

Determinants of Strategic Roles of Multinational Subsidiary: The Case of U.S.-Owned

Computer Companies in Taiwan

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The aim of submission of PhD Colloquium is to seek advices from the panel particularly on the issues regarding to literature review, sample data and sample size.

- **Literature reviews is lengthy.**

This thesis reviews literature on the theory of the MNC and subsidiary strategy. It is claimed that relevant literature has been consulted but is lengthy and needs to be refocused.

- **A concern was raised about what the sample is and represents. How to relate subsidiary divisions to subsidiary?**

The unit of analysis is subsidiary value-adding activities rather than subsidiary. Giving the argument of that several roles might exist in a large subsidiary, activities of R&D, marketing and sales, and services in single subsidiary should be divided and analysed separately. However a concern was raised about what it does all mean for the analysis of the subsidiary role and performance. Does it also make the difference in reviewing literature? (Review literature on organisation rather than subsidiary?)

- **Sample size**

A concern was raised about the sample size.

1. Background Information

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- **Title:** Determinants of Strategic Roles of Multinational Subsidiary: The Case of U.S.-Owned Computer Companies in Taiwan
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2. The Aims and Objectives of Research

The first major objective of this thesis is to explore the roles played by subsidiaries of foreign-based multinational companies in a newly emerging country (Taiwan). This research proposes and validates an integrated model specifying the determinants that possibly affect the strategic roles of foreign subsidiaries. These determinants are grouped in three categories: subsidiary level, head office and local environment. This model builds on and adds value to Birkinshaw and Hood (1997, 1998) by extending and enriching the factors discussed in their relevant conceptualisation. The research also presumes and tests that there might be differences across different strategic types.

The second objective is to re-examine the relevant unit of analysis when discussing the role of multinational subsidiaries. It calls into question whether the subsidiary is the relevant unit of analysis when analysing their strategic roles. Rugman and Verbeke (2001) suggested that subsidiaries' development and diffusion activities may differ across the value chain. This concurs with the earlier view of Birkinshaw and Hood (1998) that a subsidiary can perform a single activity or an entire value chain of activities.

A shift in emphasis toward the subsidiary as a unit of analysis created a good understanding of the various strategic roles that subsidiaries take on (e.g. Bartlett and Ghoshal 1986; Jarillo and

Martinez, 1990; Roth and Morrison, 1992). At the corporate level, research has focused on the fit of the overall structure of the organisation with its corporate strategy. They argued that the fit between the strategy and structure of a firm leads to better performance. However, specifically addressing the linkages between structure and strategy in subsidiary role development is not yet explored. The former stream in MNC subsidiary studies have only focused on the meaning of strategy while the latter has emphasised structure. Although Birkinshaw and Morrison (1995) took the approach of strategy-structure fit to evolve subsidiary roles, it was lack of precision due to common methods bias from a single respondent questionnaire and without considering value-added activities across subsidiaries.

Most of researchers have classified subsidiary structures according to 'pure' types, even though virtually all organisations have somewhat mixed structural element. This thesis suggests that as product diversity increases, firms move from pure functional structures to multidivisional structures. Despite international expansion, some fundamental differences exist in single subsidiary, the business units in subsidiary level should take into account. By adapting a configurational approach, the ways in which subsidiary structural varied across subsidiary strategy can be emphasised.

Configuration defines the geographic location of the organisation's functional activities, international strategy can be evaluated either by locating each functional activities (i.e. manufacturing, purchasing, marketing, etc) in a single country or all functional activities (i.e. the complete value chain) of business within each country. A dispersed configuration allows the entire value chain of the business to reside within each country location, thereby providing for the responsiveness of all functional activities to the local context. This creates firm specific advantage that can benefit a company only in a particular location and lead to benefits of national responsiveness. This implies the argument raised by Rugman and Verbeke (2001). They insisted that as the firm-specific advantages may be differentiated across various value chains, an MNC parent company and one of its subsidiaries cannot just decide upon a simple, optimal structural context that would determine all their interactions. Therefore, case studies of MNC subsidiaries

could be conducted which would attempt to deconstruct for each value china function performed by subsidiaries.

This thesis prefers to use research questions rather than hypothesis. This indicates less an absence of a priori expectations than a lack of established measures. Data is presented in its raw form rather than a higher level of aggregation to aid interpretation. Appropriate statistical tests are also conducted. The research questions are as follows.

- (a) What different types of subsidiary do U.S.-owned computer companies have in Taiwan?
- (b) What factors/determinants are associated with differences in the types of strategy among foreign subsidiaries of U.S.-owned computer companies in Taiwan?
- (c) How do differences in the types of subsidiary strategy relate to subsidiary performance?
- (d) How do these factors/determinants affect each other? What are their associations with subsidiary role development?

3. Main Relevant Strands in the Literature

The literature review is divided into two chapters. The first chapter is concerned with the theory of the MNC. The approach taken is to discuss how the dynamic theory of MNC and evolution of MNC and its organisation can shed the light on subsidiary strategic development. The dynamic theories of MNC provide ideas on why firms go abroad, establish subsidiaries in foreign countries and describe how the development of ownership advantage shift from MNC to their subsidiary. The organisational models of MNC explain how the traditional multidivisional-form organisation has shifted to a modern network-integrated model of MNC, in which a subsidiary's position can give it influence over the strategic orientation of the MNC.

The second chapter considers the concept of subsidiary role development, or more specifically the process through which the subsidiary's capabilities and charter change over time. These include the

numerous empirical studies that examine the efficiency of subsidiary strategic roles, and subsidiary strategic development. The literature review enables one to conclude that subsidiary strategic types might be the product of the influences of various actors at the subsidiary level, head office and the local environment. The literature review chapters form the theoretical and empirical foundation to support the research questions and methodological approach.

- **Subsidiary role typologies**

This is the centre theme of the thesis. Subsidiaries can assume a broad variety of roles by giving literature on world product mandate (White and Poynter, 1984; D’Cruz, 1986; Rugman and Douglas, 1986;), charters (Birkinshaw and Hood, 1998; Birkinshaw, 2000), and the centers of excellence (COEs) (Bartlett and Ghoshal, 1986). They all show that subsidiary provides a significant contribution to the MNC competitive achievements.

- **Subsidiary role development**

This overview provides the idea of the redevelopment of subsidiary role that can be either a negative or a positive change.

- **Drivers of subsidiary development**

This overview provides the drivers of subsidiary role changes that have been discussed by various authors. For example, Birkinshaw and Hood (1997) identified subsidiary management, parent company managements and host-country policy-makers as the three factors that have a vested interest in subsidiary development and the necessary power to influence the process. Birkinshaw and Hood (1998) further developed a model of multinational subsidiary evolution that integrated three perspectives: head-office assignment, subsidiary choice and local environment determinism. Moreover, by extending and enriching the drivers discussed in Birkinshaw and Hood (1997, 1998), the subsidiary evolution framework of Tavares’ (2001) also proposed and considered three main drivers: subsidiary, internal and external environment. Brock (2000) pointed out that the studies written from the corporate managerial perspective assume that parent company managers are the

most important drivers. The studies written from the subsidiary perspective emphasise subsidiary initiative (Birkinshaw, 1997) and the studies from a regional development perspective (Hood and Young, 1994) emphasise the environmental effects, and the effect of government on the environment. Jarillo and Martinez (1990) greatly expanded the understanding of the local government's impact as well as changes in the local economic environment. Finally, the studies of Hood and Young (1994) and Hood and Taggart (1999) analysed how existing subsidiaries develop and how new subsidiaries with appropriate qualities could be established as part of the developmental program of MNCs.

4. Research Model

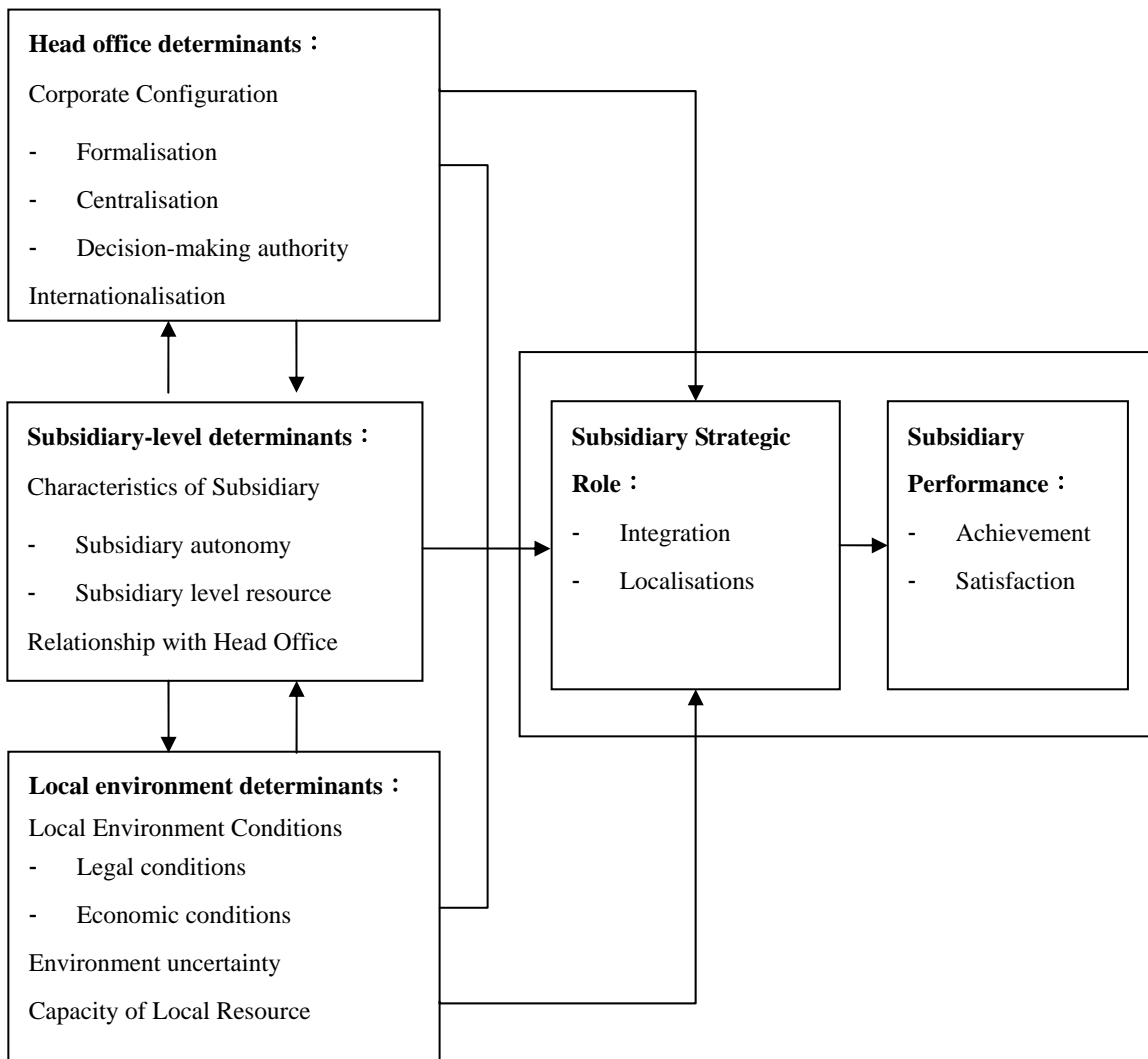
The research framework (Figure 1) is added and extended based on the subsidiary evolution proposed by Birkinshaw and Hood (1998). The subsidiary role development literature shows that the subsidiary's position in the MNC is a product of interactions between the subsidiary itself, head office and the local environment. Obviously, one cannot explain subsidiary role development solely through isolated factors. There are a number of studies that have looked at the factors associated with differences in subsidiary strategic roles, but they typically have focused on only a sub-set of the potentially important factors. The studies reviewed in subsidiary evolution and development on the other hand emphasised more specifically that three contrasting perspectives could be discerned. To address the research questions this dissertation formulates and tests three perspectives: subsidiary level, head office and local environment determinants. It is argued in the research that these factors are associated with the differences in subsidiary strategic roles and with the differences in subsidiary performance.

The head office is a critical determinant of subsidiary development but it is just one of broad mechanisms that determines subsidiary roles. Head office determinant includes aspects such as the MNC's corporate configuration, degree of internationalisation, and head office relationship with

subsidiary. Subsidiary level factors reflect the decisions taken by subsidiary management to define for themselves the role of their subsidiary. The subsidiary level determinant is underpinned by the subsidiary's proactive action and capabilities. This determinant includes the aspects of subsidiary autonomy, subsidiary resource and subsidiary relationship with head office. The local environment determinant argues that the role of subsidiary can be understood as a function of the constraints and opportunities in the local market. Host country conditions, particularly the stability of economic and political conditions, have been argued to influence foreign subsidiary operations and outcomes. The environment complexity might result from the perceived interconnectedness of the different external forces that influence the subsidiary's operations. It might also result from the perceived diversity of the needs of the different customer groups that the subsidiary serves.

The thesis tests the supposition that three sets of determinants interact to determine the subsidiary's role at any given point in time (see Figure 1). This is indicated by the arrows leading from each of the three determinants to subsidiary strategic role. In addition, the arrows between head office, subsidiary level and local environment determinants show that the effects of each of the three determinants on each other are interactive; the effects may either cause or affect another. The research also presumes that these three determinants result in the differences of subsidiary performance as measured by operation achievement and satisfaction.

Figure 1
Research framework



5. Methodology

The current research is concerned with understanding strategy in large and geographically dispersed corporations, and how they can be structured in such a way that they can reap the benefits of size without sacrificing the benefits of local presence. Accordingly, it chooses to study the large U.S.-owned computer companies in Taiwan whose annual sales revenues typically exceed \$50 billion and whose operations span 50 or more countries. The case study of U.S.-owned computer companies in Taiwan is combined with face-to-face interviews and follow-up questionnaires with

decision-makers in subsidiaries. The unit of analysis is subsidiary activities. The reason for choosing to focus on the subsidiary value-added activities rather than the subsidiary is that the notion of subsidiary role itself needs to be refined given the argument of Rugman and Verbeke (2001) that subsidiaries' development and diffusion activities may differ across the value chain. Unlike other studies that focused on various industries in one country, only subsidiaries of U.S.-owned computer companies in Taiwan are selected as in-depth case delve into things in more detail and control for industry-specific or home or host country-specific differences. Moreover, compared to Japanese and Korean computer manufactures, U.S. computer companies have an entire value chain of activities in Taiwan. These activities include marketing and sales, services, product research and development, and finance.

The data collection and analysis are divided into three steps: case study, face-to-face interviews and follow-up questionnaire survey.

The context of case study chapter summarises the general economic situation and computer industry structure in the U.S. as well as the local environment determinants in Taiwan through a short historical survey of its economic and industrial development, and the computer industry in particular. The case companies: Dell Inc, Hewlett-Packard, International Business Machines are presented by a survey of each company's history, global strategy and structure of their subsidiaries in Taiwan.

Face-to-face interviews were conducted with business units of each foreign subsidiary of the three companies in 2005 and 2006. The subsidiaries' head offices in Taiwan are all located in Taipei, the capital city. The responsibilities of Taiwan's head offices include major businesses and management operations within the island and with their other Asian regional subsidiaries. A total of 23 interviews were conducted. This research prefers interviewing informants that are more concerned with the operations of the organisation than with the making of decisions. Therefore, the informants were not all senior managers. Instead, these informants are chosen based on their well

understanding of handling business between the subsidiaries in Taiwan and American headquarters. Each interview took 60 to 90 minutes based on the interviewee's availability. The interviews were conducted in Chinese. The interviews were recorded by audio tapes and this supplemented by notes in the form of hand written script.

The questionnaires survey in Chinese was conducted in 2006 and 2007 by email and telephone. This enabled more participants to be obtained; some 22 completed questionnaires were obtained via email and telephone and 9 additional surveys were obtained by face-to-face. Totally, 31 questionnaires were obtained (the number of questionnaires might be increasing).

6. Methods of analysis

Two chapters comprise the methods of analysis: interview and questionnaire survey analysis.

6.1 Interview Data

The data is presented using a variety of graphical and tabular formats for structuring the analysis process. The interview texts are presented in two ways: free lists (Henley, 1969; Borgatti, 1998) and componential analysis (Bernard, 1994; Bernard and Ryan, 1998). The research interprets the frequency of mentions and the order in which items were mentioned in the lists as an indicator of items' salience. Then the co-occurrence of items across lists and the proximity with which items appear in list were used as measures of similarity among items. Componential analysis then produces models based on logical relationships among features. The interviews from several respondents in the same company take into account each respondent's responsibilities and level in the organisation. The interviews data were also compared with public company reports and press releases, internal company documents, and other articles written about the company and its operations. Finally, in combining information from different companies, the responses were coded,

which can detect tendencies, such as the percentage of respondents considering a certain factor to be important.

6.2 Questionnaire Survey

The data are analysed by a four-stage procedure, which has been widely employed by similar previous studies (Jarillo and Martinez, 1990; Birkinshaw and Morriosn, 1995; Taggart, 1998). In order to test the convergent validity of scales, a principal component analysis was first applied. This is to ensure that the variables loaded significantly and uniquely on the appropriate dimensions. It also does this by summarizing the underlying patterns of correlation and looking for groups of closely related items. Prior to performing principal components analysis the suitability of data for analysis were assessed by Bartlett's test of sphericity (Bartlett, 1954) and Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy. In this research, the KMO value exceeded the recommended value in all cases, and Barlett's test of sphericity research proved statistical significance ($p=.000$). In addition to this, two techniques were used to assist in the decision concerning the number of factors to retain: the eigenvalue and scree test (Catell, 1966). Only factors with an eigenvalue of 1.0 or more were retained for further investigation. The Cronbach's alpha coefficient is applied to test research reliability, with above 0.7 as the ideal Cronbach's alpha coefficient (Nunnally, 1978). In this study the lowest value of Cronbach alpha was found to be 'Environment uncertainty' ($\alpha=0.727$) which is above the recommended value of 0.7. The reliability of variables was therefore found to be satisfactory.

Second, in respect of Research Question 1, cluster analysis was used to cluster the sample subsidiaries into groups representing different subsidiary roles.

Third, in order to test Research Question 2 and 3 each characteristic variable was then tested by analysis of variance to determine whether there is significant differentiation across the different strategic roles of the subsidiaries..

Finally, to test Research Question 4, correlation was used to describe the strength and direction of relationship between the determinants and a regression model was used to further explore the relationship between three determinants with integration and localisation variables. The results indicate how well the sets of variables were able to predict integration and localisation variables, and it also presents how much variance each of the determinants explains in the integration and localisation variables.

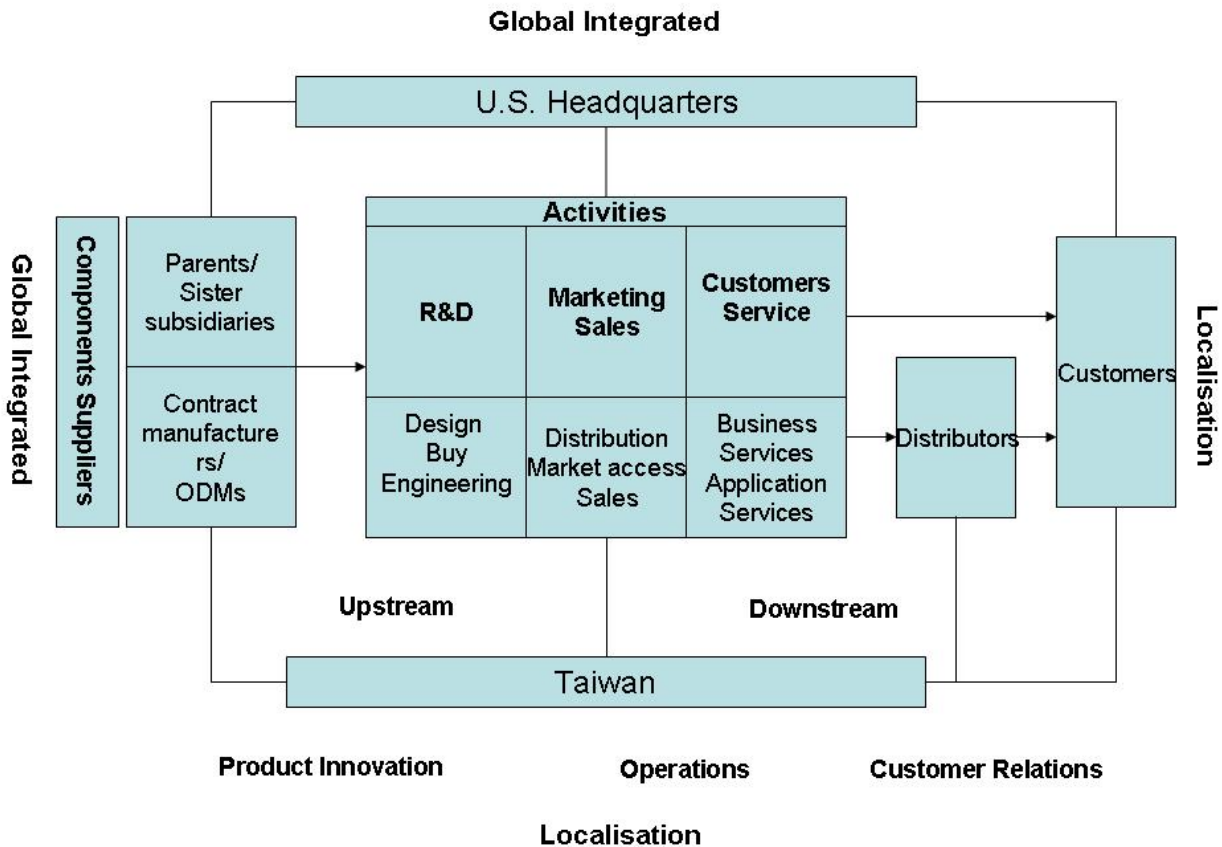
All the analysis was performed using SPSS.

7. Findings of the Research to Date

7.1 Interview Data

In order to understand the structure and strategy of sample subsidiaries, it is important to look at the network of computer industry. Figure 2 shows the operations and network of American computer subsidiaries in Taiwan. The network consists of subsidiary activities, their parents, external and internal components suppliers, customers, and host country environment. The activities of subsidiaries can be categorised into three parts: research and product development, marketing and sales, and services.

Figure 2
Operations of U.S.-owned computer subsidiaries in Taiwan and their links with external and internal environment



The next section presents a sample of the interview data analysis.

High integration of the R&D function with parents

Innovation in the computer industry is highly global. Most of the core innovation occurs at the component and software level in computer industry led by the parent firms. There is also a global network that supports system-level innovation by parents who focus on incorporating component innovations into new products. In the firms, high level architectural design and product management are done in-house, while physical development and manufacturing are generally outsourced. In national level, the higher value analytical, design and management activities are usually done in the U.S. by parent firms, whereas the development and manufacturing of the physical product, along with the more routine product and process engineering is done by the subsidiaries in Taiwan.

'Our projects are assigned by the headquarter. We can propose our ideas for new products, however it needs to be approved by head office before we progress it' (Project manager).

'Our product design and development need to integrate a standard component; it involves very intensive joint development with headquarter or sister subsidiaries' (Project design, engineer).

'Using the notebook as example, IBM usually keeps the notebook design in-house. Product development takes manufacturability into account from the beginning. Head office pay lots of attention on innovation, otherwise a product may be developed that cannot be produced at the necessary cost or quality' (Associate project manager).

And so on.

7.2 Questionnaire Survey Data

Strategic Roles of U.S.-Owned Computer Companies in Taiwan

The resultant three clusters represented the different strategic roles of subsidiaries separately, with each of them occupying one of three quadrants made up of integration and localisation (Figure 3). The means of integration and localisation variables are shown in Table 1. It shows that there are significant values ($p < 0.01$) difference among the mean scores on eight variables for the three groups, except 'Products adapted to local' ($p = 0.226$). 'Products adapted to local' has no significant difference between three groups and the total mean score is quite low ($M = 2.00$).

The results show clearly that there are three types of subsidiary roles: Receptive, Active and Autonomous as proposed by Jarillo and Martinez (1990) and Taggart (1998) exist in the case of foreign subsidiaries of U.S.-owned computer companies in Taiwan. Research and development activities are more likely Receptive type (high integration, low localisation). Marketing and sales activities tend to be Active type (high integration, high localisation) and Autonomous (low

integration, high localisation) type is presented by Services activities.

Figure 3
Strategy typology of U.S.-owned computer companies in Taiwan

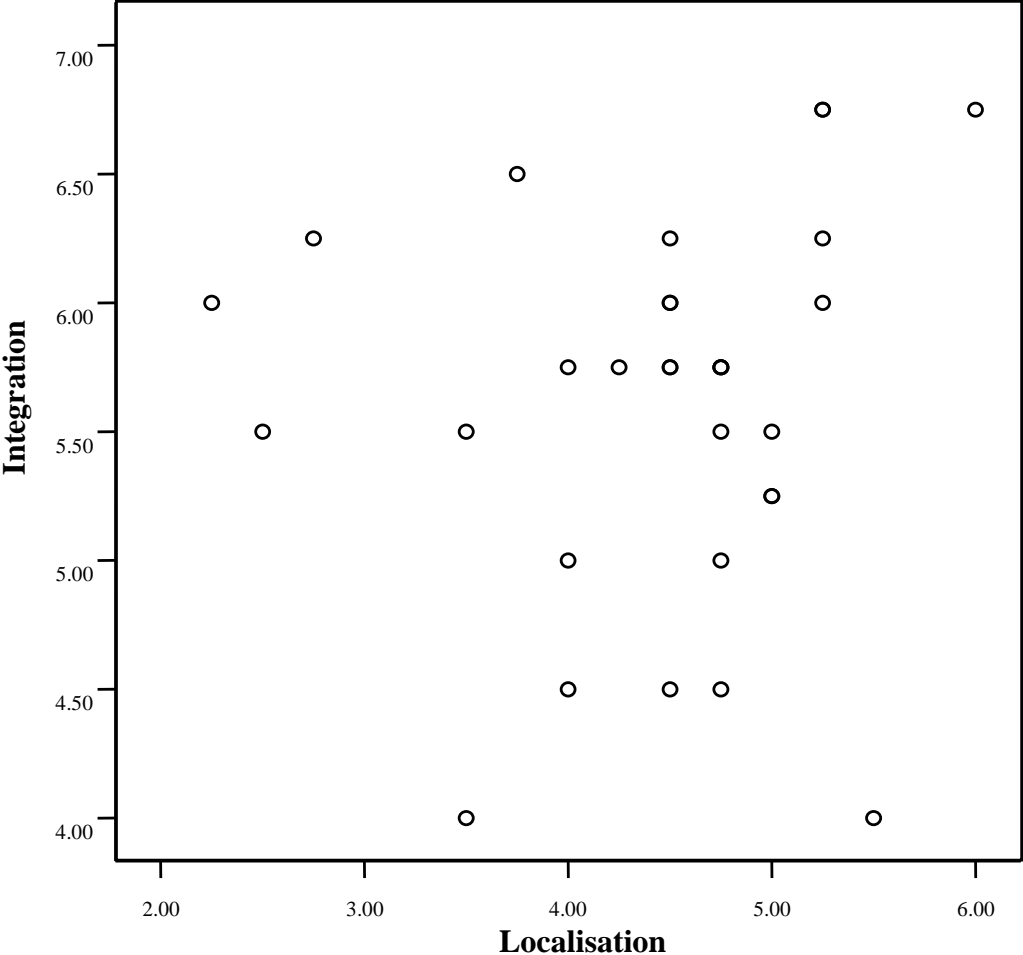


Table 1
Cluster analysis: means of three-cluster solutions

Variables	Cluster 1 n=4 Receptive	Cluster 2 n=19 Active	Cluster 3 n=8 Autonomous	F-statistics	p-value
Integration					
Products developed by subsidiary	5.00	5.32	3.63	12.624	.000***
Integration of R&D	6.50	6.42	5.25	12.805	.000***
Integration of manufacturing	6.25	6.32	5.25	8.940	.001**
Integration of marketing	5.50	5.89	4.25	13.114	.000***
Localisation					
% of inputs from subsidiary	3.25	6.00	5.50	51.835	.000***
% of locally produced	3.25	5.63	5.38	8.003	.002**
Locally content in locally produced	3.00	5.32	5.13	8.690	.001**
Products adapted to local	1.50	2.11	2.00	1.571	.226

Note: For integration, higher score signifies more integration (min=3, max=7). For localisation, higher score signifies more localisation (min=1, max=6)

*p<0.05, **p<0.01, ***p<0.001

Associations between Strategy Roles and Three Determinants

The omnibus associations between the strategic roles and each of determinants are analysed by analysis of variance. Table 2 shows the results of the comparison of subsidiary level, head office, local environment determinants across the subsidiary typologies. For the significant variables, detailed comparative analyses across each pair of the strategic roles are conducted using Duncan's multiple range test (significant level at p<0.05). The result suggests that most proposed predictors significantly influence the formation of subsidiary strategic roles, except subsidiary autonomy of local market and internationalisation of firm. There is also varying effectiveness in differentiating between pairs of clusters (Receptive is very different from Active and Autonomous types particularly).

Table 2
Comparison of subsidiary level determinants across the strategic typology

Variables	Cluster 1	Cluster 2	Cluster 3	F-statistics	p-value.	Effect size+	Differences between clusters++
	n=4 Receptive	n=19 Active	n=8 Autonomous				
Subsidiary level							
Market autonomy	4.250	5.211	4.833	2.557	.096	0.154	
Product autonomy	1.000	2.342	2.813	19.167	.000***	0.578	(1,2) (1,3)
Subsidiary resource	4.875	6.040	5.656	7.009	.003**	0.334	(1,2) (1,3)
Communication	4.917	6.193	5.750	20.491	.000***	0.594	(1,2) (1,3) (2,3)
Head office							
Formalisation	5.625	6.316	6.000	3.718	.037*	0.210	(1,2)
Centralisation	2.250	4.053	4.000	13.335	.000***	0.488	(1,2) (1,3)
Decision making authority	6.250	4.737	5.375	8.754	.001**	0.385	(1,2) (1,3)
Internationalisation	6.438	6.816	6.688	1.918	.166	0.120	
Local environment							
Legal	5.875	4.000	3.625	4.466	.021*	0.242	(1,2) (1,3)
Economic	5.875	6.342	5.500	4.578	.019*	0.246	(2,3)
Environment uncertainty	5.167	6.175	6.042	6.019	.007**	0.301	(1,2) (1,3)
Local resource	4.850	6.432	5.875	15.830	.000***	0.531	(1,2) (1,3)

Notes: Higher scores signify higher levels for all dimensions

+Calculated using Eta squared

++Results of Duncan's multiple-range test at significant level $p < 0.05$

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Associations between Strategic Roles and Subsidiary Performance

In respect of the Research Question of how differences in the types of subsidiary strategy associate with subsidiary performance, analysis of variance is conducted to explore the impact of performance on different strategic types. Table 3 shows that operation achievement [$F(2, 28)=8.293$, $p < 0.01$] and operation satisfaction [$F(2, 28)=6.899$, $p < 0.01$] display statistically significant differences for the three strategic types.

Table 3**Associations between subsidiary strategic roles and subsidiary performance characteristic**

Variables	Cluster 1 n=4 Receptive	Cluster 2 n=19 Active	Cluster 3 n=8 Autonomous	F-statistics	p-value	Effect size+	Differences between Clusters++
Achievement	4.438	5.355	4.594	8.293	0.001**	0.372	(1,2) (2,3)
Satisfaction	4.188	5.750	5.438	6.899	0.004**	0.330	(1,2) (1,3)

Notes: Higher scores signify higher levels for all dimensions

+Calculated using Eta squared

++Results of Duncan's multiple-range test (significant level $p < 0.05$)

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The Linkages between Three Determinants and Integration-Localisation

The research suggests that subsidiary strategies are determined by multi-level factors rather than single ones. Subsidiary resource, authority from parents and legal condition of host country heighten Integration; parent-subsidiary relationship and economic condition of host country propel most Localisation.

Table 4 relates integration and localisation with all three determinants within an integrated model. In the first group, all three determinants together demonstrate a statistical significance in explaining variations in integration ($R^2=0.354$). Among the predictor variables, subsidiary resource ($p < 0.1$) and host country legal condition ($p < 0.01$) have significantly positive impacts on integration. Decision making authority ($p < 0.1$) is significantly negative associated with integration. The second group demonstrates a high statistical significance in explaining variations in localisation ($R^2=0.710$). Among the predictor variables, communication ($p < 0.05$) has significantly positive impact on localisation while economic condition of host country ($p < 0.05$) has significantly negative impact on localisation.

Table 4
Determinants of integration and localisation

Variables	Integration	Localisation
Subsidiary level		
Market autonomy	-.119	.121
Product autonomy	-.162	.083
Subsidiary resource	.568†	.001
Communication	-.343	.633*
Head office		
Formalisation	.068	.106
Centralisation	-.405	.324
Decision making authority	-.566†	-.037
Internationalisation	.183	.106
Local environment		
Legal	.668**	.061
Economic	.248	-.416**
Environment uncertainty	-.067	-.032
Local resource	.351	-.064
Adjusted R ²	0.354	0.710
F ratio	2.372*	7.119***

Significant level: † p<0.1; * p< 0.05; ** p< 0.01; *** p< 0.001

8. Conclusion

The results support the argument of that several strategic types exist in a single subsidiary. R&D activities are more likely Receptive type (high integration, low localisation). Marketing and sales activities tend to be Active type (high integration, high localisation) and Autonomous type (low integration, high localisation) is presented by Services activities. It suggests that most proposed predictors significantly influence the formation of subsidiary strategic roles, except subsidiary autonomy of local market and internationalisation of firm. In terms of subsidiary achievement and satisfaction, Active type is significantly better than the other two types. The research also suggests that subsidiary strategies are determined by multi-level factors rather than single ones. Subsidiary resource, authority from parents and legal condition of host country heighten Integration;

parent-subsidiary relationship and economic condition of host country propel most Localisation.

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	Appendix 1 Questionnaires

Key References

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