strengthen productivity supported by policy, to be served as the core to produce huge cluster effects that apparently become a successful paradigm for a county to develop the semi-conductor industry. Furthermore, the semi-conductor industry is capital intensive, and companies must conduct earnings management for the BSC implementation to grasp advantages in the knowledge economy era of drastic change. In the meantime, any company can also lay stress on intellectual capital accumulation and enhance customers' repurchase rate in hopes of increasing financial performance that in turn increases competitive advantages for enterprises.

Therefore, this research uses HMLM and HLM6.08V as research tools in hopes of understanding the influence of the BSC implementation and earnings management by listed electronics companies in Taiwan on financial performance, and meanwhile, attempts to understand intellectual capital accumulation and if customer satisfaction shows moderating effect, and the research purpose is given below:

(1) Understand if the BSC implementation by listed electronics companies in Taiwan shows significant positive influence on financial performance;
(2) Delve into whether earnings management of listed electronics companies in Taiwan shows significant positive influence on financial performance;
(3) Understand if intellectual capital and customer satisfaction of listed electronics companies in Taiwan show moderating effect on financial performance.

Literature review

To develop an understanding of an overview of the literature relating to the topic, this research explains dimension-related literature of each research topic respectively:

BSC-related literature

According to Maisel (1992), the traditional performance measuring methods overemphasize financial indicators that enterprises will not lead to make accurate evaluations. Therefore, the BSC implementation can improve this flaw to measure management from the overall perspective, but not emphasize the financial aspect. In a word, the BSC retains the traditional financial perspective. Besides, the BSC adds dimensions of customer, internal process, learning and growth, and uses future performance measures to supplement the inadequacy in only measuring financial dimensions in the past.

According to Kaplan & Norton (1996), external measurement emphasizes both financial and customer perspectives, and internal measurement emphasize internal process perspective and learning and growth perspective.

A study by Wu (2002) indicated that sources of corporate value creation for hi-tech industry change from fixed assets of traditional industry to customer relationship management, human resources, corporate process, corporate culture, and innovative ability, which are intellectual capital of one company, and these five types of intellectual capital are related to learning and growth perspective, internal process perspective, and customer perspective of BSC. Besides, Wang and Kao (2002) also put forward financial BSC as a strategic management system with three perspectives of customer perspective, internal process perspective, and learning and growth perspective being equivalent to customer capital, innovation and process capital, and human capital respectively.

Liao (2004) integrated corporate governance, intellectual capital, and BSC concept to construct a corporate value management model which implies four dimensions with the key performance indicator of each dimension that has casual connection, as the constructed corporate value management model aggregates relative explanatory powers of four perspectives for wafer OEM value. Research findings show that corporate governance indeed shows influence on value of wafer OEMs, while influence of these four perspectives on wafer OEM value are as in order: learning and growth perspective, followed by internal process perspective, then by corporate governance perspective, and finally followed by customer perspective.

Studies of Huang (2004) delved into correlations between performance-measuring indicators of our perspectives of BSC and corporate intellectual capital, trying to find the key performance measurement indicators affecting intellectual capital to probe into the sources of competitiveness of the banking industry. Empirical results show that the connotation of intellectual capital can use each indicator of the BSC to construct and verify the banking industry's sources of intellectual capital value that include financial capital and other non-financial factors. Aside from corporate performance, it includes affects resulting directly from other perspectives (such as customer, internal process, learning and growth) and must emphasize investment of tangible and intangible assets to increase core competitiveness.

According to the above analysis, relevant effects of the BSC on organizational performance quote classifications by Kaplan & Norton (1996). Measurement instruments of four perspectives in the BSC are: (1) financial perspective: ROE is measurement criteria; (2) customer perspective: market share is measurement criteria; (3) internal process perspective: corporate innovation process and after-sale service process standards are measurement criteria; and (4) learning and growth perspective: employee retention rate and production rate are measurement criteria.

Earnings management-related literature

Empirical studies by Barth *et al.* (1999) indicated that if the company deliberately maintains sustainable growth of EPS, better PE ratio will be achieved. Under such circumstances, stronger motivation of earnings management means higher financial and return performance (Kang, 2002).

Research by Lin (2011) indicated significant relationships between earnings management and financial performance.

Research by Chan (2012) indicated that enterprises with higher levels of earnings management have better average financial performance.

Empirical results by Lin *et al.* (November, 2012) indicated that managers can use earnings management to beautify financial performance.

The measurement instrument of earnings management is the company's strength of motivation of earnings management as the criteria, i.e. if the company deliberately maintains the sustainable growth of EPS (Earnings per Share), better PE ratio (Price Earnings Ratio) will be achieved. Therefore, EPS and P/E are instruments measuring earnings management of one company.

Intellectual capital-related literature

Lynn (1998) held that intellectual capital includes (1) human capital: internal staff; (2) structure capital: including formal and informal systems that lay an efficient and effective foundation for organizational operation; and (3) relationship capital: relationships between the organization and external organizations, such as relationships between suppliers and customers.

Knight (1999) indicated that intellectual capital consists of human capital, structure capital, external capital and financial performance.

According to Lee (2008), intellectual capital is an important factor that will make enterprises enjoy competitive advantages, and intellectual capital is per se one intangible asset, including human resource, innovation, customer relationship and business process, all of which can further bring more values and competitive advantages for enterprises than traditional tangible assets (Guthrie, 2001; Chen, 2001; Kuo, 2004)

Studies by H. T. Huang (2008) indicated that intellectual capital includes (1) customer capital: the measuring variables are number of main customer, market growth, and product release rate; (2) process capital: the measuring variables are increase rate of management fees, inventory turnover, and average management fees of each one; (3) human capital: the measuring variables are employee productivity, employee value addition, ratio of executive employees holding an advanced degree, and business profits of each employee; and (4) innovation capital: the measuring variables are factors such as R&D personnel ratio, R&D intensity, R&D productivity, and R&D expenses.

Measuring instruments of intellectual capitals are (1) customer capital: revenue growth rate, number of main customers, and product release rate, i.e. (1- sales returns and allowances/net sales) are measurement criteria; (2) process capital: increase rate of management fees 【i.e. (management fees of current year-management fees of first half of the year)/management fees of first half of the year】 and inventory turnover (cost of goods sold/average inventory) are measurement criteria; (3) human capital: employee productivity (net sales/total number of employee) and employee value addition (net profit after tax/total number of employee) are measurement criteria; and (4) innovation capital: R&D productivity (net profit after tax/R&D expenses) is measurement criteria.

Customer satisfaction-related literature

BSC put forward by Kaplan and Norton (1996) emphasizes mapping out each strategic vision and goal from viewpoints of Financial Perspective, Customer Perspective, Internal Process

Perspective, and Innovation and Learning Perspective to increase performance, while customer perspective also emphasizes the importance of customer satisfaction, which has influence on performance.

Roberts and Dowling (2002) used ROA to measure the influence of corporate financial performance on customer satisfaction, and results show that customer satisfaction shows positive influence on corporate financial performance.

According to empirical results by Huang (2008), more commercial transactions will be developed between enterprises and customers from economic perspective to make sustainable profits when enterprises face a more competitive market and establish good customer relationship. Besides, Huang also indicates that lower industry concentration rate means manufacturers are required to offer satisfactory customer services in hopes that customers can re-purchase their products to pursue higher financial performance. On the contrary, higher industry concentration rate means that manufacturers are not required to pursue customer satisfaction, as customers will be repeat buyers of consumption behavior.

Measuring instrument of customer satisfaction uses customer acquisition as measurement criteria.

Financial performance-related literature

When one company demonstrates good financial performance, its corporate value will create maximizing effects. There are large numbers of domestic and overseas studies about financial performance measuring indicators, and the points relating to this essay are briefly explained:

Huang (2008) used indicators of ROE, ROA, and EVA to measure financial performance. With respect to the influence of intellectual capital on financial performance, studies by Firer & Williams (2003), Liao (2004), and Lin (2004) indicate that ROE and ROA are traditional indicators to analyze financial performance, and EVA is less used to measure the influence of intellectual capital on financial performance. On the basis of objectivity of measurement indicators, this research has also adopted EVA measurement.

Lee *et al.* (2011) combined ROE, MB ratio and TobinQ to create an aggregate financial performance indicator (PERF) so as to indicate financial performance of the organization.

With regard to the measuring instrument of financial performance, this research uses enterprises' use of ROE and ROA as measurement criteria for financial performance.

Research method

On the basis of the preceding research motivation, purpose and literature review, this study deduce the research hypothesis and construct conceptual research framework of the following research model, as indicated in Figure 1.
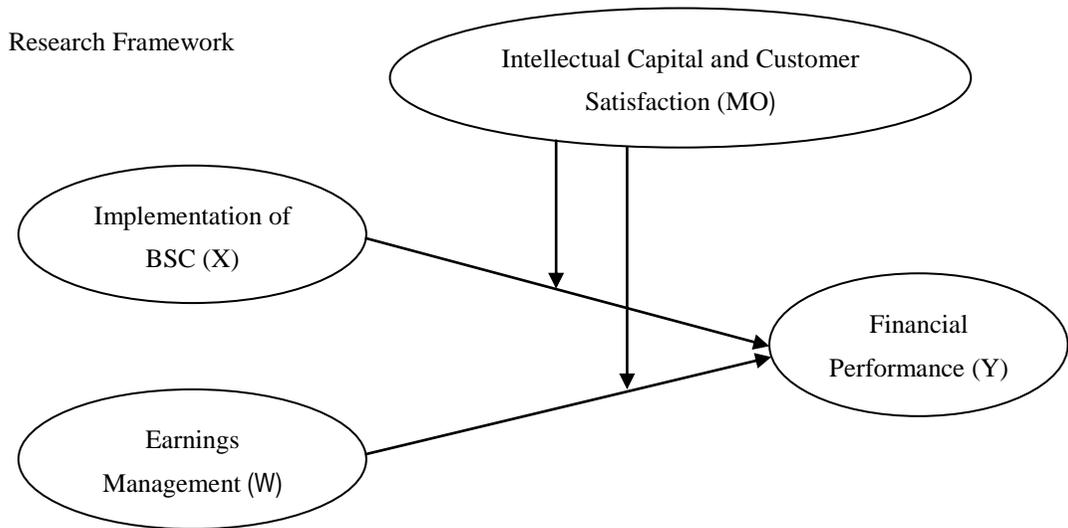
Research Framework

Figure 1: Conceptual framework

Data collection

This research adopts the database of the Taiwan Economic Journal (TEJ) for data collection. As HNLM is the research model, a large database is required for the basic information needed (Shiu, 2014).

HLM$_3$ Model

The summary of this research model is specified as follows

Level-1 Model

$$\text{MATH}_{ijk} = \pi_{0jk} + e_{ijk}$$

Level-2 Model

$$\pi_{0jk} = \beta_{00k} + r_{0jk}$$

Level-3 Model

$$\beta_{00k} = \gamma_{000} + u_{00k}$$

Mixed Model

$$MATH_{ijk} = \gamma_{000} + r_{0jk} + u_{00k} + e_{ijk}$$

For starting values, data from 7125 level-1 and 1738 level-2 records were used

Final Results - Iteration 7

Iterations stopped due to small change in likelihood function

$\sigma^2 = 1.53192$

Standard error of $\sigma^2 = 0.02911$

τ_π	
INTRCPT1,π_0	0.57037
Standard error of τ_π	
INTRCPT1,π_0	0.03337

Random level-1 coefficient	Reliability estimate
INTRCPT1,π_0	0.593

τ_β	
INTRCPT1	
INTRCPT2,β_{00}	0.32152
Standard error of τ_β	
INTRCPT1	
INTRCPT2,β_{00}	0.06573

Random level-2 coefficient	Reliability estimate
INTRCPT1/INTRCPT2,β_{00}	0.863

The value of the log-likelihood function at iteration 7 = -1.265286E+003

Final estimation of fixed effects:					
Fixed Effect	Coefficient	S. error	t-ratio	Approx. $d.f.$	p-value
For INTRCPT1, π_0					
For INTRCPT2, β_{00}					
INTRCPT3, γ_{000}	-0.510017	0.077971	-6.543	59	<0.001
Final estimation of fixed effects (with robust standard errors)					
Fixed Effect	Coefficient	S. error	t-ratio	Approx. $d.f.$	p-value
For INTRCPT1, π_0					
For INTRCPT2, β_{00}					
INTRCPT3, γ_{000}	-0.510016	0.077962	-6.541	59	<0.001
Final estimation of level-1 and level-2 variance components					
Random Effect	Standard Deviation	Variance Component	$d.f.$	χ^2	p-value
INTRCPT1,r_0	0.75523	0.57037	1661	4253.88861	<0.001
level-1, e	1.23446	1.52392			

Final estimation of level-3 variance components

Random Effect	Standard Deviation	Variance Component	d.f.	χ^2	p-value
INTRCPT1/INTRCPT2,u_{00}	0.56361	0.31766	59	573.08981	<0.001

Statistics for the current model

Deviance = 25305.980943

Number of estimated parameters = 4

Results and analysis

Through HMLM for analysis, testing results are given below:

Results of general linear hypothesis testing – test 1

	Coefficients		Contrast
For slope$_=\pi_1$			
For INTRCPT2 = B10			
INTRCPT3$_=\gamma_{100}$	7.036470	0.0000	0.0000
Z$_=\gamma_{101}$	0.020715	0.0000	0.0000
L2XMEAN$_=\gamma_{102}$	1.139240	0.0000	0.0000
For X, B11			
INTRCPT3$_=\gamma_{110}$	0.920143	1.0000	0.0000
For slope$_=\pi_2$			
For INTRCPT2$_=$B20			
INTRCPT3$_=\gamma_{200}$	6.169735	0.0000	0.0000
Z$_=\gamma_{201}$	0.780080	0.0000	0.0000
L2XMEAN$_=\gamma_{202}$	1.156264	0.0000	0.0000
For X, B21			
INTRCPT3$_=\gamma_{210}$	1.262387	-1.0000	1.0000
For D3 slope$_=\pi_3$			
For INTRCPT2$_=$B30			
INTRCPT3$_=\gamma_{300}$	7.332560	0.0000	0.0000
Z$_=\gamma_{301}$	-0.897216	0.0000	0.0000
L2XMEAN$_=\gamma_{302}$	1.307578	0.0000	0.0000
For X, B31			
INTRCPT3$_=\gamma_{310}$	0.225050	0.0000	-1.0000
$\chi2$ statistic = 73.165472	Degrees of freedom = 2		p-value = <0.001

Chi-square value, degree of freedom, and p-value of the preceding statement results indicate that each predictor variable of the research model show significant positive effect on each dependent variable.

Conclusion and suggestions

This section reaches conclusions on the basis of the fixed and random effects called mixed effect from the above analysis and findings and elaborates on the contribution of this paper. Last, the research limitations are summarized and the suggestions to follow-up studies are made.

Conclusions

According to the preceding analysis, this model estimates significant fixed effect and random effect of explanatory variables at each tier on outcome variables. In a word, research results listed electronics companies in Taiwan: (1) the BSC implementation shows significant positive influence on financial performance, and this result is similar to the argument put forward by Maisel (1992); (2) good earning management shows significant positive influence on financial management, and this result is similar to the argument of research put forward by Barth *et al.* (1999), Kang (2002), Chan (2012), Lin (2011), and Lin *et al*. (November, 2012); and (3) intellectual capital accumulation and its customer satisfaction show moderating effect on financial performance, and this result is similar to studies by H. C. Huang (2008) and H. T. Huang (2008) respectively.

Research contribution

Having reviewed the past literature, most studies used single-variable of HLM, but not HMLM, to analyze exploratory research. As indicated in the introduction to this essay, multiple single-variable of HLM used to analyze results for discussion will result in (1) the weakening of statistical power; (2) inflation of type 1 error rate; and (3) failure to compare and explain effects of variables on different dependent variables that makes HMLM the best instrument to solve preceding problems. Therefore, the use of HMLM as the research method in this research has demonstrated innovation.

Besides, the research results can be offered to listed semi-conductor companies in Taiwan as a reference in their sustainable development of practical value.

Limitations of the study and suggestions for future research

This research suggests that subsequent researchers can consider attempting to expand the field of research or use other research methods, such as using CFA to verify different trades or comparing differences of goodness-of-fit of each trade under the same model.

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