

Subsidiary Strategies and Roles of Functional Activities: The Case of Foreign-Owned Subsidiaries in Taiwan's IT Industry

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ABSTRACT

This paper exposes a gap between the theory of organisation and subsidiary role development and demonstrated that researchers have paid little attention to the functional issues inside the foreign-owned subsidiary. Based on this, this study examines the impact of functional activities on the development of subsidiary strategy. It specifically looks at whether or not the role of the functional unit has a positive impact on subsidiary strategic change. The empirical data was collected by means of semi-structured face-to-face interviews with 16 US-owned subsidiaries in Taiwan's IT industry. This study confirms that the strategies of US-owned subsidiaries in Taiwan's IT industry are segmented into distinct types according to the two strategic dimensions of global integration and local responsiveness. All the cases clearly illustrate a process more geared towards global integration and local responsiveness, especially in terms of the future. The result also shows that functional activity has a strong impact upon subsidiary strategic change, especially in respect of activities which come from upstream of the value chain (research, development and production).

KEYWORDS: subsidiary role, functional unit, integration, responsiveness

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1. INTRODUCTION

Since White and Poynter's (1984) pioneering study, there has been an increasing interest in the strategies or roles of multinational subsidiaries (such as Bartlett and Ghoshal, 1989; Birkinshaw and Morrison, 1995; Gupta and Govindarajan, 1991; Jarillo and Martinez, 1990; Taggart, 1998). This great interest has paid little attention to the functional issues inside the foreign-owned subsidiary. Strategic literature argues that the functional level strategies directed at improving the effectiveness of operations within a company, and claims that the different functions of a company can help in the process of driving down costs and increasing the perception of value through differentiation (Hill and Jones, 2007). At the subsidiary level, a subsidiary can only be effective if it can integrate functional strategies into an internally consistent whole. Studies conducted by Jarillo and Martinez (1990) and Taggart (1998) take subsidiary functional activities into account while emphasising subsidiary strategies, the links between subsidiary strategic development and roles of functional activities are not yet well discussed.

The current paper is to explore the role played by the value chain of subsidiaries in evaluating subsidiary strategic development. The empirical data was collected by means of semi-structured face-to-face interviews with foreign-based multinational companies in Taiwan, a newly emerging country. According to Roth and Morrison (1990), global integration and local responsiveness pressures impact the structure of different industries, competitive positioning within industries, and even the configuration of an organisation. Thus, through the IR framework, the relative strength of the global integration and local responsiveness pressures may be analysed at a functional level within a subsidiary. Thus, the principal objective of this research is to examine the roles played by the different functions in implementing subsidiary role development.

2. LITERATURE REVIEW

This research explores the subsidiary strategic development, specifically seeking to understand the roles played by functional units during subsidiary strategic changes over time. In doing so, it aims to shed light on the models of intra-firm relationships.

The first part of literature review explores the studies from the perspective of the organisation as a whole, firstly introducing the strategy of the organisation, in particular the functional-level strategy. This, together with the value chain, can help us to understand how an organisation is structured and can provide a systematic way to divide an organisation into its discrete activities. Thus, it can be used to examine the activities in a subsidiary and determine how they can be grouped.

The second section draws on a range of literature about global integration and the local responsiveness framework which has been applied to study the strategy of MNCs and subsidiaries. This will enable an understanding of how MNCs shift their strategies and structures to fit the complex environment. The final section will review the literature on subsidiary roles and role development. Overall, the objective of this research is addressed by concluding that functional activities should play a role in the development of subsidiary roles.

(1) Functional Level Strategy

According to Hill and Jones (2007), functional level strategies means strategies directed at improving the effectiveness of operations within a company, such as manufacturing, marketing, materials management, product development, and customer service. These are so-called primary activities (Porter, 1985) and each activity adds value to the product with the ultimate goal of maximising value creation while minimising costs (Hill and Jones, 2007). R&D is concerned with the design of products and production processes, and by means of superior product design, R&D can increase the functionality of products to make them more attractive to consumers.

Alternatively the work of R&D may result in a more efficient production processes, thereby lowering the production costs. Production is concerned with the creation of goods or services, and the production function of a company creates value by performing its activities efficiently in order to lower costs. Production can also create value by performing its activities in a way that is consistent with high product quality, which leads to differentiation and lower costs.

In terms of marketing and sales functions, these can increase the value that consumers perceive to be contained in a company's product through brand positioning and advertising (Hill and Jones, 2007). Insofar as these activities help to create a favourable impression of the company's product in the minds of consumers, they increase value. Marketing and sales can also create value by determining consumer needs and communicating them back to the R&D function, which can then design products which better match those needs. Finally, the role of the service function of an enterprise is to provide after-sales service and support. This function can create a perception of superior value in the minds of consumers by resolving customers' problems and supporting customers after they have purchased the product.

In summary, the value chain lends emphasis to how an organisation is structured in order to create competitive advantage, and the value chain can also play a valuable role in designing a subsidiary structure. The application of value-adding activities at a level below the subsidiary is, therefore, appropriate.

(2) Global Integration and Local Responsiveness Framework

The integration-responsiveness framework was developed by C.K. Prahalad, Yves Doz, and Chris Bartlett for global companies to develop very different strategic and organisational responses to the changes in their environment. When a company seeks to expand its operations outside its home country, it must consider the various global strategies it can adopt to compete in the global marketplace. These companies typically face two types of competitive pressures, namely pressure

to reduce costs and pressure to be locally responsive. Responding to pressure for cost reductions requires a company to try to minimise its unit costs and offer a standardised product to the global marketplace. On the other hand, responding to pressure to be locally responsive requires that a company differentiates its product offering and marketing strategy from country to country. Dealing with these two conflicting and contradictory pressures is a difficult strategic challenge for a company, since being locally responsive tends to raise costs.

Several researchers have examined the strategies MNCs can adopt in order to deal with these pressures. For example, Bartlett (1986) contends that the increasing manufacturing economies associated with a global or regional scale demand, or the need to spread escalating technological development cost over short product lifecycles, tend to create the need for a greater global co-ordination of effort and integration of operation. On the other hand, national differences in consumer tastes or market structures, or host government protectionism or regulation, increase the need for more local differentiation and responsiveness. It is the balance and interrelationship of integration-responsiveness which is influential in shaping the organisational task of the MNC. Therefore, Bartlett and Ghoshal (1989) present four types of strategy: international, global, multinational, and transnational.

Prahalad and Doz (1987) have developed an IR framework to analyse the management of relationships between headquarters and subsidiaries. The managers of multinational companies face one central issue, namely the strategic integration of their operations in various countries in the presence of strong forces of national responsiveness and fragmentation. This model posits that three subgroups or sub-classifications of international business strategies exist, namely locally responsive, global integration and multifocal.

(3) Integration and Responsiveness at a Functional Level

Balancing global integration and national differentiation requires that a company adapts to the

diverse requirements of different countries, different products, and different functions. Thus, through an IR framework, the relative strength of global integration and local responsiveness pressures may be analysed at the aggregate level of industry, at the level of an individual business, or at a functional level within a subsidiary. According to Bartlett and Ghoshal (1989), different tasks in the value-added chains of the businesses require different levels of efficiency, responsiveness, and learning capabilities. Among functions, R&D is globally integrated, while sales is organised by national units which are differentiated to meet local market characteristics. Segal-Horn and Faulkner (1999) also suggest that some activities may be centralised globally (R&D, product design), others regionally (manufacturing, distribution, some marketing) and still others locally (sales). The value chain configuration will depend upon the benefits to be gained from each particular set of variations for each industry. Not only may it be appropriate to locate a particular function in a country or countries other than the home country, but some activities, e.g. sales, may need the greatest effect to be duplicated country-by-country, even in so-called global corporations. Table 1 shows the roles played by different functions in the dimensions of global integration and local responsiveness. Multifocal is a strategic role which combines both of these elements.

INSERT TABLE 1

The primary roles of research and development are to boost efficiency by designing products that are easy to manufacture (Hill and Jones, 2007). The advantages of integrating R&D activity with parents are to design global standardised products that are easy to manufacture, this helps to achieve cost reduction. Integrated R&D activity can also be pooled to reap economies of scale (Hill and Jones, 2007). In the other hand, local responsive R&D activities helps subsidiary to customise the product to the unique needs of individual customers (Hill and Jones, 2007). Bringing customers into product development process, it does mean bringing in customers' opinions by soliciting feedback from customers on the company's good. This also helps to

respond to consumer demands very quickly in developing new innovation.

The primary roles of production are to reduce set up times for complex equipment, increase the utilisation of individual machines through better scheduling, and improve quality control at all stages of the manufacturing process. The way to increase efficiency and drive down unit costs is to limit product variety and produce a standardised product in large volumes. In the other hand, companies can provide a higher level of satisfaction if they customise the product to the requirements of individual customers and minimise the times it takes to respond to customer demands. However, customisation raises costs. The development of flexible manufacturing technologies has made it feasible to produce a far greater variety of products (Hill and Jones, 2007). Flexible manufacturing technologies allow the company to produce a wider variety of end products at a unit cost that one time could be achieved only through the mass production of a standardised output by reducing setup times for complex equipment, increasing the utilisation of individual machines through better scheduling, and improving quality control at all stages of the manufacturing process.

The roles of marketing and sales refer to the position that a company takes with regard to pricing, promoting, advertising, product design, and distribution. Close integration between global R&D and local marketing is required to ensure that product development projects are driven by the needs of customers. A company's customers can be one of its primary sources of new product ideas (Hill and Jones, 2007). Moreover, integration of global R&D activities and marketing is crucial if a new product is to be properly commercialised, without this integration, a company runs the risk of developing products for which is little or no demand. However, local responsive activities of marketing and sales are able to cope with the differences in national market and media structure. Marketing strategies may have to be responsive to differences in distribution channels among countries. Local responsive marketing can also help to reduce response time. This requires a marketing function that can quickly communicate customer requests to

production.

The service function can create a perception of superior value in the minds of consumers by solving customer problems and supporting customers after they have purchased the product. Customer service can apply standardised operational system to archive company's requirements in the local markets. At the same time, to gain a competitive advantage, company must often respond to consumer demands very quickly (Hill and Jones, 2007). Local responsive service speed up the response time to customer demands and can help production and marketing quickly adjust production schedules in response to unanticipated customer demands.

(4) Subsidiary Role and Role Development

The review of literature on subsidiary role typologies (see Table 2 for summaries and comparisons) addresses that subsidiaries can assume a broad variety of roles to include 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), all of which demonstrate that subsidiaries provide a significant contribution to the competitive achievements of MNCs.

INSERT TABLE 2

The overview of subsidiary role development provides the idea of the redevelopment of a subsidiary role which can either be a negative or positive change. Several researchers have based their surveys on subsidiary role developments on the White and Poynter terminology. Early literature viewed role changes as part of rationalisation or centres of excellence formation. Later, the integrative aspects of role change were also investigated. Hood *et al* (1994) used the five subsidiary roles to group their sample of Japanese establishments in Scotland and defined subsidiary development as the progression from one role to another. Maignight (1995)

investigated role changes as a slow process of integration into the operations of the firm. Delaney (1998) presented subsidiary development as series of stages of increasing integration and importance. He viewed miniature replicas, marketing satellites and rationalised manufacturers as basic mandates, whereas strategic independent units and product specialist were interpreted as advanced mandates. Birkinshaw and Hood (1997) partially used the White and Poynter's framework, operating with product specialist on the one hand and subsidiaries with world product mandates on the other. Further, Jarillo and Martinez (1990) and Taggart (1998) have tested subsidiary role change in relation to integration-responsiveness framework and both articles reported increases in the subsidiaries internal integration with other MNC units.

Another literature stream operates with its own definitions of role change. Birkinshaw (1997) viewed role development as a change in mandate. Galunic and Eisenhardt (1996) drew on the same concept, describing the loss of divisional charters. Egelhoff *et al* (1998) measured development as evolution in unique, value-creating resources and gained strategic responsibilities. They operated with three development paths for sixteen Irish-based subsidiaries. Five aggressive subsidiaries built up unique value creating resources and gained strategic responsibilities; four incrementally developing subsidiaries only gained extended product positions and finally the remaining subsidiaries did not widen the scale and scope of their activities. Williams (1998) concentrated on whether subsidiaries change in respect to the number of value-creating activities and autonomous actions. Operating with his own definitions of market and product mandates, Pearce (1999) established the fact that within different groups of subsidiaries, role change took place in between 13 % and 21 % of the cases (190 UK-based subsidiaries). Pearce (1999) found market and product mandates to be representative of role development.

3. RESEARCH GAP AND RESEARCH QUESTION

Literature review exposed a gap between theory of organisation and subsidiary role development and demonstrated that researchers have paid little attention to the functional issues inside the

foreign-owned subsidiary. The reviewing of literature leads to research question:

What are the roles of functional units in evaluating subsidiary strategic changes?

The research question is to examine the roles played by the different functions in evaluating a subsidiary strategy over time. In order to reflect the parent's global strategy, a foreign subsidiary might perform a single value-adding activity (e.g. manufacturing, R&D, or sales) or an entire value chain activity. Porter's value chain model stresses that an organisation is structured in order to create competitive advantage, the application towards functions at a level below the subsidiary is therefore appropriate.

(1) Globally Integrated Subsidiaries and their Functional Units

Bartlett (1986) distinguishes global organisation is oriented towards the world market, seeking competitive advantage in the economies of scale attendant to a standardised product design, global scale manufacturing, and centralised control of operation. Jarillo and Martinez (1990) categorise a globally integrated subsidiary as being one in which few of the functions are performed in the same country (typically, only marketing and sales, but it may be a purely manufacturing or extracting operation), and they are highly integrated with the rest of the firm. Birkinshaw and Morrison (1995) also insist that this type of subsidiary has considerable expertise in certain specific functions or activities, but that its activities are tightly co-ordinated with other subsidiaries or parent. Thus it is characterised by a narrow set of value activities and high levels of interdependence with affiliated subsidiaries or their parent (Roth and Morrison, 1992). This type of subsidiary usually has specialised capabilities in upstream activities (such as R&D, production and manufacturing).

Roth and Morrison (1990) identify the fact that business units in a globally integrated group place considerable emphasis on controlling overheads and manufacturing efficiency, engineering and R&D expertise, and developing new products. Taggart (1998) mentions that globally integrated

subsidiaries typically confine themselves to the adaptation of manufacturing technology, perhaps with a minimum of capability in product adaptation. Their functional units work within a networked environment where important skills and resources tend to be concentrated at the headquarters, at which a great deal of the purchasing of raw materials is also carried out. This research suggests that the functional value chain of a global integration subsidiary are tightly integrated with the firm's headquarters, especially those activities in upstream of value chain.

(2) Local Responsiveness Subsidiaries and their Functional Units

A multinational organisation tries to profit from the firm's ability to differentiate its products in each country in order to satisfy local tastes and national interests. According to Jarillo and Martinez (1990), local responsiveness subsidiaries carry out most of the functions of the value chain in a manner which is relatively independent of their parent. Meanwhile, Birkinshaw and Morrison (1995) insist that this type of subsidiary typically specialises in downstream activities (such as sales and marketing). According to Taggart (1998), local responsiveness subsidiaries have a low export propensity and fairly well-developed R&D facilities. Their functional activities concentrate on the subsidiary's own needs, and they are sensitive to the needs of the market when developing new and improved products. They do not have a high level of marketing co-ordination within their respective networks, but a high level of subsidiary-based purchasing activities, and key skills and resources. Doz and Prahalad (1984) mention that local responsiveness pressures are the result of a perception of diverse market conditions, and the social and political demands found among the countries in which the firm operates. The competitive advantage of these businesses is derived through the development of market-specific value activities (Porter, 1980). Therefore, this research suggests that a functional value chain in a locally responsive subsidiary will place greater emphasis on downstream activities, and that these downstream activities are decentralised from the firm's headquarters.

(3) Multifocal Subsidiaries and their Functional Units

Multifocal subsidiaries are categorised by Jarillo and Martinez (1990) as having many activities located in a country, which are carried out in close co-ordination with the rest of the firm. Birkinshaw and Morrison (1995) also insist that this type of subsidiary typically has an unconstrained product range and a broad value-added scope. These activities are integrated worldwide but are managed from the subsidiary rather than the head office. This type of subsidiary also usually has specialised capabilities for upstream activities (such as R&D and manufacturing). Taggart (1998) also identifies this type of subsidiary as having very well-developed R&D capabilities, producing new and improved products for worldwide markets. Meanwhile, complex innovations often appear in this type of strategy (Roth and Morrison, 1990). At the same time, this type of subsidiary does not see customers' needs as being highly standardised, perceiving governmental constraints on their activities, and viewing local customer service as extremely important, whilst emphasising the competitive attributes which differentiate activities and products in the marketplace. This research suggests that a functional value chain in a multifocal subsidiary will place greater emphasis on both upstream and downstream activities, and that these activities will be integrated with the firm's headquarters and its responsiveness to local markets.

(4) Strategy Shift and Functional Units

Both Prahalad and Doz (1987) and Jarillo and Martinez (1990) indicate that an evolution of strategy types over time is worthy of examination as it helps to illuminate the pressures between the strategic dimensions. It also enriches the interpretation of the subsidiary development model. According to Taggart (1998), intuitively very few subsidiaries are likely to remain unchanged across both of the dimensions of integration and responsiveness, unless only a short time period is examined. However, some changes will lead to a subsidiary moving from one quadrant of the model to another (change of strategy), while others will leave the subsidiary in the same quadrant (strategy stability). Taggart (1998) indicates that different strategic types are likely to have different levels of value chain activities. For example, the low integration and low localisation

subsidiary is likely to have fewer value chain activities than the local responsiveness subsidiary. It may also have significantly few linkages with the remainder of its internal network than the global integrated subsidiary. This research suggests that the functional activities in stable strategies are different from functional activities in a change of strategy.

4. METHODOLOGY AND DATA COLLECTION

In order to investigate the role of subsidiaries and their functional activities at an intra-organisational level, a case study is chosen as a research method for this study. The empirical data was collected by means of semi-structured face-to-face interviews from 16 US-owned subsidiaries in Taiwan's IT industry.

Information technology (IT), as defined by the Information Technology Association of America (ITAA) is "the study, design, development, implementation, support or management of computer-based information systems, particularly software applications and computer hardware." The case studies selected are US-owned subsidiaries of Taiwan's IT industry since, according to the Ministry of Economic Affairs (2007), the largest foreign investors in Taiwan in recent years have been companies from the US. In addition, Taiwan has become the top IT supplier in the world (for example, LCD monitors, chip foundry service packaging, cable modems, notebook PCs, ADSL). Taiwan is also one of the world's largest producers of computer-related products, boasting an extensive, well-established network of industrial zones and a growing number of high-technology industry clusters, which are supported by high-quality human resources and fully integrated supply-chain networks. The IT sector has been the destination of most approved private foreign investment.

A total of sixteen US-owned subsidiaries are selected from Taiwan's IT industry, including Agilent Technologies, Advanced Micro Devices (AMD), Avocent, Cisco Systems, Dell, Electronic Data Systems, Frontier Semiconductor, Garmin, GE, Google, HP, IBM, Intel,

Microsoft, Motorola, and Sun Microsystems. These companies are major IT suppliers in Taiwan, all highly international, successful and innovative firms but representing a very different set of value-added activities in terms of the strategic needs for global integration and national responsiveness. The data was collected by means of semi-structured face-to-face interviews with both subsidiaries and function managers. Overall, 16 subsidiary managing directors and/or general managers, and 100 functional managers (R&D, production, marketing, sales and service) were interviewed during 2007 and 2008. In 16 firms, the study interviewed (where permitted with tape recorders) between 4 and 11 people, including the chief executives and the top teams.

The questions used in the interviews are modified from earlier research where possible. A range of variables has been used to measure integration and responsiveness, but no agreement has been achieved on the selection of variables. Jarillo and Martinez (1990) identified localisation of activities, i.e. the extent to which R&D, purchasing, manufacturing, marketing are performed in the country; and the degree of integration of those activities that are performed in the country with the same activities in other subsidiaries of the firm. On the other hand, Taggart's (1997a) measurement of integration was reflected by the degree of centralisation of decision and planning making, and the coordination between subsidiaries and their parents; and responsiveness was measured by local environment pressures, product characteristics, and adaptabilities of subsidiaries. The construction of the measurement on integration and responsiveness are amended somewhat to suit the focus of the current research.

(1) Global Integration

- products specified for its own or parent's market
- integration the functions (R&D, production process, marketing activities) with parents/regional HQ
- dependence on linkages within (corporate) internal network
- sharing of knowledge within the internal network

- the scope of service which a subsidiary serves for MNC worldwide market areas

(2) Local Responsiveness

- products and/or functional operation and decision making) developed or substantially adapted to the local
- local market area served
- percentage of inputs that comes from local
- percentage of locally produced good over totally sales
- proportion of local staff, those who work as high positions
- networking with local research institutions and suppliers/distributors

Two types of questionnaire were prepared, the first of which was to ask managing directors general questions regarding the subsidiary as a whole, and the second to ask functional managers questions regarding their functional activities. In order that their strategic stability and shift could be assessed, respondents were asked to give the present position, as well as that of 5 and 10 years ago, for each variable in the research instrument. They were requested to use their past knowledge of operations to accomplish this (Jarillo and Martinez 1990; Taggart 1998). To ensure the reliability of retrospective answers, the piloting and pre-testing of questionnaires were taking place. The pilot study was used to learn how the interviewees respond to my interview and questions; whether they understand the questions clearly. Each question is designed by using semi-structured questions and rating scale. Semi-structured and rating scale questions are designed to encourage full answers from managers. This helps us to understand not only 'How' and 'Why', but also make qualitative data manageable. All items are measured by a 7-point scale scored from 1 = extremely low to 7 = extremely high. Indexes were developed based on the average level of I-R degrees responded from the subsidiary and functional level managers.

The first part of analysis is to identify the types of subsidiaries and roles of functions. Cluster

analysis is used to cluster the sample subsidiaries and functions into groups representing different roles changed over time. The average values for integration-responsiveness of subsidiaries and functions are measured and displayed by scatter charts. This study is then able to compare and contrast strategic types of 16 subsidiaries and the roles of their functions within the theoretical framework. All quantitative data are analysed and presented by Microsoft Excel 2003 and SPSS Statistics 17.0.

5. RESULTS

(1) Subsidiary Strategic Roles

In terms of what the strategies of today's case companies are, and what they were 5 and 10 years ago, a cluster analysis is used to assess and identify the underlying group structure of the samples. Cluster analyses have been used in numerous strategy studies to identify subsidiary roles (e.g. Jarillo and Martinez, 1990; Roth and Morrison, 1990; Taggart, 1998). Since integration and local responsiveness dimensions are considered as being the two key variables of the strategy of firms in a particular country (Jarillo and Martinez, 1990), this can represent the strategy of subsidiaries by combining the value of these two dimensions.

Two stages are applied to identify the strategic types of US-owned IT companies in Taiwan, and both hierarchical and non-hierarchical clustering are used to make a visual assessment of the number of underlying clusters of affiliates in the sample (Jarillo and Martinez, 1990; Taggart, 1998). The chosen technique of hierarchical clustering is Ward's method, which uses an analysis of variance approach to evaluate the distance between clusters¹. This is regarded as being an efficient method when the sample contains clumps. It tends to create small size clusters, which is a suitable method for small sample data, as in this research. This approach indicated that a three cluster-solution seemed to be present², and this was also checked by non-hierarchical clustering.

¹ Ward's method attempts to minimise the Sum of Squares of any two clusters that can be formed at each step.

² This is indicated by Dendrograms, also called hierarchical tree plots, shows the relative size of the proximity coefficients at which cases are combined. This map is attached in Appendix.

Here, solutions are initially developed for 2, 3, 4 and 5 clusters to facilitate a comparison with previous studies. The proportion of between-group variance is calculated as a proportion of the total variance. The proportion is 41.14 percent for 2 clusters, 48.65 percent for 3 clusters, 38.69 percent for 4 clusters and 45.66 percent for 5 clusters. Thereafter 3 clusters of the incremental gain in between groups' variance falls off, which indicates that the sample contained three stable groups of samples. This is appropriate for the distinct segmentation of subsidiaries along two strategic dimensions. The three clusters also provide a basis to facilitate a comparison with previous studies (Jarillo and Martinez, 1990; Roth and Morrison, 1990; Taggart, 1998; Yu, 2000).

The resultant three clusters represented the different roles of subsidiaries separately, with each of them occupying one of three quadrants in a matrix, composed of global integration and local responsiveness. There are four global integration types located in the top-left quadrant (Cluster 1, n=4). The samples in this group are relatively concentrated, with a higher degree of integration (M=4.9643) and a lower degree of local responsiveness (M=5.1250). The samples in this cluster represent Dell, Garmin, Google and Microsoft. The local responsiveness type is found in the bottom-left quadrant (Cluster 2), with a common low mean value of the degree of integration (M=4.1714) and a high mean value of the degree of localisation (M=5.5000). This cluster represents Avocent, Cisco, EDS, Frontier and Sun Microsystems (n=5). Cluster 3 is located in the top-right quadrant, which has seven subsidiaries (n=7). This cluster, which has moderately high degrees of integration (M=5.2245) and local responsiveness (M=5.7619), could be close to the 'multifocal' type of role. This group includes Agilent, AMD, GE, HP, IBM, Intel and Motorola.

INSERT FIGURE 1

INSERT TABLE 3

Table 4 and 5 present integration-responsiveness of functional activities cross different types of subsidiaries.

Characteristics of each group:

- Cluster 1 (4 companies): Globally integrated subsidiaries (Dell, Garmin, Google, Microsoft)

This group primarily consists of subsidiaries which are set up to assist their parents rather than to serve Taiwan's marketplace. These subsidiaries appear to be more closely tied to their corporate system than to Taiwan's marketplace, since they sell global standardised products, and place a strong emphasis on R&D activities for MNCs global productions. Most of subsidiaries in this group operate R&D centres in Taiwan to improve their access to Taiwan's ODM/OEM manufacturers. Sales activities are not their priority. Due to their geographical closeness to outsourcing contractors in Taiwan, their international procurement teams play a very important role. Their R&D activities are centralised to capture new developments outside the US and then to leverage innovations created by their subsidiaries in Taiwan to the remainder of their worldwide operations. Their marketing and sales are tightly coordinated with their head offices, and Taiwanese customers are not their main focus. Sales and Service activities, however, enjoy a certain level of autonomy.

- Cluster 2 (5 Companies): Local responsiveness subsidiaries (Avocent, Cisco System, Electronic Data Systems, Frontier Semiconductors, Sun Microsystems)

This group primarily consists of subsidiaries which are set up only to serve Taiwan's marketplace. Majority of subsidiaries in this group operate only downstream activities (such as Sales and Services), selling their global products to Taiwan's corporate clients. Their prime responsibilities are to focus on the revenue side, and broaden their sales and marketing to the local region according to customer preferences. They usually follow headquarter-defined strategies, but these subsidiaries are free to develop their local-to-local strategies. Their functional activities are accompanied by high local autonomy, and such independents are flexible and responsive to the local environment. Not surprisingly, this group is much more autonomous and better connected to

the supplier network.

- Cluster 3 (7 companies): Multifocal subsidiaries (Agilent, AMD, GE, HP, IBM, Intel, Motorola)

This group primarily consists of subsidiaries which are set up to serve corporate global production as well as Taiwan's marketplace. These subsidiaries possess wider ranges of value chain activities, including R&D, production, marketing, sales and services, and they all have research centres located in Taiwan to improve their access to Taiwan's outsourcing contractors. Their upstream activities are responsible for their global production, working very closely with their worldwide R&D and productions centres. At the same time, the downstream activities focus on the revenue side, and broaden their sales and marketing to the local region. The subsidiaries in this group tend to be larger (in term of number of employees) than subsidiaries in the other groups. The functional activities in this group are also accompanied by high local autonomy, flexible and responsive to the Taiwan's marketplace.

INSERT TABLE 4

INSERT TABLE 5

(2) Roles Development

Two stages are also applied to identify the strategic types of US-owned IT companies in Taiwan 5 and 10 years ago. Both hierarchical and non-hierarchical clusterings are used to make a visual assessment of the number of underlying clusters of affiliates in the sample. Ward's method indicates that a three cluster-solution seems to be present³, and this is also checked by non-hierarchical clustering, and solutions are initially developed for 2, 3, 4 and 5 clusters to facilitate a comparison with previous studies. The proportion of between-group variance is

³ This is indicated by Dendrograms, also called hierarchical tree plots, shows the relative size of the proximity coefficients at which cases are combined.

calculated as a proportion of the total variance. The proportion is 39.99 percent for 2 clusters, 63.44 percent for 3 clusters, 54.36 percent for 4 clusters and 61.19 percent for 5 clusters. Thereafter 3 clusters of the incremental gain in between groups' variance falls off, which indicates that the sample contains three stable groups of samples.

The resultant three clusters represent the different roles of subsidiary separately, with each of them occupying one of three quadrants in a matrix composed of global integration and local responsiveness. There are five global integration types located in the top-left quadrant (Cluster 1, n=5). The samples in this group are relatively concentrated. They have a higher degree of integration (M=4.6286) and lower degree of local responsiveness (M=5.0667). The samples in this cluster represent Electronic Data Systems, Dell, Garmin, Google and Microsoft. The local responsiveness type is found in the bottom-left quadrant (Cluster 2), with a common low mean value of the degree of integration (M=3.9714) and a higher mean value of the degree of localisation (M=5.5333). This cluster represents Avocent, Cisco Systems, Frontier Semiconductors, Motorola, and Sun Microsystems (n=5). Cluster 3 is located in the top-right quadrant which has six subsidiaries (n=6). This cluster, which has moderately high degrees of integration (M=4.7619) and local responsiveness (M=5.6111), could be close to the 'multifocal' type of role. These samples include Agilent, AMD GE, HP, IBM and Intel.

INSERT FIGURE 2

INSERT TABLE 6

In terms of the subsidiary strategies adopted 10 years ago, again two stages are applied to identify the strategic types of US-owned IT companies in Taiwan. The samples of Frontier Semiconductor and Google are excluded, since they were not yet established in Taiwan at the time. Ward's

method indicates that a three cluster-solution seems to be present⁴, and this is also checked by non-hierarchical clustering, and solutions are initially developed for 2, 3, 4 and 5 clusters to facilitate a comparison with previous studies. The proportion of between-group variance is calculated as a proportion of the total variance. The proportion is 43.18 percent for 2 clusters, 59.59 percent for 3 clusters, 47.20 percent for 4 clusters and 59.622 percent for 5 clusters. Thereafter 3 clusters of the incremental gain in between groups' variance falls off, which indicates that the sample contains three stable groups of samples.

The resultant three clusters represent the different roles of subsidiaries separately, with each of them occupying one of three quadrants in a matrix composed of global integration and local responsiveness. There are six global integration types located in the top-left quadrant (Cluster 1, n=6). The samples in this group are relatively concentrated. They have a common high degree of integration (M=4.4286) and a low degree of local responsiveness (M=3.7778). The samples in this cluster represent Agilent, Electronic Data Systems, Frontier Semiconductors, Dell, Garmin, GE, Google and Microsoft. The local responsiveness type is found in the bottom-left quadrant (Cluster 2), with a common low mean value of the degree of integration (M=3.8214) and a higher mean value of the degree of localisation (M=4.1667). This cluster represents Avocent, Cisco Systems, Motorola, and Sun Microsystems (n=4). Cluster 3 is located in the top-right quadrant which has four subsidiaries (n=4). This cluster, which has moderately high degrees of integration (M=4.6786) and local responsiveness (M=4.2083), could be close to the 'multifocal' type of role. This group includes AMD, HP, IBM and Intel.

INSERT FIGURE 3

INSERT TABLE 7

⁴ This is indicated by Dendrograms, also called hierarchical tree plots, shows the relative size of the proximity coefficients at which cases are combined. See Appendix.

Table 8 and the map represented in Figure 4 is the strategy shift of 16 MNCs in Taiwan. This figure shows the strategic maps for these three time-slices, namely today, 5 years ago and 10 years ago, and the more important changes are supposed to have occurred between 1997 and 2007. There is a balance of 31 percent of US-owned IT subsidiaries in Taiwan which had changed their strategic types over the 10 year period (5 out of 16 subsidiaries). 11 subsidiaries maintained the same strategy over the 10 years, which are 4 global integration, 3 local responsiveness and 4 multifocal subsidiaries, and 5 subsidiaries changed their strategy, which were 1 local responsive and 4 global integrated subsidiaries. However, it is important to note that, in terms of the subsidiaries which remained in the same groups, their degree of integration and local responsiveness significantly increased. Each of the three groups clearly demonstrates this process towards more integration and local responsiveness, especially in respect of the future. The clusters seem to change position over time within the framework in a reasonably systematic manner. The subsidiaries which had been following local responsiveness changed very little, and only one subsidiary in this group (Motorola), shifted towards a multifocal type. The subsidiaries which had been following global integration (Agilent and GE) sharply increased their degree of local responsiveness and became multifocal types, while one subsidiary (Frontier) decreased its integration with its parent, and moved towards local responsiveness. Overall, this clearly demonstrates a trend of moving toward multifocal types.

INSERT TABLE 8

INSERT FIGURE 4

6. *IMPLICATION AND DISCUSSION*

A group of firms is located in each of the three quadrants of the IR framework. This three-group typology seems to give a reliable and robust taxonomy, since the clusters of firms are well separated by various combinations of the alternative variables used in the analysis. The clusters seem to change position over time within the framework in a reasonably systematic manner.

Where particular firms retain the same strategy over a 10-year period, this stable strategy is linked to specific changes in certain of the alternative variables. A number of discussions are drawn from this section.

(1) Strategic Stability

The subsidiaries which maintained global integration strategies over the long period (Dell, Garmin, Google, and Microsoft) increased their integrated activities with their parent. They took on more complex R&D work, increased the level of R&D and marketing coordination with their parent. This group are the youngest subsidiaries in Taiwan.

The subsidiaries which maintained local responsive strategies over the long period (Avocent, Cisco, Sun Microsystems) took more complex services to local customers. They do not have a complex production in Taiwan, but were set up to sell products and serve Taiwanese customers.

The subsidiaries which maintained multifocal strategies (AMD, HP, IBM, Intel) are distinguished by significantly increased coordinated marketing activity with their parent, and product development activities which are responsive to the market needs. The subsidiaries which maintained multifocal strategies also boosted their customer services in Taiwan. For example, the marketing strategy of HP Taiwan is to provide customer services based on market difference, therefore it set up four customer service offices across the island.

(2) Strategic Shifts

The subsidiaries which had moved into the multifocal quadrant from global integration (Agilent and GE) showed an increase in their responsibilities for global production. These subsidiaries were encouraged to co-ordinate marketing with other groups instead of following a relatively independent line. Their networks are characterised by an increased concentration of research and purchasing activities. This may mean that the subsidiaries have more complex, albeit more

centrally directed, R&D required by their parent to service the needs of other groups and have lost some independence of action.

The subsidiaries which moved into the local responsiveness quadrant (EDS and Frontier) were given some level of authority. Their marketing activities were less centralised by their parent, and they were free to develop their own marketing strategy

Motorola shifted from localisation into a multifocal type of strategy, and the interviews suggested that this shift was created by complex R&D activities undertaken by Motorola in Taiwan.

(3) Comparison of Jarillo and Martinez (1990), and Taggart (1998)

Due to the design differences between this study and that of Jarillo and Martinez (1990) and Taggart (1998), it is not possible to make an analytical comparison. However, the centres of the circles in Figure 4 represent the centroids of the respective clusters, and the figure may be visually related to a scatterplot of Spanish and UK subsidiaries. It should be stressed that this comparison may not be reliable, due to differences in integration and responsiveness measures between the three studies. The levels of integration and local responsiveness are generally somewhat higher among the sample used in this study than the sample used in Spanish and UK subsidiaries. Compared to Taggart (1998), there is no low-integration and low-responsiveness subsidiary is found in this study. This could suggest that there may be a few low-integration and low-responsiveness subsidiaries in the Taiwanese sample. However, truly high-integration and high-responsiveness subsidiaries may be a feature of Taiwan's economy, whereas truly low-integration and low-responsiveness affiliate are to be found in the UK and Spain.

7. CONCLUSION AND CONTRIBUTION

Three conclusions are drawn from this section, the first of which is that, as confirmed by the above discussion, the strategies of US-owned subsidiaries in Taiwan's IT industrial segment fall

into distinct types according to the two strategic dimensions of global integration and local responsiveness. Two variables are statistically significantly different across the three clusters, confirming the significant existence of all three types of roles. This concludes that different firms within the same industry may assign different roles to their subsidiaries in Taiwan. The clusters seem to change position over time within the framework in a reasonably systematic manner. Although 11 subsidiaries have not shifted their strategic roles significantly in a 10-year time period, each of the three groups clearly demonstrates this process towards more integration and local responsiveness, especially towards the future. No low integration and low local responsiveness subsidiary is found in this study, and this may be because the samples in this study are composed of subsidiaries of IT companies and these are the most successful firms in the industry. Finally, this study confirms that global integration subsidiary emphasises more on upstream activities whilst local responsive subsidiary emphasises more on downstream activities. Multifocal subsidiaries have performed a greater degree of globally integrated and local responsive activities than other types of subsidiaries. The result also shows that functional activity has a strong impact on the subsidiary role change, especially in terms of activities which come from upstream of the value chain (research, development and production).

Two contributions are remarkable. Existing prior research in terms of functional level strategy focuses exclusively on MNCs in developed economies and it is, therefore, unknown whether the roles of functional activities are differentiated at the subsidiary level in a newly emerging country, and how functional activities are related to, or determined by, certain characteristic variables. One of the major contributions of the current study is in linking and extending the theory and practice of the configuration of subsidiary structure and strategy with the theory of organisation. Moreover, much of the analysis in this study takes account of subsidiary functional units rather than a national subsidiary, and the results of the empirical analysis highlight the differences between value-added activities of a foreign subsidiary in a host country.

8. RESEARCH LIMITATIONS

It must be initially acknowledged that any investigation in subsidiary role development in Taiwan presents potential criticism on unsuitability of exporting western theory to other countries as it may not be appropriate. The subsidiary development in most emerging economies is underdeveloped, and this might bring criticism when comparing developed countries cases with developing countries ones. Meanwhile, due to the design differences between this study and previous studies in the area of subsidiary role development, it is not possible to give an analytical comparison. It should be stressed that the comparison may not be reliable due to differences in variables measures. Second, determining and reaching an appropriate balance between local responsiveness and integration cannot be purely analytical and rational, because local responsiveness and integration are likely to come from different parts of the organisation in distant geographical locations. The degree of local responsiveness closes to at the local level and conversely, the degree of integration are more likely to develop from headquarters than from subsidiaries catering mostly to their national markets.

There are limitations relating to the methods used in this study. Because case study approach supports insight and understanding of the relationships between the phenomena rather than aiming to seek facts and obtain statistical results through large enough samples, it greatly establishes validity of the result but not generalisation and reliability (Eisenhardt, 1989). The single case study of the IT industry focuses only on a particular setting and industry, and a sample size of 16 large US-owned subsidiaries may be insufficient to represent findings for various company sizes. The second limitation of the methodology is interview bias and response bias. Non-standardised questions in semi-structured interviews present a hazard of interview bias. During the interviews, some questions were omitted due to the respondents had less time for interviews, meanwhile, some questions were added to obtain in-depth information from the respondents who were willing to answer and provide information with longer interviews. Another response bias is related to the respondents who agreed to the interviews. The interviewees may be

from the same group which are always willing to participate in interviews. Viewpoints of these groups of people may be indifferent in general.

The final limitation of the methodology is lack of the primary data, which is due to the confidential source from employees that are restricted by company regulations. In most cases, it is not possible to access companies' data without permissions from headquarters. In addition, the secondary data of foreign subsidiaries operating in Taiwan are also limited. In Taiwan, the statistical data has not been well collected and organized in the form of a formal database for the public to access. Surprisingly, the information concerning foreign companies and investment in Taiwan are not much studied and published, and again, this is due to business confidentiality as mentioned above.

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Table 1 The roles of different functions in integration-responsiveness dimensions

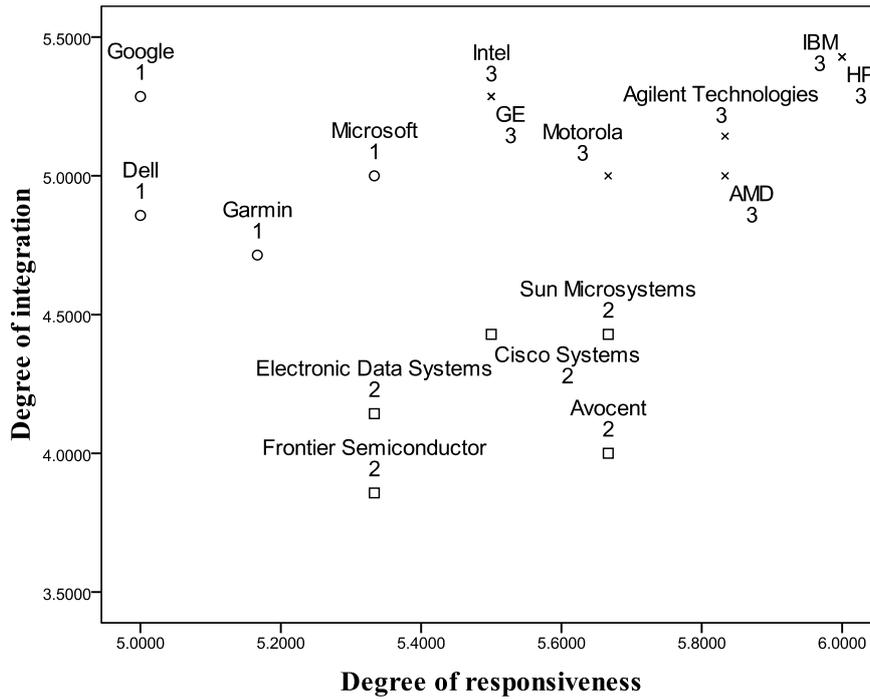
Functional units	Primary roles		Strategy dimensions		
	Value creation	Global integration	Local responsiveness		
Multifocal					
R&D	<ul style="list-style-type: none"> - Superior product design - pioneering process innovation - R&D can increase the functionality of products - makes products more attractive to consumers 	<ul style="list-style-type: none"> - Design global standardised products that are easy to manufacture to achieve cost reduction - Integrated R&D can be pooled to reap economies of scale 	<ul style="list-style-type: none"> - Customise the products offering to local conditions - Bringing customers into the product development process - Better serve local demands 		
Production	<ul style="list-style-type: none"> - Implement flexible manufacturing systems - Shorten production runs, trace defects back to source 	<ul style="list-style-type: none"> - Cooperate with R&D on designing products that are easy to manufacture - Reaping location advantages such as raw materials, energy, physical infrastructure to global production - Transfer resources to other locations where can be used to more benefit 	<ul style="list-style-type: none"> - Achieve customisation - Achieve rapid response - Require the delegation of manufacturing and production for differences in infrastructure and traditional practices among countries 		
Supply chain	<p>The efficiency of controlling the transmission of physical material through value chain can significantly lower cost thereby creating more value.</p>	<ul style="list-style-type: none"> - Rationalise suppliers - Trace defects back to suppliers 	<ul style="list-style-type: none"> - Develop logistics systems capable of responding quickly to unanticipated customers demands - Time to market is minimised - Able to respond quickly to availability, quality and price of raw materials and components 		
Marketing and sales	<p>Increase the value that consumers perceive to be contained in a company's product. Help create a favourable impression of company's product</p>	<ul style="list-style-type: none"> - Work with R&D to develop new products - Provide market information to R&D - Globally coordinated new product introduction 	<ul style="list-style-type: none"> - Able to cope with the differences in national market and media structure - Know the customers - Provide customer feedback on quality - Marketing strategies may have to be responsive to differences in distribution channels among countries 		
Service	<p>Create superior value by solving customer problems and supporting customers after they have purchased the product.</p>	<ul style="list-style-type: none"> - Leverage service know-how to local environment - Apply standardised operational system to archive company's requirements 	<ul style="list-style-type: none"> - To cope with customers who are different with regard to the ways they structure buying decision - Understand their needs - Directed contacts with customers 		

Table 2 Subsidiary role typologies

Authors	Variables	Sample Focus	Low-I Low-R	Low-I High-R	High-I Low-R	High-I High-R
White and Poynter (1984)	Product and market scopes, Value added and market scopes	Subsidiary	Marketing satellite	Miniature replica	Product specialist, Rationalised manufacturer	Strategic independent
Bartlett and Ghoshal (1986)	Competence, strategic importance	Subsidiary	Black hole	Implementers	Contributor	Strategic leader
D'Cruz (1986)	Integration, national insensitivity	Subsidiary		Branch plant	Globally rationalised	World product mandate
Porter (1986)	Coordination and configuration	Whole Corporation		Country centred strategy	Purest global strategy	High foreign invest strategy
Prahalad and Doz (1987)	Integration, responsiveness	Whole Corporation		Locally responsive, autonomous national	Integrated product, Worldwide business	Multifocal, Matrix organisation
Bartlett and Ghoshal (1989)	Adaptation, coordination, use of competencies	Whole corporation	International	Multinational	Global	Transnational
Jarillo and Martinez (1990)	Integration, localisation	Subsidiary		Autonomous	Receptive	Active
Gupta and Govindarajan (1991)	Knowledge inflows and outflows	Subsidiary		Local innovator, Implementer	Global Innovator	Integrated player
Roth and Morrison (1992)	Competencies and interdependencies	Business units of subsidiary		Local Implementer	Integrated	Global subsidiary mandate
Birkinshaw and Morrison (1995)	Autonomy, integration of activities	Subsidiary		Local implementer	Specialised contributor	World mandate
Taggart (1997b)	Autonomy, procedural justice	Subsidiary	Militant	Partner	Vassal	Collaborator
Taggart (1998)	Integration and local responsiveness	Subsidiary	Quiescent	Autonomous	Receptive	Active

Source adapted from: Taggart (1997b); Yu (2000); Tolention (2002); Paterson and Brock (2002)

Figure 1 Strategic types for today (3 Clusters)



Note: Cluster 1 represents integrated subsidiaries, Cluster 2 represents responsive type of subsidiary, and Cluster 3 represents multifocal type of subsidiary

Table 3 Cluster analysis: means of three-cluster solutions

	Cluster 1 n=4	Cluster 2 n=5	Cluster 3 n=7	F-statistics	p-value
	Integrated type	Responsive type	Multifocal type		
Integration	4.9643	4.1714	5.2245	33.925	.000***
Local responsiveness	5.1250	5.5000	5.7619	14.720	.000***

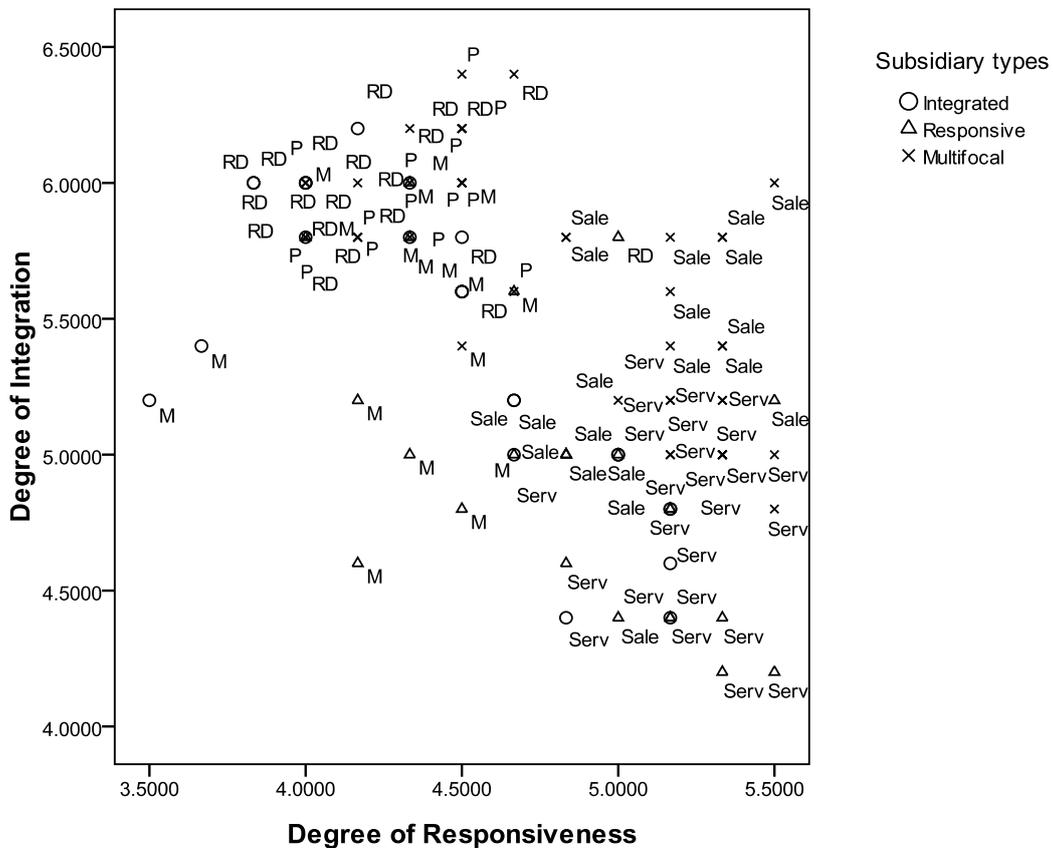
Note: For integration, higher score signifies more integration (min=2, max=6. For responsiveness, higher score signifies more responsiveness (min=4 max=7)

Significance: ***p<0.001

Table 4 Strategic types and degree of integration-responsiveness of functional activities

Degree of Integration			
	Global integration	Local responsiveness	Multifocal
Case companies	Dell, Garmin, Google, Microsoft	Avocent, Cisco, EDS, Frontier, Sun Microsystems	Agilent, AMD, GE, HP, IBM, Intel, Motorola
R&D	5.9428	5.85	6.04
Production	5.8666	5.6	6.02
Marketing	5.56	4.92	5.8
Marketing	5.56	4.92	5.8
Sales	5.05	4.9333	5.6363
Service	4.7	4.475	5.05

Degree of Responsiveness			
R&D	4.1190	4.4166	4.2166
Production	4.2222	4.6666	4.3166
Marketing	4.0333	4.3666	4.4166
Marketing	4.875	5	5.1818
Sales	5	5.2083	5.3055



Note: RD=R&D, P=Production, M=Marketing, Sale= Sales, Serv=Service

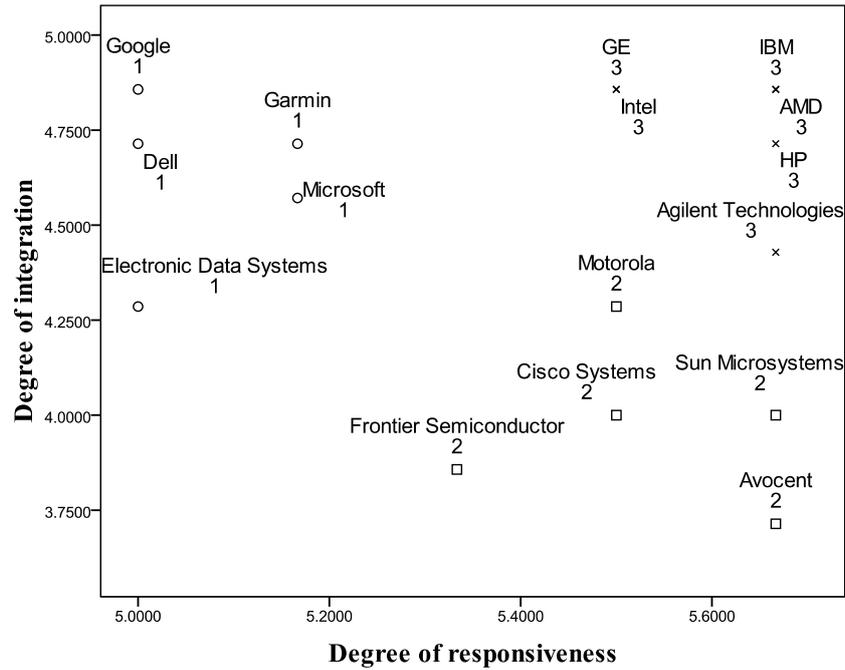
Table 5 Subsidiary roles and integration-responsiveness of functional activities

Functional Units	Subsidiary Roles		
	Global integration	Local responsiveness	Multifocal
Case companies	Dell, Garmin, Google, Microsoft	Avocent, Cisco, EDS, Frontier, Sun Microsystems, Silicon Motion	Agilent, GE, HP, IBM, Intel, Motorola
R&D	★ Working closely with global R&D centres, working with cross-functional teams, ★ responsible for global development teams	★ Decisions are HQ-defined, but free to develop, ★ cooperate with their worldwide offices, internal stakeholders	★ R&D centres operating in Taiwan for global production. ★ Key decisions are made by head/regional offices, ★ working closely with IT clients and Business Executives in worldwide offices
Production	★ Products globally standardised, coordination with Regional factories	■ Production for global markets but autonomy in productions	★ Working for MNCs global production, Decisions are HQ-defined and subsidiary operated
Supply chain	★ Planning, tracking and receiving of material for development teams (teams in Taiwan, China or Asian Pacific)	■ Working closely with end-to-end supply chain planning teams in Taiwan	★ Working closely with Development and Manufacturing sectors, ★ linked with MNCs' worldwide offices, Working closely with end-to-end supply chain planning teams (Asia Pacific teams, and Taiwan)
Marketing	★ Working closely with senior staff in head and regional offices/regional head offices, ★ follow head offices' operation, ★ Working for their Asia Pacific/Japan market areas, set up and enrich market intelligence data	■ Decisions of what to buy and sell are made by parents, but free to develop, ■ cooperate with local agents in promoting marketing activities	★ Responsible for Taiwanese and Asia Pacific marketplace, ■ authorised to develop own market/clients. ■ Has own marketing teams in Taiwan.
Sales	★ Follow head offices' operation, based on specific needs of Taiwan's local market, jointly work with functional teams to design market projects	■ Major for Taiwan's market but also cooperate with other regional offices (such as China, Singapore, HK), ■ Working with	■ Responsible only for Taiwan's market, key decisions are made by head offices, and adapted to the specific needs of Taiwan's market, ★ working

		Sales Offices all over Taiwan.	with financial sectors, top management (Taiwan, Asia Pacific, US)
Service	<ul style="list-style-type: none"> ■ Servicing Taiwan’s market only, leverage on similar programmes run in America/Europe/Asia to Taiwan, free to develop 	<ul style="list-style-type: none"> ■ Main focus on Taiwan’s market place, only deal with clients in Taiwan 	<ul style="list-style-type: none"> ■ Cooperate with IT and Business Executives clients in Taiwan, ■ responsible for Taiwanese community, consumers, and larger corporations

Note: ★ represents integrated activities; ■ represents local responsive activities

Figure 2 Strategic types for 5 years ago (3 Clusters)



Note: Cluster 1 represents integrated subsidiaries, Cluster 2 represents responsive type of subsidiary, and Cluster 3 represents multifocal type of subsidiary

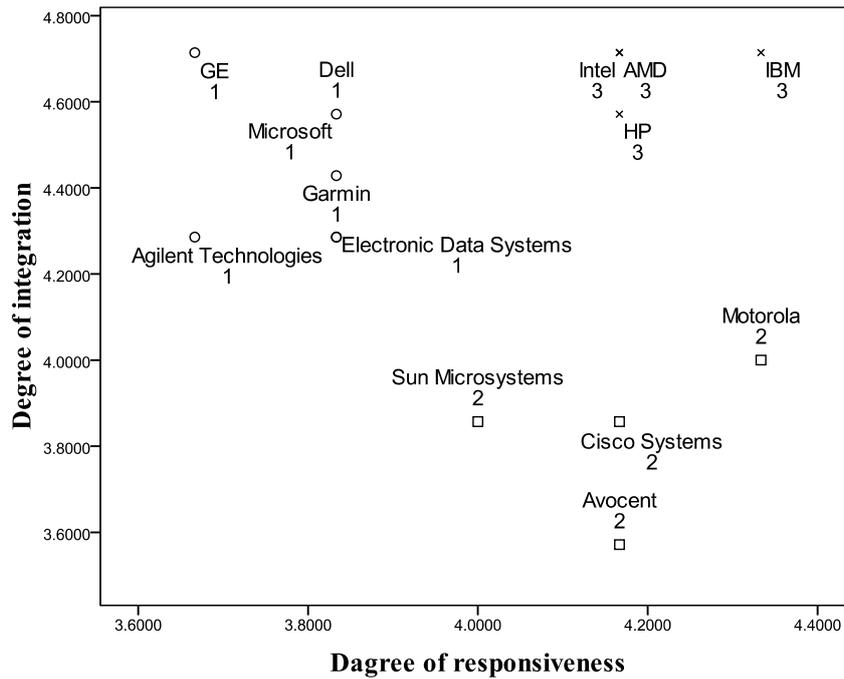
Table 6 Cluster analysis: means of three-cluster solutions for 5 years ago

	Cluster 1 n=5	Cluster 2 n=5	Cluster 3 n=6	F-statistics	p-value
	Integrated type	Responsive type	Multifocal type		
Integration	4.6286	3.9714	4.7619	23.632	.000***
Local responsiveness	5.0667	5.5333	5.6111	39.812	.000***

Note: For integration, higher score signifies more integration (min=2 max=6. For responsiveness, higher score signifies more responsiveness (min=4 max=7)

Significance: ***p<0.001

Figure 3 Strategic types for 10 years ago (3 Clusters)



Note: Excludes Frontier Semiconductor and Google

Cluster 1 represents integrated subsidiaries, Cluster 2 represents responsive type of subsidiary, and Cluster 3 represents multifocal type of subsidiary

Table 7 Cluster analysis: means of three-cluster solutions for 10 years ago

	Cluster 1 n=6	Cluster 2 n=4	Cluster 3 n=4	F-statistics	p-value
	Integrated type	Responsive type	Multifocal type		
Integration	4.4286	3.8214	4.6786	31.516	.000***
Local responsiveness	3.7778	4.1667	4.2083	28.077	.000***

Note: Excludes Frontier Semiconductor and Google

For integration, higher score signifies more integration (min=2 max=6). For responsiveness, higher score signifies more responsiveness (min=2, max=6)

Significance: ***p<0.001

Table 8 Degree changes in integration-responsiveness and their functional activities

Functional Units	Strategic development	
	Subsidiary that increasing integration	Subsidiary that increasing responsiveness
R&D	<ul style="list-style-type: none"> - Their R&D centres were establish in this period - Their R&D centres operating in Taiwan for global production - Key decisions were made by head offices 	<ul style="list-style-type: none"> - No R&D activities took place in their early years in Taiwan
Production	<ul style="list-style-type: none"> - Working for MNCs global production - Decisions are HQ-defined 	<ul style="list-style-type: none"> - No production, procurement were their major activities
Marketing	<ul style="list-style-type: none"> - Working closely with senior staff in head and regional offices/regional head offices - Follow head offices' operation - Working with teams from HQ 	<ul style="list-style-type: none"> - Decisions of what to buy and sell are made by parents - Responsible for Taiwan's domestic market, followed marketing strategy that defined by HQ - Little authorisation to develop own market/clients
Sales	<ul style="list-style-type: none"> - Follow head offices' operation - Jointly work with functional teams to design market projects 	<ul style="list-style-type: none"> - Responsible only for Taiwan's market - Key decisions are made by head offices - Offices only set up only in Taipei
Service	<ul style="list-style-type: none"> - Main focus on Taiwan's market place, only deal with clients in Taiwan - Responsible for Taiwanese community, consumers, and larger corporations 	<ul style="list-style-type: none"> - Servicing Taiwan's market only - Cooperate business executives clients in Taiwan

Figure 4 Strategy shifts

