

Management Accounting Change Among Local and Foreign Manufacturing Firms in Malaysia

Che Ruhana Isa

Dynamic business environments have significantly intensified competition both in the domestic and the international markets. Increasing participation from multinational firms through foreign direct investments (FDI) coupled with drastic changes in manufacturing and information technologies have brought about new challenges to Malaysian firms. Changes in competitive and manufacturing environments have important implications for designing appropriate strategies and control systems in organizations. One of the strategies to cope with escalating market competition is adoption of advanced manufacturing technologies which have resulted in drastic changes in the manufacturing cost components. In such environment, the traditional management accounting system is argued to be no longer capable in meeting the information needs of managers. Foreign firms are argued to be more equipped and amenable to face these challenges as top management support and organizational culture within these firms are perceived to be more receptive and conducive to adoption of organizational changes including accounting and control systems (MACS) changes. It has been argued that the cultures of the parent multinational firms influence the cultures of the employees in their subsidiaries through socialisation and selection process. This paper examines the effect of market competition and advanced manufacturing on MACS change. Test was also conducted to investigate whether firm ownership moderates the relationships between the independent variables and MACS change.

Key words: Management accounting change, advanced manufacturing technology, market competition

1. Introduction

Escalating trade liberalization and rapid advancements in manufacturing and information technologies have significantly intensified competition in the domestic and the international markets to survive in this challenging and turbulent environment, manufacturing firms should constantly review and revise their manufacturing processes and strategies, which often require adoption of manufacturing technology (AMT) (Lee, 1996). In addition, changes in information and communication networks such as Management Accounting and Control Systems (MACSs) (Williams and Seaman, 2002) are important as MACSs play a vital role in monitoring the strategic progress of a firm through a feedback information system. The remainder of this paper is organized in the following manner.

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Section 2 provides development of the theoretical framework that depicts the relationships under investigation. Section 3 presents the method and followed by the results of the data analysis in Section 4. Finally, discussion and conclusions are presented in Section 5.

2. Theoretical Framework and Hypotheses Development

AMT adoption often results in drastic changes in manufacturing processes and cost structures which often entail appropriate MACS changes in firms (Burns and Vaivio, 2001; Mia and Clarke, 1999; Libby and Waterhouse, 1996; Yakou and Dorweiler, 1995; Kaplan, 1984). It has been argued that in an AMT environment, MACSs need to change in order to continue to remain relevant in providing relevant, timely and accurate information to management for planning, control and decision-making purposes (Bjørnenak and Olson, 1999; Drury and Tayles, 1995, Hoque and Hopper, 1994; Simons, 1990; Cooper and Kaplan, 1988; Johnson and Kaplan, 1987; Kaplan, 1984). This has led to “new or claimed to be new” management accounting systems, such as new product costing systems, strategic cost analysis methods, quality management and others (Libby and Waterhouse, 1996). Libby and Waterhouse (1996), and subsequently, Williams and Seaman (2001) provided empirical evidence on the extent and determinants of changes in MACS, specifically the five sub-systems for planning, controlling, costing, directing and decision-making. Using a sample of 24 Canadian firms, Libby and Waterhouse (1996) found that on average, 31% of the MACS in the sample firms changed during the period 1991-1992. The greatest number of changes occurred in the decision-making sub-system and fewest changes occurred in the directing sub-system and the best predictor was organizational capacity to change.

Williams and Seaman (2001) found an overall 22.1% rate of MACS change and centralization (replacing decentralization) was the only significant predictor of MACS change, while size and capacity to change variables exhibited mixed results. Decision-making sub-system exhibited the highest number of changes while the lowest number of changes occurred in the costing sub-system. Behavioural factor such as managers' cultural and leadership values can also play an important role in encouraging or inhibiting innovation or change (Elizur and Guttman, 1976). Numerous writers have implicated leadership as critical in the process of innovation or change (e.g. Scott and Bruce, 1994). According Hofstede's (1980a) and Hall's (1976) cultural frameworks, in a high power distance, low individualism and high context society such as an Asian country, the people are more receptive to inequality of power and respect for authority and hierarchy (Hofstede, 1980a) and more emphasis is given to collective achievement compared to individual achievement. In this culture, there will be more autocratic leadership and centralisation of authority, which is argued to inhibit or discourage changes (Shane, 1992; Herbig & Dunphy, 1998). In contrast, low power distance, high individualism and low context societies such as Anglo-American countries) put less emphasis on status differences, more discretion is given to subordinates and there is strong emphasis on individual achievement (Hofstede, 1982).

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Market Competition and MACS Change

Intensifying market competition induces firms to continually re-evaluate their existing competitive strategies as well as their management control system. Studies have shown mixed result on the impact on market competition on management control. Khandwalla (1972) found a positive relationship between market competition and reliance on accounting information system while others such as Mia and Clarke (1999) management accounting information mediated the relationship between competition and performance. In this study, the relationship between the level of perceived intensity of market competition and MACS change is investigated. As the aims of MACS are to provide information that would facilitate planning, costing, performance measurement and decision-making, firms operating in a competitive environment need to constantly review their MACS to ensure that the appropriate costing and performance measurement systems are instituted for sustained competitiveness (Libby and Waterhouse, 1996). Thus, it is hypothesized that more intense market competition will lead to more extensive changes in MACS. Hypothesis 1 ensues:

H1: There is a positive relationship between intensity in market competition and the rate of MACS change.

Advanced Manufacturing Technology and MACS Change

AMT adoption leads to significant changes in the component and nature of manufacturing operations and cost structures. For example, the size of direct labour cost component has declined while the indirect costs such as overhead costs has ballooned. In such environment, managers will need a broader scope of data, relevant and timely information (Chenhall & Morris, 1986). Thus, managers are expected to make greater use of MACS information when the level of AMT adoption increases. The following hypothesis is proposed:

H2: There is a positive relationship between the rate of MACS change and the level of AMT adoption.

Moderating Effect of Firm Ownership

The effects of culture on management accounting practices have been the interest of many studies and many have argued that leadership is critical for innovation or change (e.g. Scott and Bruce, 1994). Managers coming from high individualism and low power distance cultures (companies originated from the Anglo American countries will serve as proxy nations) will be more supportive of MACS change compared to managers from low individualism and high power distances societies such as Malaysia. It is conjectured that firm ownership might moderate the relationship between the independent variables: market competition and AMT adoption with MACS change. The following hypotheses state this relationship formally:

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- H3: Firm ownership moderates the relationship between the rate of MACS change and intensity of perceived market competition.
- H4: Firm ownership moderates the relationship between the rate of MACS change and the level of AMT adoption.

Research Framework

Using the contingency theory as basis, the following research framework is developed. It is proposed that MACS change is affected by the following contingent factors, namely market competition, AMT adoption and firm ownership. In this study, the dependent variable (DV) is MACS change; the independent variables (IDV) are intensity of perceived market competition and level of AMT adoption and a moderator variable, firm ownership. Figure 1 depicts the proposed relationships.

The following is the basic regression equation related to the above model:

$$Y = b_0 + b_1X_1 + b_2X_2 + e$$

Where Y = the extent of change in MACS; X1 = intensity of perceived market competition and X2 = level of AMT adoption.

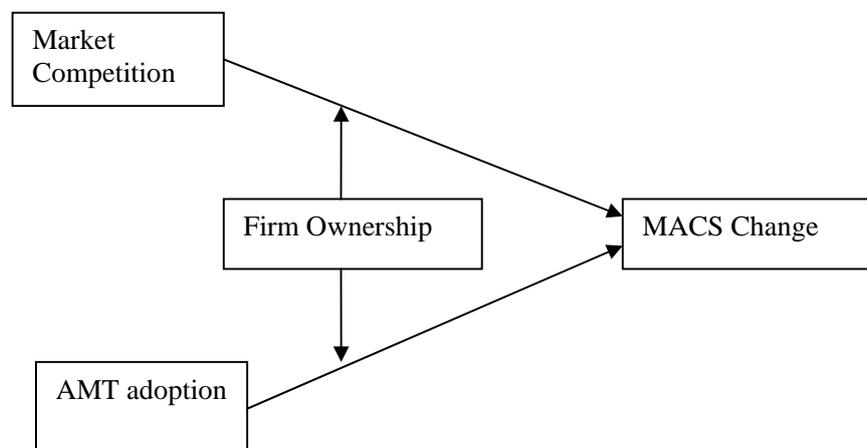


Figure 1: The Research Model

3. Method

Data was collected using self administered mail survey among randomly selected manufacturing firms listed on 2001/2002 Federation of Malaysian Manufacturers (FMM) directory. A total of 110 responses were chosen for the final data analysis, representing a final response rate of 11%. Following Libby and Waterhouse (1993), MACS change was measured as the number of MACS change experienced by the respondents for the last three-year period from January 2000 to December 2002 using the 23 items

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comprising five main system components: planning, controlling, costing, directing and decision-making (see Appendix A).

Intensity of perceived market competition was measured using a modified version of the composite scale for measuring competitive pressure proposed by Khandwalla (1972). The AMT adoption was measured using an instrument consisting of 22 items for measuring adapted from Snell and Dean (1992). Firm ownership was categorised into local and foreign based on firm ownership structure stated by the respondents. Local firms were those more than 50% owned by Malaysians while foreign firms represented by those more than 50% owned by foreign firms.

4. Results

Survey Results

Profile of Respondents and Sample Firms

Table 1 shows accountants or managers, who represented the middle-level management, constituted 51.8% of the total respondents. The rest of the respondents were general managers/financial controllers (25.8%), managing directors/CEOs (6.4%), engineers (7.4%) and others (11.8%), who did not clearly specify their job designations. Table 2 shows electrical and electronics firms represent 30%, the largest group, of sample firms, followed by chemical and plastic (22.7%) and metallurgical (13.6%). In terms of firm ownership, 49.1% of the firms were local while 50.9% were foreign. A majority (85%) of the firms were established more than 10 years ago. A majority of the firms were larger firms as almost 90% of them had more than 100 employees and almost 82% of them had annual sales turnover of more than RM26 million.

Table 1: Profile of Survey Respondents

Background Variable	Categories	Frequency	Percentage %
Job Designation	Managing Director/CEO	7	6.4
	General Manager/Financial Controller	25	25.8
	Accountant/Manager	57	51.8
	Other-Engineer	8	7.4
	No information provided	13	11.8
Work Experience	Between 1 to 3 years	36	32.7
	More than 3 years	74	67.3
Gender	Male	84	76.4
	Female	25	22.7
	No information provided	1	0.9
Nationality	Malaysian	99	89.9
	Other	4	3.6
	No information provided	7	6.4

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Table 2: Profile of Overall Sample Firms

Background Variable	Categories	Frequency	Percentage %
Type of Industry	Electrical and electronics	33	30.0
	Food, beverage and tobacco	10	9.1
	Textiles, clothing and foot ware	3	2.7
	Transport and automotive	8	7.3
	Wood and timber products	9	8.2
	Metallurgical	15	13.6
	Chemicals and plastic	25	22.7
	Other	7	6.4
Ownership Structure	Local (more than 50% locally owned)	54	49.1
	Foreign (more than 50% foreign)	56	50.9
Years of Operation	Less than 5 years	6	5.5
	Between 5 to 10 years	18	16.4
	More than 10 years	85	77.3
	No information	1	0.9
Number of Employees	0-100	11	10.0
	101-250	23	20.9
	251-500	31	28.2
	More than 500	43	39.2
Annual Sales Turnover	Less than RM25 million	14	12.7
	Between RM26 to RM100 million	37	33.6
	More than RM100 million	53	48.2

Descriptive Statistics

Table 3 summarizes the descriptive statistics for main variables: intensity in market competition, AMT adoption and MACS change for the overall sample as well as for local and foreign firms. The rate of MACS change for the overall sample was moderate, 44%. The rate of MACS change was higher for the foreign subgroup, 47.6% compared to the local subgroup which showed a rate of 41.2%. The highest rate of change occurred in the decision-making sub-system (11.6%), while the lowest level of change was observed in the directing sub-system (5.1%) which is fairly higher than those reported by Libby and Waterhouse (1996) and Williams and Seaman (2001). Comparative analysis for the local and the foreign subgroups revealed rates of change for all the MACS components, except for costing, were consistently higher for the foreign firms. Consistent with the results for the whole sample, both groups of firms showed the highest level of change was in planning while the lowest was in directing.

Table 3: Descriptive Statistics of Variables

Main Variables	Overall Sample (N=110)				Local Firms (N=54)		Foreign Firms (N=56)	
	Mean	SD	Observed Range	Theoretic al range	Mean	SD	Mean	SD
Overall rate of MACS change	44.4%	0.95	0 – 87%	0 – 100	41.2%	0.25	47.6%	0.22
Planning	11.6	0.07	0 – 23	0 – 100	11.3	0.07	11.9	0.08
Controlling	11.3	0.07	0 – 23	0 – 100	9.3	0.07	13.3	0.07
Costing	9.6	0.70	0 – 23	0 – 100	9.9	0.07	9.3	0.07
Directing	5.1	0.04	0 – 9	0 – 100	5.0	0.04	5.3	0.04
Decision Making	9.7	0.06	0 – 23	0 – 100	8.6	0.06	10.7	0.06
Intensity of competition	4.50	0.95	2.57 – 6.57	1 – 7	4.47	0.88	4.52	1.02
Overall AMT adoption:	2.81	1.06	0– 5.0	1 – 5	2.47	1.00	3.13	1.03
Technical	2.62	1.14	0 – 5.0	1 – 5	2.30	1.03	2.92	1.16
Computer integration	3.19	1.10	0 – 5.0	1 – 5	2.85	1.06	3.51	1.06

Table 4 shows the correlations between the main variables for the overall sample and for the local and foreign subgroups, respectively. The Cronbach alpha coefficients ranged from 0.70 to 0.91 suggesting acceptable levels of scale reliability (Nunnally, 1967) for the variables concerned. The Pearson correlation between MACS change and intensity of perceived market competition was insignificant. The correlation between MACS change and AMT adoption ($r = 0.353$, $p \leq 0.001$) was also positive and significant. The results also indicate a positive and marginally significant correlation between perceived market competition and AMT adoption.

The correlation results for the subgroups indicate MACS change correlated significantly with AMT adoption for both groups but with higher significance value for the foreign group ($r = 0.386$, $p \leq 0.001$) compared to the local firms ($r = 0.280$, $p \leq 0.05$). Interestingly, the correlation results for the foreign subgroup showed an unexpected significant correlation between AMT adoption with perceived market competition ($r = 0.292$, $p \leq 0.05$).

Table 4: Correlations (p values) and Reliability Measures for Variables for Overall Sample, Local and Foreign Firms

Variables	Overall			Local			Foreign			Cronbach Alpha
	1	2	3	1	2	3	1	2	3	
1.MACS Change	1			1			1			N/A
2.Perceived Competition	-0.037	1		-0.110	1		0.025	1		0.70
3.AMT Adoption	0.353***	0.172*	1	0.280**	0.022	1	0.386***	0.292**	1	0.90

*** $p \leq 0.01$, ** $p \leq 0.05$, * $p \leq 0.10$

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Regression Results

Regression runs were separately carried out using the rate of change for each of the five sub-systems of MACS, as well as the overall MACS change, as the dependent variable and level of perceived market competition and AMT adoption were the independent variables for the whole sample and for both subgroups. Table 5 shows that. The rate of MACS change was significantly associated with increasing AMT adoption but was insignificant with perceived market competition. Thus, hypothesis H2 is supported, while hypothesis H1 is not supported which are consistent with the findings by Williams and Seaman (2001). Libby and Waterhouse (1996), on the other hand reported a positive but insignificant relationship between MACS change and market competition.

While the regression model for the foreign group was significant, the model for the local group was insignificant. The results for both groups showed similar findings with the overall sample results which indicated AMT adoption was a significant predictor of MACS change while perceived market competition was not.

Table 5: Regression Results

Independent Variables	Dependent Variable: Rate of Changes in MACS		
	Overall Sample	Local	Foreign
Perceived Competition	-0.103	-0.116	-0.104
AMT Adoption	0.374***	0.283**	0.418***
R2	0.135	0.092	0.159
Adj. R2	0.119	0.056	0.126
F	8.268***	0.085	4.899**

***p≤ 0.01, **p≤ 0.05, *p≤ 0.10

Moderating Effect of Firm Ownership

A comparative analysis for the foreign and local firms was conducted to investigate whether firm ownership has any effect on the relationships between MACS change and the independent variables: market competition and AMT adoption. The correlational method/Fisher z'-transformation was used to test the moderating effects of firm ownership as it is one of most commonly used methods when the moderator variable can be categorised into two distinct groups (Snell and Dean, 1992; Baron and Kenny, 1986). The results shown in Table 6, indicated no support was found for the hypothesised moderating effect of firm ownership on the relationships between market competition, AMT adoption and MACS change. Hence, hypotheses H3 and H4 were not supported.

Table 6: Testing the Moderating Effects of Firm Ownership Using Correlational Method

Moderating Variable: Firm Ownership	Pearson Correlation	Fisher Z-transformation
1. Market competition and MACS change Local (N=54) Foreign (N=55)	$r = -0.011$ ($p = 0.430$) $r = 0.025$ ($p = 0.859$)	$Z = -0.6850$ ($p = 0.4933$)
2. AMT adoption and MACS change Local (N=54) Foreign (N=55)	$r = 0.280$ ($p = 0.040$) $r = 0.386$ ($p = 0.004$)	$Z = -0.5379$ ($p = 0.5907$)

5. Discussion and Conclusions

The objectives of the study are to investigate the relationships between intensity of perceived market competition and AMT adoption with MACS change and to examine whether firm ownership moderates those relationships. The statistic tests did not provide support to the prediction that higher level of market competition should result in higher level of MACS thus not supporting hypothesis H1 suggesting that market competition did not directly affect the level of MACS changes in firms. MACS changes generally require a long-term planning because firms need to examine market changes and the effects of those changes on their management accounting information needs, and devise strategic plans to face the new market and manufacturing environments in advance. The correlation and regression results showed a negative relationship between change in market competition and MACS change which is consistent with Williams and Seaman's (2001), but contrary to Libby and Waterhouse's (1996). The mix findings might be due economic and/or cultural factors. Malaysia and Singapore (Williams and Seaman's study) belong to the developing and emerging economies with Asian cultural values, while Libby and Waterhouse's (1996) study was based on a sample of Canadian manufacturing firms, which were of Anglo-American cultural value and in an advanced economy.

The results, however, revealed a significant positive relationship between AMT adoption and MACS change, thus providing support for the hypothesis H2. Since the previous studies mentioned (Libby and Waterhouse, 1996; Williams and Seaman, 2001) did not examine the relationship between AMT adoption and MACS change, this finding adds to our understanding on the role of AMT adoption in MACS change. No support was found for the moderating role of firm ownership in the relationships between market competition, AMT adoption and MACS change.

The survey results suggest that there could be many other factors influencing MACS change and the issues related to MACS change is not as straight forward as we might think. One of the factors that have been suggested in the literature that influence change efforts is top management support. Unless the top management are trained in

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the accounting field, the top management may not understand the types and nature of changes in MACS that are needed to meet the changing demands of information.

Another factor that may explain the lack of changes in MACS is that the accountants' themselves could be more adverse to changes compare to other managers. Coad (1996) argued that accountants are performance oriented instead of learning oriented and could partly explain the lack of changes in the accounting discipline compared with other discipline. Accountants are more likely to avoid new challenges such as change and try to maintain the current systems (Johnson, 1992). Since changes in MACS are within the accountants' domain, it is less likely for them to initiate the changes or to convince the top management of the need to change, which could partly explain the slow change in the accounting discipline (Coad, 1996). In addition, there are many barriers in implementing changes in MACS. Among the main barriers include factors such as high costs of implementing the changes, lack of expertise and lack of facilities. Overall, the results provide some empirical evidence on MACS changes among Malaysian manufacturing firms role of competition in predicting MACS change in a developing economy, this study provides insights to the roles of other variables, namely, market competition, AMT adoption and firm ownership, in the predicting MACS change. The results of the study, however, are subject to the several limitations. First, the study is associated with the usual limitations of cross-sectional survey research, namely data collected at a single point of time. Second, this study covers only manufacturing firms which limit its generalist ability to other sector. Third, a majority of the respondents in the survey were middle-level managers and were not the senior or top-level managers as initially targeted.

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Appendix A: Measures used for MACS Change

Planning systems

1. Budgeting
2. Operation planning(production)
3. Capital budgeting
4. Strategic planning
5. Other planning systems

Controlling systems

6. Individual or team-based performance measurement
7. Organizational performance measurement
8. Measurement of performance in terms of quality
9. Measurement of performance in terms of customer satisfaction
10. Other performance measures

Costing Systems

11. Direct allocation of manufacturing overhead
12. Direct allocation of marketing costs
13. Direct allocation of other overhead
14. Internal (department or divisional) product transfers
15. Other costing systems;

Directing Systems

16. Reward systems – bonuses
17. Reward systems – pay for performance plans
18. Other reward systems

Decision-making systems

19. Information reported more frequently
20. Use of more non-financial measures
21. Information reported more broadly
22. Other changes to reporting systems
23. Other changes to systems that do not appear on this list