School of Commerce

A Performance Linked Management Accounting Typology Within Contingency And Institutional Frameworks In The Malaysian Manufacturing Industry

Anuar Bin Nawawi

This thesis is presented as part of the requirements for the award of the degree of Doctor of Philosophy of the University of Adelaide

August 2006
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>SECTION</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>TABLE OF CONTENTS</td>
<td>i</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>x</td>
</tr>
<tr>
<td>LIST OF FIGURES</td>
<td>xvi</td>
</tr>
<tr>
<td>ABSTRACT</td>
<td>xvi</td>
</tr>
<tr>
<td>DECLARATION</td>
<td>xix</td>
</tr>
<tr>
<td>ACKNOWLEDGEMENTS</td>
<td>xx</td>
</tr>
<tr>
<td>CHAPTER 1: INTRODUCTION TO THE STUDY</td>
<td>1</td>
</tr>
<tr>
<td>1.1 Chapter Outline</td>
<td>1</td>
</tr>
<tr>
<td>1.2 Purpose Of The Research</td>
<td>1</td>
</tr>
<tr>
<td>1.3 The Research Propositions</td>
<td>2</td>
</tr>
<tr>
<td>1.4 Significance Of The Study</td>
<td>4</td>
</tr>
<tr>
<td>1.5 The Research Strategies And Approaches</td>
<td>5</td>
</tr>
<tr>
<td>1.6 Scope Of The Research</td>
<td>10</td>
</tr>
<tr>
<td>1.7 Background To The Developments In Management Accounting</td>
<td>12</td>
</tr>
<tr>
<td>1.8 Overview Of Subsequent Chapters</td>
<td>13</td>
</tr>
<tr>
<td>1.8.1 Overview Of Chapter 2</td>
<td>13</td>
</tr>
<tr>
<td>1.8.2 Overview Of Chapter 3</td>
<td>14</td>
</tr>
<tr>
<td>1.8.3 Overview Of Chapter 4</td>
<td>14</td>
</tr>
<tr>
<td>1.8.4 Overview Of Chapter 5</td>
<td>14</td>
</tr>
<tr>
<td>1.8.5 Overview Of Chapter 6</td>
<td>15</td>
</tr>
<tr>
<td>1.9 Summary</td>
<td>16</td>
</tr>
<tr>
<td>CHAPTER 2: REVIEW OF LITERATURE</td>
<td>17</td>
</tr>
<tr>
<td>2.1 Introduction</td>
<td>17</td>
</tr>
<tr>
<td>2.2 Management Accounting Systems' Information Characteristics</td>
<td>18</td>
</tr>
<tr>
<td>2.3 Management Accounting Practices/Techniques</td>
<td>19</td>
</tr>
</tbody>
</table>
2.4 Manufacturing Management.................................................. 20
2.5 Organizational Performance................................................ 23
2.6 Contingency Factors Affecting Management Accounting System Design.................................................. 32
2.7 The Isomorphic View Of Institutional Theory.................................. 35
2.8 Institutional Influences.................................................. 40
2.9 Limitations Of Contingency Theory............................................. 44
2.10 Limitations Of Institutional Theory............................................. 47
2.11 Summary Of Focal Literature And Its Gaps........................................... 51

CHAPTER 3: CONCEPTUAL FRAMEWORK AND HYPOTHESIS GENERATION 55

3.1 Introduction.............................................................................. 55
3.2 Theoretical Foundation.......................................................... 56
3.2.1 Cluster Analyzing Of Firms And Matching Them To Performance.................................................. 56
3.2.2 Contingency Factors As Possible Predictors To Clusters Of Firms.................................................. 57
3.2.3 Institutional Factors As Possible Predictors To Clusters Of Firms.................................................. 58
3.3 The Research Problem, Question And Objectives................................. 59
3.3.1 The Research Problem.......................................................... 60
3.3.2 The Research Questions.................................................. 61
3.3.3 The Research Objectives.................................................. 62
3.4 The Conceptual Model And Main Components Of The Constructs.................................................. 63
3.4.1 The Conceptual Model.................................................. 64
3.4.2 Main Components Of The Research Constructs.................................................. 66
3.5 Hypothesis Development And Testings.................................................. 69
3.5.1 The Research Hypotheses And Hypothesis Testings.................................................. 70
3.5.2 The Significance Levels And P-Values.................................................. 75
3.6 Summary.............................................................................. 77
CHAPTER 4: RESEARCH DESIGN AND VARIABLE MEASUREMENTS

4.1 Introduction ................................................................. 79
4.2 Sample Selection .......................................................... 81
4.3 Survey Development ...................................................... 83
4.4 Research Instruments .................................................... 84
4.5 Measurements Of Research Constructs And Dimensions .......... 88
4.6 Data Screening, Cleaning, Recoding And Transformation ........... 93
4.7 Unidimensionalities Of Research Constructs And Dimensions ...... 95
  4.7.1 Method Used To Factor Analyze Management Accounting
       Systems' Presentation Of Information Dimensions And Management Accounting Practice/Technique Constructs .......... 96
  4.7.2 Method Used For Reliability Analyses Of Management Accounting Systems' Presentation Of Information Dimensions And Management Accounting Practice/Technique Constructs .......... 100
4.8 Method Used For Cluster Analysis Of Management Accounting
       Systems' Presentation Of Information And Management Accounting Practices/Techniques ........................................ 102
  4.8.1 Clustering Variables .................................................. 103
  4.8.2 Clustering Algorithms ................................................. 107
  4.8.3 Determining The Number Of Clusters ................................ 111
  4.8.4 Validating Clusters ................................................... 114
  4.8.5 Method Used To Test Cluster Differences ....................... 117
4.9 Issues On Demographic Controls And Testing For Bias ............... 118
  4.9.1 Demographic Controls ................................................ 119
  4.9.2 Non-Response Bias In Mail Surveys ................................ 119
  4.9.3 Estimating Non-Response Bias ...................................... 120
4.10 Method Used To Test For Significant Associations Between Cluster Solution And Ancillary Factors (Background Information And Manufacturing Management Methods) .................. 123
4.11 Method Used To Test For Significant Differences In The Mean Scores Of The Institutional And Contingency Factor Variables For The Cluster Solution................................................................. 125
4.12 Method Used To Predict The Cluster Membership Based On Values From The Ancillary, Institutional And Contingency Factor Variables.................................................. 126
   4.12.1 Techniques Available For Predicting (Explaining) And Model Testing......................................................... 127
   4.12.2 The Choice Of Multinomial Logistic Regression Procedure........................................................................ 128
   4.12.3 The Need For Assumption Testings In The Multinomial Logistic Regression.............................................. 129
   4.12.4 Justification On Specifying A Stepwise Model For The Multinomial Logistic Regression Procedure........ 130
   4.12.5 Justification On Selecting The Forward Entry As The Stepwise Method..................................................... 131
   4.12.6 Presenting The Results Of The Multinomial Logistic Regression................................................................. 131

4.13 Method Used To Predict Performance Based On Values From The Management Accounting Systems’ Presentation Of Information And Management Accounting Practice/Technique Variables................................................................................. 133
   4.13.1 The Choice Of Multiple Linear Regression Procedure............................................................................. 133
   4.13.2 Justification On Specifying A Stepwise Model For The Multiple Linear Regression Procedure............... 134
   4.13.3 The Need For Assumption Testings In The Multiple Linear Regression Procedure................................ 135
   4.13.4 Brief Results Of The Multiple Linear Regression Procedure For The 70 Variables (Items).................. 136

4.14 Method Used To Predict Performance Based On Values From The Management Accounting Systems’ Presentation Of Information And Management Accounting Practice/Technique Dimension......................................................................................... 137
CHAPTER 5: DATA ANALYSIS AND DISCUSSION

5.1 Introduction ................................................................. 144
5.2 Analysis of Interviews ...................................................... 146
5.2.1 Findings From The Interviews ........................................ 146
5.3 A Guide To The Constructs, Dimensions and Variables Used In This Research ...................................................... 148
5.4 Testing For Unidimensionailties Of Research Constructs And Dimensions .......................................................... 160
5.4.1 Factor Analyses Of Research Constructs And Dimensions .......................................................... 160
5.4.1.1 Factor Analysis Of Management Accounting Systems' Presentation of Information: Scope Of Information .......................................................... 161
5.4.1.2 Factor Analysis Of Management Accounting Systems – Presentation Of Information: Timeliness Of Information .......................................................... 162
5.4.1.3 Factor Analysis Of Management Accounting Systems – Presentation Of Information: Aggregation Of Information .......................................................... 162
5.4.1.4 Factor Analysis Of Management Accounting Systems’ Presentation Of Information: Integration Of Information .......................................................... 163
5.4.1.5 Factor Analysis Of Management Accounting Practices/Techniques – Budgeting Techniques .......................................................... 164
5.4.1.6 Factor Analysis Of Management Accounting Practices/Techniques – Performance Evaluation Techniques .......................................................... 165
5.4.1.7 Factor Analysis Of Management Accounting Practices/Techniques – Costing Techniques................................................................. 167

5.4.1.8 Factor Analysis Of Management Accounting Practices/Techniques – Strategic Planning Techniques........................................... 168

5.4.1.9 Factor Analysis Of Management Accounting Practices/Techniques – Quality Control Techniques............................................... 168

5.4.2 Reliability Tests On Research Constructs And Dimensions.......................................................................................................... 169

5.4.3 Summary Of Factor Analyses And Reliability Tests On Research Constructs And Dimensions............................................................ 170

5.5 Weighted Average Performance Index............................................................................................................................................. 172

5.6 Cluster Analysis Of Management Accounting Systems’ Presentation Of Information And Management Accounting Practices/Techniques......................................................... 173

5.6.1 Standardization Versus Non Standardization Of Clustering Variables.......................................................................................... 173

5.6.2 Multicollinearity Among Clustering Variables......................................................................................................................... 175

5.6.3 Reliability Of The Cluster Solution............................................................................................................................................. 175

5.6.4 Validity Of The Cluster Solution.............................................................................................................................................. 176

5.6.5 Testing Cluster Differences........................................................................................................................................................... 177

5.6.6 Summary Of The Cluster Analysis Results............................................................................................................................... 182

5.7 Demographic Controls And Testing For Bias.............................................................................................................................. 182

5.8 Testing For Significant Associations Between Cluster Solution And Ancillary Factors (Background Information And Manufacturing Management Methods). ............................................................... 186

5.8.1 Summary Of The Significance Testings Between Cluster Solution And Ancillary Factors (Background Information And Manufacturing Management Methods)........................................................................... 195
5.9 Testing For Significant Differences In The Mean Scores Of The
Institutional And Contingency Factor Variables For The Cluster
Solution................................................. 196

5.9.1 Summary Of The Testing For Significant Differences
In The Mean Scores Of The Institutional And
Contingency Factor Variables For The Cluster
Solution................................................. 205

5.10 Predicting The Cluster Membership Based On Values From The
Ancillary, Institutional And Contingency Factor Variables........ 206

5.10.1 Testing Assumptions In The Multinomial Logistic
Regression............................................. 207

5.10.2 Interpreting The Results Of The Multinomial Logistic
Regression............................................. 215

5.10.3 Summary Of The Results Of The Multinomial Logistic
Regression............................................. 221

5.11 Predicting Performance Based On Values From The
Management Accounting Systems’ Presentation Of Information
And Management Accounting Practice/Technique Variables...... 222

5.11.1 Testing Assumptions In The Multiple Linear
Regression Procedure For The 70 Variables (Items) .... 222

5.11.2 Presenting The Results Of The Multiple Linear
Regression Procedure For The 70 Variables (Items)...... 242

5.11.3 Interpreting The Results Of The Multiple Linear
Regression Procedure For The 70 Variables (Items)...... 246

5.12 Predicting Performance Using Dimensions Rather Than
Variables For Management Accounting Systems’ Presentation
Of Information And Management Accounting
Practices/Techniques.................................................. 248

5.12.1 Presenting The Results Of The Multiple Linear
Regression Procedure For The 10 Dimensions
(Factors).......................................................... 249

5.12.2 Interpreting The Results Of The Multiple Linear
Regression Procedure For The 10 Dimensions
(Factors).......................................................... 256
5.12.3 Summary Of The Results Of The Multiple Linear Regression ................................. 258
5.13 Summary .............................................................................................................. 260

CHAPTER 6: CONCLUSION ......................................................................................... 263
6.1 Introduction ........................................................................................................... 263
6.2 Recapitulating And Interpreting The Findings ..................................................... 264
6.2.1 The Hypothesis Tests And Their Interpretations ............................................. 264
6.2.2 Answering The Research Questions .................................................................. 272
6.3 Limitations Of The Study ..................................................................................... 275
6.3.1 Limitations Embodied In The Selected Theories .......................................... 275
6.3.2 Limitations Embodied In The Design And Administration Of The Survey .... 275
6.3.3 Limitations Of The Data Analyses ..................................................................... 280
   6.3.3.1 Limitation Of The Multinomial Logistic Regression Procedure .................. 280
6.3.3.2 Limitations Of The Multiple Linear Regression Procedure ....................... 281
6.3.3.3 Limitation Of The Stepwise Model In Regression Procedures ...................... 285
6.3.4 Limitations Of Scope In Interpreting The Results ........................................... 286
6.4 Implications For Theory And Practice ............................................................... 287
6.5 Directions For Future Research ........................................................................... 293
6.6 Summary .............................................................................................................. 297

LIST OF APPENDICES .............................................................................................. 300
APPENDIX 1: QUALITATIVE INTERVIEW AND PRE-TESTING OF SURVEY QUESTIONNAIRE SHEET ................................. 301
APPENDIX 2: DETAILS OF THE INTERVIEWEES AND GIST OF THE INTERVIEWS ........................................................................ 306
APPENDIX 3: COVER LETTER ACCOMPANYING SURVEY QUESTIONNAIRE ........................................................................... 338

viii
A PERFORMANCE LINKED MANAGEMENT ACCOUNTING TYPOLOGY
WITHIN CONTINGENCY AND INSTITUTIONAL FRAMEWORKS IN THE
MALAYSIAN MANUFACTURING INDUSTRY

ABSTRACT

Management accounting systems' (MAS) information attributes coupled with management accounting practices/techniques (MAPT) form complex configurations that differ across manufacturing firms. The extent to which management adopts and relies on these management accounting configurations is expected to have outcome effects on the performance of their firm. The adoption and reliance upon these configurations are also expected to be influenced by the context in which manufacturing managers operate. In particular, the contingency factors faced by a firm and the institutional norms prevalent on a firm will have an impact on the way management chooses to configure its combination of features of MAS and MAPT. The empirical literature on these complex configurations is not well established.

This study aims to establish a discernible typology of manufacturing firms that adopt and rely on combined features of management accounting systems and practices/techniques in Malaysia. In particular, a systems approach employing cluster analysis is used to determine the existence of a management accounting typology of firms. Using this empirically derived cluster solution, the further aims of this study are to identify which typological group is better performing, based on a weighted average measure of performance of member firms in each MAS/MAPT-type group. The final aim is to model and test a set of predictors of the better and weaker performing MAS/MAPT-type groups of firms. These predictors are drawn from the background characteristics of respondents and their firms, key contingency theory variables and isomorphic institutional theory variables.

Data is collected from a sample of management accountants employed in manufacturing firms in order to obtain measures relating to relevant constructs and their underlying dimensions and variables. The constructs are manufacturing management methods, management accounting systems' presentation of information, management accounting practices/techniques in use, organizational performance, contingency factors (involving
strategic manufacturing priorities, organizational interdependence, decentralization of structure and perceived environmental uncertainty), and institutional influences (involving mimetic, coercive and normative dimensions). The survey instrument for this study was based heavily on a selection of multi-item measures that have been tested and validated in prior empirical research literature. This instrument was pre-tested through interviews with five management accounting experts. It was then mailed to the membership list of the Chartered Institute of Management Accountants (CIMA) in Malaysia. There were 127 usable responses received.

The results first reveal that there are two distinct clusters of manufacturing firms, distinguished by the extent to which management accountants in those firms consider MAS information attributes as more useful and claim more benefit from practising MAPT. Using a weighted average performance index, it is further found that firms in the cluster of high management accounting users perform significantly better. The inference is that better performing manufacturing firms fall into the group whose management uses a wide range of MAS information attributes and MAPT for their planning, control and performance evaluation functions compared to those who tend to not use these methods.

The two clusters of manufacturing firms are also tested for significant associations and relationships with the background information (predominantly demographic factors), manufacturing management methods, the institutional influences and the contingency factors measured through the survey. Both bivariate analyses and multivariate logistic regression are applied. Under bivariate analyses, variables found to be significant determinants of the cluster solution are: respondents' previous length of service and education at certificate level, manufacturing strategies (all three types), all mimetic and normative institutional influences, one coercive influence, and autonomy of management relating to staffing. Logistic regression analysis results in the following variables having a significant effect on the cluster solution: respondents' previous length of service, ten management's attention on the functionality of management control systems, the dependence of top management on advice from the management accountant, and the manufacturing strategy of giving priority to customer service and delivery.

In order to test whether MAS information attributes and MAPT can predict the weighted average performance index, two multiple linear regression modellings are developed. The first model tests all seventy MAS information attributes and MAPT indicators and
discovers that only four of them are significant predictors to the weighted average performance index. The four predictors are owners' (shareholders') value analysis, performance evaluation: non-financial measures, performance evaluation: ongoing suppliers' evaluation and cost-volume-profit analysis. The second model utilizes ten factor analysed dimensions of the MAS' information attributes and MAPT. Out of the ten principal components treated as independent variables in the multiple regression modelling, only one significant predictor to the weighted average performance index emerges. The single predictor is the 'performance benchmarking' factor. Except for cost-volume-profit analysis, all the significant predictors in the first model can be found within the performance benchmarking factor.

The findings from this study provide a better understanding of the many variables that are related to the firms that place greater emphasis on the use and perceived benefits of use, of management accounting systems, practices and techniques. These firms, in turn, are established as the better performing manufacturing firms. This study also manages to isolate a number of management accounting practices/techniques instrumental to predicting a firm's performance. The implications for practice are that an emphasis on the use of management accounting generally is integral to success in the manufacturing industry, although some MAPT stand out as key predictors of this success.