National Chiao Tung University

Department of Management Science

Dissertation for the Degree of Doctor of Philosophy

A New Marketing Tool: The Use of E-Catalogs by Taiwan Industry

Student: Peng Yung-Chuan

Advisor: Dr. Charles V. Trappey

December 11, 2004

National Chiao Tung University

Department of Management Science

Dissertation for the Degree of Doctor of Philosophy

A New Marketing Tool: The Use of E-Catalogs by Taiwan Industry

Student: Peng Yung-Chuan

Research committee: Dr. C. V. Trappey

Dr. Chintay Shih

Dr. Yee-Yeen Chu

Dr. Jen-Huang Hwang

Dr. Po-Young Chu

Advisor: Dr. Charles V. Trappey

December 11, 2004

A New Marketing Tool: The Use of E-Catalogs by Taiwan Industry

Student: Peng Yung-Chuan

Advisor: Dr. Charles V. Trappey

A Dissertation

Submitted to Department of Management Science

College of Management

National Chiao Tung University

In Partial Fulfillment of the Requirements

For the Degree of

Doctor of Philosophy

in

Management

December 2004

Hsin-Chu, Taiwan, Republic of China

A New Marketing Tool: The Use of E-Catalogs by Taiwan Industry

Student: Peng Yung-Chuan. Advisor: Dr. Charles V. Trappey

Department of Management Science

National Chiao Tung University

ABSTRACT

The purpose of this study is to derive baseline statistics for Taiwan automobile component and assembly, Taiwan electronics companies, and IC design industry, concerning their usage of traditional product catalogs and the emergence of electronic or Internet-based catalogs. The difference of the usage in three industry are compared. The data collected provided information about companies and their catalog content. Using phone interviews, site visits, and mail surveys, the researchers derived a taxonomy of products, a content analysis of product descriptions, a summary of relevant dimensions and units used to describe products, a description of the market channels, and a summary of the barriers to Internet catalogs. The result shows that there is a significant difference in the number of product categories in automobile component and assembly and electronics industry, a sigificant difference of the SKUs in IC design industry between paper catalogs and website catalogs. There are significant difference in product categories and brand name of electronic catalogs (e-catalogs) between Taiwan automobile component and assembly, Taiwan electronics, and IC design industry. This study explores the use of Internet based catalogs and provides recommendations for promoting the use of e-catalog content to better expose prospective buyers to the items offer for sale by Taiwan automobile component and assembly, Taiwan electronics companies, and IC design companies.

Keywords: electronic catalogs, Internet marketing, electronics Industry, IC design industry Taiwan Automobile Component and Assembly Industry, e-catalog content

Acknowledgements

This study has benefited greatly from the insightful comments and suggestions of research committee Dean of NTHU Dr. Chintay Shih, Professor of NTHU Dr. Yee-Yeen Chu, Dr. Adam Hou, Professor of NTCU Dr. Jen-Huang Hwang, Dr. Po-Young Chu, and my advisor Dr. Charles V. Trappey. They have provided perspectives, shrewdness, and constructive criticisms that are vital in this work.

Thanks to my family my Mom, my wife Lian, my daughters Grace together with Angel, and all the friends that who support and encourage me to go through the lonely and tuff journey of the Ph.D. program. Besides, I want to give my thanks to general director Dr. C. M. Liu, deputy general director Dr. A. K. Li, deputy general director Dr. Y. M. Peng, and Dr. H. U. Wen director of ITRI MRL. They encourage and support my study. It is a great favor to give me the chance on the Ph.D. program. I want to present this work to my advisor, teachers, research committee, my family, my friends, my colleagues, and especially to my father and express my thanks and appreciation.

CONTENTS

TABLE CONTENTS

FIGURE CONTENTS

1. Introduction

The newest marketing promotion and communication channel for industry is the website. A large number of the companies are displaying products and providing information online and some have comprehensive e-commerce sites. Companies are also designing websites for buyers to place orders, to eliminate intermediaries, and increase profits. In order to create better electronic catalogs, unified catalog content is needed to facilitate the exchange of information between buyers and sellers. The research motive behind this study is to determine the costs and opportunities for generating unified catalog content for Taiwan suppliers. The creation of electronic content for an industry sector requires knowing (1) who the suppliers are, (2) the nature of how to transfer available catalog content into electronic form, (3) the requirements of an electronic catalog, (4) the nature and volume of content, and (5) the standard means of listing the content (product taxonomies and dimensions).

Our objective is to derive benchmark statistics about product catalogs used by the Taiwan's industry so that we can make strategic recommendations to increase e-catalog usage and train companies in the creation of electronic content. Taiwan automobile component and assembly industry was set up earlier than electronics, and IC design industry. It is so called a traditional industry in Taiwan. From 1992 to the year 2000, the production values of the Taiwan automobile component and assembly industry has increased from NT $92 billion dollars to NT $140 billion dollars (Table 4.3). However, most automobile component and assembly companies are original equipment manufacturers (OEM) and as a result are less likely to develop brand names and global marketing strategies. Electronics industry plays an important role in the economic development of Taiwan. Obviously, Taiwan is a global leader in the manufacture of information and communications technology (ICT) products. The shipment of notebooks was 24,253k sets owned 64.6% global share in 2003 (IEK/ ITRI). In recent years, the manufacture industries are moving into Mainland China for the low cost land and labors. Knowledge-based industry like IC design industry is showing its important role in the development of Taiwan economy. The revenue of Taiwan IC design industry was NT $4.35 billion owned 27.8% global share (Fig 6.2). However, most Taiwan high-tech companies are original equipment manufacturers (OEM) and as a result are less likely to develop brand names and global marketing strategies. There are one traditional manufacturer, one high tech industry, and a new knowledge-based industry that all of them have competitive advantage in the world and play an important role in Taiwan Industry. Thus, my dissertation tries to study Taiwan automobile component and assembly, electronics, and IC design industries to explore the use of E-catalog by Taiwan industry. A driving question for this research is

the degree to which Taiwan automobile component and assembly, electronics, and IC design manufacturers are marketing products under their own brand names, the means by which they sell their products, and the methods used to increase market share and sales. The manufacturers of these two industries frequently attend international trade or advertise their products in trade magazines and newspapers to develop marketing channels.

In order to derive the statistics, a comprehensive database of Taiwan suppliers was created. In addition to building a database 195 automotive and motorcycle parts suppliers, 205 electronics, and 180 IC design companies were asked to send their product catalogs by mail to our office for analysis. First, the catalogs of electronics industry were analyzed to derive information such as the number of product categories and the number of product Stock Keeping Units (SKUs) produced by each company. The taxonomy of products was derived using five international classification systems as well as trade show classifications and local trade association standards. The product descriptions were analyzed to derive standard product taxonomies for electronics industry sector. From associations, suppliers, and the Industrial Technology Research Institute (ITRI), information about current product classification systems, trade shows, market channels, common sales techniques, and frequently used promotion materials were recorded. Second, the collection of catalogs by the automobile and motorcycle parts industry was analyzed to abstract relevant catalog content such as the number of product categories and the number of stock keeping units produced by each company. The taxonomy of products was derived using both association standards and manufacturers lists. In addition to creating a product's taxonomy, the product descriptions were studied to derive basic statistics and to build a parts dictionary in English and Chinese. From association interviews and discussions with major suppliers, information about market channels, common sales techniques, and frequently used promotion materials were recorded. Finally, the research targeted the IC design industry, and the suppliers' web-based catalogs were studied and compared to paper catalogs for these three industry sectors.

2. E-Catalogs

There are 350 million Internet users worldwide and by the year 2005 the Wall Street Journal (2002) predicts that the number of users could potentially exceed 766 million. The use of electronic systems in the exchange of goods, services, and information is booming, reaching US$ 114 billion in 1999 with predictions to reach US$ 1.5 trillion in 2004 (Goldman Sacks Investment Research, 1999). By the development of Internet, every enterprise is trying to promote their business and products on the Web. Electronic catalogs (e-catalogs) become more and more important in the business running.

2.1 Catalog and Internet

What makes a catalog? A common mistake among start-ups the belief that the company has what it takes to build a profitable catalog program. Another common mistake of direct marketers is thinking a small collection of products will make a small collection of products will make a successful catalog program. Actually, a successful catalog is a collective merchandise concept, not a single-focus, single-category product line, and a catalog is a store offering a variety of products under a single concept (Boyle, 2004). The Internet appears to have emerged as a most positive development for the catalog industry (Miller, 2000). From the survey of Beaudry 2000 that more than half of the 36% that do buy products from the Internet indicates that their motivation is the convenience offered by the Web. Most U.S. businesses buy products via the Internet are computer equipment and software. The mean percentage of respondents' business purchases that come from the Internet is only 10% compared with a mean of about 64% of the total purchases that come from print catalogs. The share of orders received by Internet more than doubled from 11.7% of 2001 to 24.1% of year 2003. Besides, only 3% of B-to-Bers and 6% of consumer catalogers admitted to a rising level of returns. Online ordering is almost universal the percentage of respondent growing from 64% to 74% since 2001 to 2003. This shift is leading catalogers to consider how e-commerce fits into not only their marketing plans but also their operational strategies and back-end structures (Chiger and Katz, 2003). Following are just a few of suggestions for milking the most from Internet the newest utensil of the marketing toolbox:

(1) Go high-tech with customer service – If you save customer's time and energy by providing a well-planned Web site you will win their pocket book.

(2) Create cyber catalogs – Web site operators can track who visits their site and databases can record their purchase history, which allows a company to develop a more personalized relationship with individual customers.

(3) Streamline direct mail – An online system that allows the user to execute a direct mail campaign using the Internet.

(4) Virtual tradeshow – The Internet has made this possible by offering almost unlimited space to display product information and even run games and sweepstakes. The limiting factor to virtual tradeshows is bandwidth.

(5) Go online at a tradeshow – Creating or using proprietary software at tradeshows also can be a valuable use of the Internet.

(6) Sell information – The new model involves payment for information that is delivered in a new way.

(7) Let the salesforce communicate – The database is more than just a collection of names and addresses; it's valuable client information that your company needs not only to sell more efficiently, but also to educate incoming sales staff about their new customers (Alexander, 1998).

Most of the new-to-file customers are coming in via the Internet, while most of the sales are being generated by a catalog. Shoppers have become adept at locating their product needs using various Internet capabilities, such as search engines, product syndicates of catalog content (Catalog City, AOL Shopping), and aggregators of product from multiple sellers such as eBay (Nicolai, 2003). As tracking orders via source codes (also called sales codes or key codes) is one of the most import ways to measure customer and prospect marketing efforts. Therefore, a growing number of Internet orders go into the uncoded category and must be matched back against the mailing list to ascertain whether the catalog actually drove the order (Schmid, 2002). Companies need to analyze and standardize product information. Therefore, three kinds of data analyses should be conducted (1) review existing product in formation, (2) check for missing data, and (3) organize product line. Editorial interface and workflow program are necessary tools to create and manage database information (Brooks, 2001). To make sure of the catalog Internet success, Bill Nicola developed the ten checklists for it in 2003. The checklists are shown below:

1. Use syndicated links and unpaid search optimization to assure that product and company keywords result in a customer finding your site.

2. Allow catalog requests and referral opportunities to be fulfilled across channels.

3. Join appropriate aggregation opportunities, such as Catalog City and Amazon.com. Work toward pay-per-performance advertising terms rather than pay-per-click or pay-per-view.

4. Use list-optimization services such as those from Abacus, Z-24, NextAction, and I-Behavior to score Web buyers and inquiries for mailing.

5. Use e-mail to pre-notify buyers of catalog mailing.

6. Use e-mail to allow lapsed customers to request catalogs.

7. Use e-mail to allow customers to send referrals.

8. Consider the information content of product characteristics when merchandising and presenting in a catalog. For example, include keyword information in product heads and text so those customers using product search aggregators will find your terms in their automated searches. Remember that a search engine spider will only read text, not graphic elements.

9. Work toward presenting custom page views for each customer based on his history. Even someone driven by a catalog to the "quick shop" window will pause and consider additional item if you show a product on the landing page that is specific to his interests.

10. Try to assure that your customer always comes back to a site where his cart is prepared with his shipping and payment preferences, courtesy of a sophisticated shopping cart module (Nicolai, 2003).

2.2 Catalog and Marketing

In today's over stimulated communications environment, catalog sellers are unlikely garner enough attention from prospects to create sufficient demand. The best prospecting strategy is pulling marketing, which is to use information to enable a new customer to find your product. A defining characteristic of all the Internet-originated contacts is that they represent genuine pull marketing rather than push selling. The customer is driving the process through his interests and needs, rather than being driven by direct mail promotion (Nicolai, 2003). The standardized information can be disseminated on the Web catalog, in print catalog, and on CD-ROM (Brooks, 2001). Most American business are mail order catalog shoppers the result showed that 93% of the total surveyed 1,000 business respondents made purchases from print catalogs during the past year. Indeed, the mean frequency of businesses ordering from catalogs is nearly 14 times annually, and most business order from print catalogs ordered by phone and fax (Beaudry, 2000). Among the 232 Catalog Age subscribers who participated in the survey large companies likely locate more budgets to their Websites, and the vast majority 78% had both online and offline catalogs. There are several methods for promoting online catalogs e-mail, search engines, promotions in catalog, direct mail, print advertisements, and phone. E-mail is the most popular promotional tool. The survey also showed that the print catalog orders are larger (73%) than Web orders (10%) for most mailers (Chiger& Krap, 2003). As digital advances in

production, such as selective binding or versioning, ink-jetting and computer-to-plate technologies become more efficient and affordable, they're bringing catalogers closer to what many consider the industry's ultimate goal: one to one marketing. Yet some companies hesitate to charge into one to one marketing on the Internet because of database management, security and privacy issues (Oberdorf, 1996).

2.3 Electronic Catalogs

Segev, Wan and Beam (1995) define e-catalogs as electronic representations of information about the products and services of an organization. Thus, a company's Web page that provides a short list of products is considered an e-catalog and even simple online product representations are acknowledged to increase sales exposure and market presence. In relation to the trend of using Internet, the electronics catalog is the entry point of electronic commerce (Kalakota & Whinston, 1996). Electronic catalogs are becoming as important in business-to-business communication as the telephone or fax machine, a product catalog on a Web site, and clients can get the most up-to-date data on the products and prices at less cost than printing and mailing annual catalogs. Companies are offering a variety of products online and are increasingly viewing product descriptions and systems of products as an industry standard (Kilbane, 1999). E-catalog is a rich, highly flexible information asset, and virtual sales connect with customers all over the world, 24 hrs a day. There are several key characteristics such as rich content, classification, granularity, meta-data, customization, and adaptability. An electronic catalogs is not simple spread sheet or database file with part numbers and product attributes, not a digital copy of a printed catalog, not an ERP transaction file (MRO Software Inc, 2002). Besides, two kinds of information (1) name, description, features, price, volume, price, specification, and warranty (2) extensions to facilitate sales such as product cross-selling, up-selling and special offers. The main objective of the e-catalog is in attracting customers and supporting product search and ordering over the web (Laakso, 2002). For manufacturers, retailers and distributors doing business online, that contact point has become the e-catalogs (Croneweth, 2002).

2.4 Benefits and Challenges of E-Catalogs

The benefits of e-catalogs for both suppliers and retailers are reducing production costs, expanding markets, and reducing processing costs (Baron, Shaw & Bailey, 2000). In 2002 MRO, Software Inc. claimed that the e-catalogs can satisfy customer and channel demand, enhance existing customer relationships, support more sales channels and reach new customers, reduce catalog management and distribution costs,

reduce order processing and customer service costs, drive competitive advantage and differentiation, and speed time to market. The increased sales exposure impacts consumer expectations and customers are not likely to be satisfied with online catalogs unless they offer similar advantages and shopping experiences as stores and traditional catalogs (Roxanne, 2000). There are barriers to e-commerce (e.g., differing infrastructures that delay transmission of information, differing legal environments) that requires marketing managers to continuously monitor the external environment and adapt marketing strategies to satisfy the needs of international customers (Harrison-Walker, 2002). Even after adapting to the global market trends and investing in electronic catalogs and e-commerce platforms, there is no guarantee that the customers will change their ways of doing business. Gilbert (2001) reports (and most managers admit) that some customers will still use the fax over a web-based order system as long as there is a published fax number. The ideal approach for a company is not to deny the customer a point of contact but to facilitate multiple and integrated points of contact so that what ever means is used to place an order or send a request is tracked and satisfied.

There are many challenges of e-catalogs like inaccurate data, inconsistency, and inefficient processes (APSIVA, 2002). Acquiring the content presents can be more difficult than expected. Product similarity must highlight a supplier's differentiation, or the buyer will focus price only (Gartner's Enterprise, 2001). The central challenge is the creation and maintenance of available information taxonomy (Cronenweth, 2002). The key challenges in building and maintaining an electronic catalog are (1) combining multi-source product data into a coherent catalog (2) customizing and distributing catalogs to multiple customers and channels (3) managing changes to both the content and structure of the catalog (MRO Software Inc, 2002). Undoubtedly, supplier and catalog content management remain the biggest technical challenges to e-procurement (SAQQARA, 2002).

2.5 E-Catalogs Management

The information of e-catalogs can easily be changed on an as-needed basis, monthly, weekly, or daily. No older catalog numbers of discontinued items, inaccurate descriptions, and outdated prices will be handed in your customers' hands. To meet the need for convenient, accurate data, vendors and industry groups are offering a variety of products almost as fast as the click of a mouse button, and are typing to make their system of product descriptions an industry standard (Kilbane, 1999). Knowing how to manage an e-catalog can help ensure that the system put into place will be successful. The step to any company's successful e-commerce venture is getting its database in order and standardized (Brooks, 2001). Customer data captured

online can range from “basic registration information” to details about navigation paths and the most-visited pages (Miller, 2001). Sell-side catalog content management involves creating, managing, and deploying product data for access by customers. The content-design must consider the issues of product ontology, structural standards, semantic standards, multi-lingual catalogs, and integration. Software is important but is only part of the equation. The major focus of any effort has to be on the process and content design for future flexibility (Laakso, 2002). Management system should have technology, some fundamental functionality and features (1) central repository and management (2) manage products down to granular level (3) standardize and enhance data (4) seamlessly push to and synchronize between multiple channels (5) repeatable and automated (Apsiva, 2002). To implement catalog management technology must consider the business processes, information models must facilitate commerce across each supply chain, and must work with trading partners to establish the supply chain's current and future information-sharing strategy (Gartner’s Enterprise, 2001).

In order to produce the optimal e-catalog, its contents must be merged in real time with inventory data, special pricing and other personalized data elements at the point of contact with the individual customer (Cronenweth, 2002). Besides, the optimal electronic catalog management solution should (1) manage catalog content in one place (2) rich content (3) taxonomy-based approach (4) manage catalog for business users (5) support for different customers and sales channels (MRO Software Inc, 2002). At the simple end of the spectrum, customers visiting an Internet catalogs can send e-mail to ask question or place orders. At the other end of the spectrum is the integrated system that allows customers to place orders online. At fully integrated system allows up-to-the-minute sales and inventory information. When all the pieces of e-catalogues, CD-ROMs and print catalog together companies stand a better chance of gaining multiple benefits and achieve success in the Internet economy (Brooks, 2001).

Taiwan is a global leader in the manufacture of information and communications technology (ICT) products. However, most Taiwan companies are original equipment manufacturers (OEM) and as a result are less likely to develop brand names and global marketing strategies. A driving question for this research is the degree to which Taiwan manufacturers are marketing products under their own brand names, the means by which they market their products, the methods used to increase their market share and sales. Taiwan manufacturers frequently attend international trade or advertise their products in trade magazines and newspapers to develop marketing channels. The newest marketing promotion and communication channel for Taiwan manufacturers is the website. A large number of the companies are displaying products and providing information online and some have comprehensive

e-commerce sites. Those companies are also designing websites for buyers to place orders, to eliminate intermediaries, and increase profits.

3. Methodology

The methodology details the collection of primary and secondary data for the automobile component and assembly, electronics, and integrated circuit (IC) design industry sectors. The flowchart of this research is shown on figure 3.1. First target industry is the automobile component and assembly industry the primary data resulted from an interview with The Taiwan Transportation Vehicle Manufacturers Chief in Taipei. Following the interview, letters were sent to 195 large automobile parts manufacturers, located in different counties of Taiwan, requesting a catalog for research purposes. The data from the catalogs were coded and entered into a database. Web-sites were studied and coded for content. There were 102 paper-based catalogs received and 39 companies published on-line catalogs. Given the limitation on the number of companies with websites, the analysis between catalog types was based on a sample of 39 companies that had paper catalogs as well as website catalogs. Secondary data from the Directorate General of Customs Data were retrieved in order to define the way that the Directorate General of Customs (DGOC, 2001) classifies vehicle parts for customs processing. The authors also used Internet search engines (Yam and Google) to identify the 20 leading Automotive Associations in Taiwan. After collecting association names and addresses, phone calls and visits were made to associations to complete the Taiwan list of related automobile and motorcycle associations. The authors visited Mr. Huang, Chief of Business Affairs Section at the Taiwan Transportation Vehicle Manufacturers Association, for in-depth case data and addresses. The ITIS database (www.itis.org.tw) provided company names as well as import and export trend statistics for the research. To summarize trends in the industry, we collected data related to the profile and structure of Taiwan Automobile Component and Assembly Industry, including major component parts, total production values, the amount of export and import and the sales. The Corporate Synergy Factory System (C-S system), founded through the support of The Industrial Development Bureau, Ministry of Economy Affairs (MOEA), was studied. Since characteristics of companies will be influenced by the capital and number of employees these are the two factors that are used to create size classification rules. Small, medium and large-scale companies were grouped according to the rules to discuss the relationship among the groups. Four common product classification systems, the Taiwan Customs Classification System, The TTVMA Classification System, The Yu-Long Automobile Classification System and the Trade Show Classification System were studied. In addition, this research evaluated the sample of 39 companies' e-catalogs as compared to their paper catalogs in terms of the differences in the number of categories, Stock Keeping Units (SKUs), brand names, and illustrations. Product category means kinds of product classified in different

groups on the catalog. There are many similar products that are put together in the same category, each one of them represents a type of Stock Keeping Units (SKUs). The figure or picture of the product is defined to be the illustrations in this research. Brandname of product also can be found on the catalog of different companies. Finally, the conclusion and recommendations were drawn based on the data and analysis.

Secondly, for the electronics industry research required the collection of primary and secondary data from members of the Taiwan Electrical and Electronics Manufacturing Association (TEEMA). The primary data sources included recorded dialogues from two research managers in the Electronic Component Department, the Industrial Technology Research Institute, and the Executive Director of the Taiwan Electrical and Electronic Manufacturers Association. The secondary data sources consisted of company catalogs, government statistics, association lists, and other sources of published data. The company research database was built by abstracting data, according to a code sheet, from the catalogs provided by 205 computer and peripheral parts manufacturers in Taiwan. First, letters were sent to each company requesting a catalog for research purposes. Then, the catalogs were analyzed, coded and data recorded in a database. Web sites were also analyzed and coded for content. A complete list of the website URLs was derived from the paper catalogs and association member list. Product descriptions for notebooks, Personal Digital Assistants (PDAs), and electrical computer cables are studied. Internet search engines were used to find various product classification systems. Using the product classification systems as a basis for comparison, the differences between systems used in Taiwan and in foreign countries are evaluated from the perspective of building better Internet-based catalogs. After the differences between various product-classified systems were identified, a sample of product descriptions was generated for illustration and for discussion. Using the distribution analysis and classification method, we derived partitioning rules using the capital and employees data to create a new set of small, medium, and large size companies (Table 1). For example, company is classified as a small enterprise if its capital less than NT$ 20 million and the number of employees is less than 30. If a firm satisfies one partitioning criteria, but not another, then it is omitted. Only clearly partitioned data that satisfy both criteria on employees and capital are allowed into the subset. Since the combined classification fairly describes three distinct groupings by two commonly reported parameters, it is used for comparing companies and describing the differences between products and catalogs across company size. All the paper catalog and e-catalog were also collected and compared the category, SKUs, illustrations, and brandname in electronics industry.

The automobile industry is so called a traditional industry, and the electronics industry represents the new developed high-tech industry in Taiwan. Both of their catalogs promote the tangible product. Thirdly, this research study the IC design industry because of their high value-added property and their intangible product. The primary data and secondary data were collected by the way of interview, collecting paper catalogs and study the websites of the IC design house. The list of IC design companies was provided by Terry Chen, research manager of IC department industrial economics and knowledge center Inustrial Technology Research Institute (IEK ITRI). The address of websites were clearly shown on the list (Appendix K). Paper catalogs were collected by the help of Dior Chen, Manager of Taiwan Semiconductor Industry Association (TSIA), Jack Sheu manager of open-lab service department ITRI, Kenny Wang manager of IC facility agent, and Mr. Lee director of Taiwan Hsin Chu Science Park Association. After compared the product categories, SKUs, brandname, and illustrations by the collected paper catalogs and websites, some stastics and t-test were executed. Field review were done to get more information about the perpespective of the supplier Ping Huan senior specialist of customer service department Sunplus, Dennis Liu public relationship manager of Elan, and Mr. Jian a researcher of IC design industry at IEK ITRI, then compared the three industries to formulate a model of product promotion by the use of catalog.

In conclusion, this dissertation tries to stdudy the use of e-catalogs by Taiwan industry. Three Taiwan great global impact industries were chosen in this research. This research have done three studies in sequence. The first target of this dissertation is automobile component and assembly industry. The second is electronics industry, and the third is IC design industry. We use hypothesis testing to analysis the result of the three studies in comparing the paper catalog versus e-catalogs. Finally, the research compare the e-catalogs between automobile component and assembly industry, electronics industry, and IC design industry. ANOVA seems to be a good method to analysis the results of this study. All the analysis will be shown in section 7.4.

3.1 Standard Descriptions and Taxonomy of Taiwan Automobile Part Product

There are often numerous product descriptions for a single part or component produced by Taiwan manufacturers. For a buyer, this creates difficulties since in order to find the product requires mapping English terms from the Taiwan industry part classification to other classification systems such as the US Census Bureau Harmonized System (HS code), the UNSPSC Code, or other standard product classifications. Four common classifications, such as Taiwan Customs Classification System, The Taiwan Transportation Vehicle Manufacturers Association (TTVMA)

Classification system, The Yu Long Automobile Company Classification System and The Trade Show Classification System are described below to highlight the advantages and disadvantages that exist between different part classification systems.

The Directorate General of Customs and the Board of Foreign Trade publish a comprehensive classification system called *The Customs Import Tariff and Classification of Import and Export Commodities of the Republic of China.* This classification system provides manufacturers, suppliers, and distributors an extensive list of parts descriptions, tariff fees, and import restrictions. Other related information for auto part classification can be obtained from the Taiwan Transportation Vehicle Manufacturers Association, the Yu Long Automobile Company, and from the trade show catalogs produced by CETRA and the Taipei World Trade Center (2002 Taipei International Auto and Motorcycle Parts and Accessories Show). The classification system for trade shows is referred to as the Taipei Auto and Motorcycle Parts and Accessories (TAMPA) Code.

Taiwan Customs Classification System has a few disadvantages. First, The Directorate General of Customs struggles to keep up with classifying new products and particularly classifying products and parts that are technical innovations. New products tend to be placed into broad existing categories and new categories are slowly created. The degree of correspondence with the HS Code system is not known but discrepancies between the two systems do exist. As well as, a search engine allows users to find the appropriate code number given a part description. An advantage of the system is that the Industrial Technology Intelligence Services has automated the Taiwan customs classification system and provides on-line access. Furthermore, the Taiwan system provides a good standard list of English and Chinese part descriptions related to the HS Code and the UNSPSC.

The TTVMA Classification system is non-automated and is derived from member self-reports of parts and components produced at their factories. The major classifications are for automobiles (308 categories), bicycles (91 categories), motorcycles (161 categories), and railroad vehicles (4 categories). However, there is no method for identifying and classifying single part stock keeping unit (SKU). We found the computerized database of members and their information is updated yearly and that the system likewise provides a good standard list of English and Chinese part descriptions related to the way manufacturers classify their production activities.

The Yu-Long Automobile Company Classification System is one of the most accurate and complete automotive parts classification systems used in Taiwan. The system offers a comprehensive means to classify parts as stock keeping units for inventory control. The system utilizes a column and row system with four major part divisions including engine parts, electrical parts, chassis parts, and body parts. Each

major division has a sub-division (xxx level) and each sub-division has an even finer layer (xxxxx level). This system is one of the most complete standard lists of English and Chinese part descriptions that can be used to describe automotive part SKUs.

The Trade Show Classification System is used to place manufacturer exhibits and sales booths into a logical presentation order. Buyers from all over the world use the system to locate manufacturers exhibiting products. The system has a long history being used for mapping of categories to the floor plan of the Taipei World Trade Center Exhibition Hall. The shortcoming of the system is the incomplete and non-standard list of English and Chinese part descriptions.

3.2 Standard and Product Taxonomy for Electronic Product

Product descriptions for notebooks, Personal Digital Assistants (PDAs), and electrical computer cables are targeted to the study. Taiwan's related information about product classifications from the websites of CETRA and the Directorate General of Customs (DGOC) are analyzed. The official classifications include the Harmonized Commodity Description and Coding System (HS), the Classification of Commodities of the R.O.C (CCC Code), the Industrial Code, and the International Standard Industrial Classification (ISIC). For widely used international product classifications, the United Nations Standard Products and Services Codes (UNSPSC), the Central Product Classification Version 1.0 (CPC V1.0) and the Standard Industrial Trade Classification (SITC) are compared and studied.

The Taiwan government currently uses the HS Code system and the CCC Code system for customs import and exports tariff and classification of import and export commodities. The classifications for the three target products are not precise since these two systems are fully not consistent. Further, these two classifications do not code electrical computer cables under a product category that is easy for users to relate to. Taiwan industries use the ISIC Code and the Industrial Code as well. The ISIC Code and the Industrial Code are better for classifying the three target products than the HS Code and the CCC Code. However, the product descriptions in the ISIC Code system and the Industrial Code system are controversial. Within these two systems, there are two descriptions for notebooks. The Industrial Code system gives two descriptions to PDAs, and there's only one description for PDAs in the ISIC Code system that differs from the popular one used in the marketplace. Except for UNSPSC, the international classifications, such as CPC, and SITC, are not much better for classifying the target products. Among these classifications, UNSPSC specifically classifies the target products the best since it gives only one description for each product. In addition, the product descriptions match the current ones used in the marketplace.

The US Census Bureau Harmonized System (HS Code), the Customs Cooperation Council Code (CCC Code), the Industrial Code, the International Standard Industrial Classification (ISIC), the UNSPSC system, the Computex Taipei 2001 standard, and the Taiwan Electrical and Electronic Manufacturers' Association standard are very important for electronic product classification. A good e-catalog system will enable buyers to search and find products no matter which classification system they are using. Also, they will be able to search and find products using keyword descriptions in Chinese or in English.

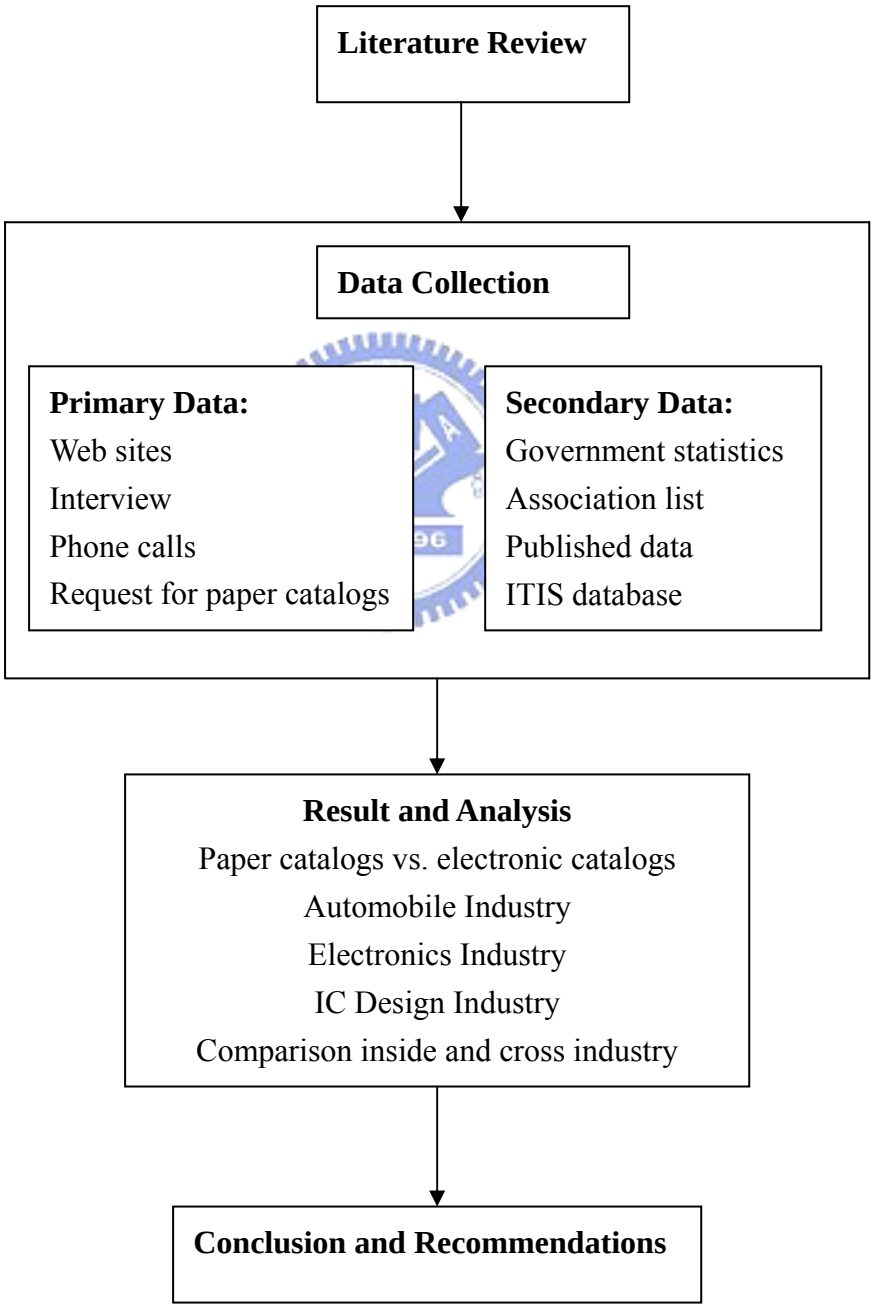


Fig 3.1 — Flowchart of research

4. The Profile and Structure of Taiwan Automobile Component and Assembly Industry

There are six major kinds of the automobile component and assembly industries in Taiwan with "others" meaning industries manufacturing or assembling related products. Each of these sectors has about 60 to 70 companies and on average each employs about 200 employees and has capital of about $NT 300,000. Table 4.1 shows the profile of the automobile component and assembly industry in Taiwan.Table 4.2 illustrates the employee distribution of the Taiwan automobile component and assembly industry. One half of the companies, according to ITRI's data, have fewer than 20 employees.

Table 4.1 — Taiwan Automobile Component and Assembly Industry Profile

Parts	Company Number	Average Capital (Unit: Thousand NTD)	Average Employees
Engine Parts	70	234,520	201
Engine Accessories	62	276,321	217
Electrical Parts	93	316,760	536
Chassis System	63	375,776	231
Stamped Parts	55	315,534	128
Ornaments	29	62,738	93
Others	57	87,630	83
Total	429	255,747	248

Source: The Taiwan Transportation Vehicle Manufacturers Association; ITRI/ ITIS

Table 4.2 — the Employee Distribution of the Taiwan Automobile Component and Assembly Industry

Employees	Company Number	%
<20	1,437	66.4
20-29	240	11.1
30-99	361	16.7
100-199	71	3.3
200-299	25	1.2
>300	29	1.3
Total	2,163	100.0

Source: ITRI/IT IS

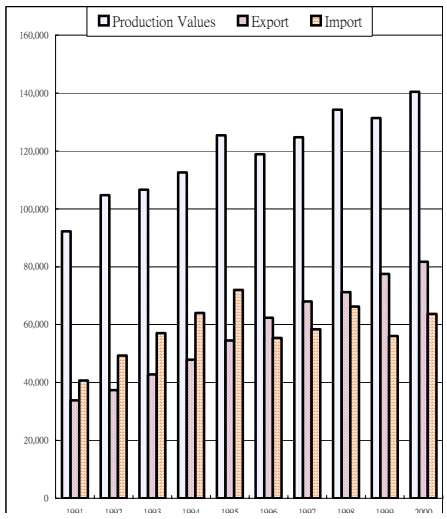
Generally speaking, the production values for the Taiwan automobile component and assembly industry have been increasing yearly since 1991. Exports and production show steady and positive growth. Imports, however, impact production and exports (Table 4.3). In general, the direct exports for Taiwan's automobile

components are increasing. The sales were positive except for 1996 and 1999, and the overseas sales were better than domestic sales. Table 4.4 shows the sales of Taiwan automobile components and assembly industry from 1992 to 2000. The production values of the Taiwan automobile components and assembly industry has grown from NT$ 92 billion to NT$ 140 billion since 1992 to 2000 (about 7% per year).

Table 4.3 — the Export and Import Values of the Taiwan Automobile Component and Assembly Industry over 1991 and 2000

Million NTD, Thousand NTD/Ton, %

Year	Production Values	Export		Import	
		Amount	Average Unit Price	Amount	Average Unit Price
1991	92,208	33,834	124	40,741	209
1992	104,728	37,418	127	49,311	216
1993	106,607	42,755	139	57,108	245
1994	112,613	47,914	143	64,076	271
1995	125,373	54,534	148	71,981	297
1996	118,875	62,370	149	55,371	270
1997	124,734	68,034	148	58,354	243
1998	134,278	71,215	160	66,287	155
1999	131,414	77,555	155	56,089	250
2000	140,449	81,728	154	63,745	253

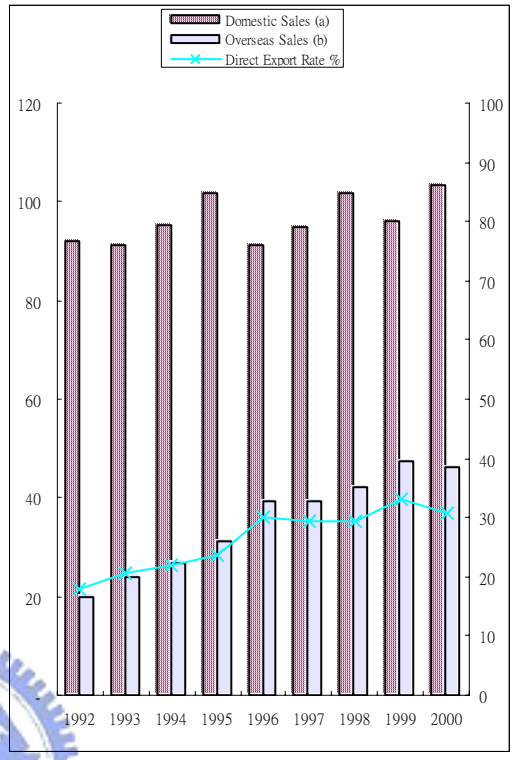


Source: ITRI/IT IS

Many of the Taiwan automobile component and assembly companies are after-sales oriented and sell into the international marketplace using their own sales force. Others focus on original equipment manufacture (OEM) and follow the manufacturing plans of the car companies. Some companies do commit to researching and developing automobile parts and providing target markets with those parts. The 2001 Industry Statistic Survey Report published by MOEA shows that the Taiwan automobile components and assembly industry has 2,163 companies. Automobile parts are manufactured from metal and non-metal materials. Thus, the up-stream companies in this industry are steel, rubber, plastic, electrical parts, electric machinery, glass, and paint industries. Since most companies in this industry are original equipment manufacturers (OEM), their down-stream buyers are car manufacturing companies. The suppliers of this industry are raw material companies, component manufactures, and related service providers. There is also a sector of companies that imports raw materials for the supply chain members. The Taiwan automobile components and assembly companies sell their products to venders, agents, and automobile manufacturing companies domestically 69% and internationally 31%.

Table 4.4 — the Sales of the Taiwan Automobile Component and Assembly Industry 1992 and 2000 Unit: Million NTD, Growth Rate %

Year	Domestic Sales (a)	Overseas Sales (b)	Sales (a + b)	Direct Export Rate %
1992	92,165	19,933	112,098	17.8
	22.4	-13.1	14.1	
1993	91,064	23,780	114,844	20.7
	-1.2	19.3	2.5	
1994	95,314	26,733	122,046	21.9
	4.7	12.4	6.3	
1995	101,764	31,281	133,046	23.5
	6.8	17.0	9.0	
1996	91,292	39,151	130,443	30.0
	-10.3	25.2	-2.0	
1997	94,994	39,284	134,278	29.3
	4.1	0.3	2.9	
1998	101,785	42,133	143,918	29.3
	7.1	7.3	7.2	
1999	96,097	47,390	143,487	33.0
	-5.6	12.5	-0.3	
2000	103,408	46,282	149,690	30.9
	7.6	-2.3	4.3	



Note: Direct Export Rate = Export/Sales x 100%
Source: ITRI/ITIS

4.1 The Corporate Synergy System

The Industrial Development Bureau of the Ministry of Economic Affairs established a Corporate Synergy Factory System (C-S system) as a channel to promote business between small and medium enterprises in 1984. Since then, 278 automobile companies have registered in the system. The system increases the competitiveness of manufacturing industries by developing a cooperative network. The system also helps enterprises reduce purchase and production costs.

The C-S system builds on an outsourcing relationship between hub factories, first-tier satellite factories, second-tier factories, and third-tier factories. Hub factories outsource parts to first-tier satellite factories, first-tier satellite factories outsource parts to second-tier satellite factories, and then second-tier factories outsource parts to third-tier satellite factories. This structure forms vertical segmentation in the industry and allows for greater flexibility while maintaining economy of scale. The corporate synergy system currently has 16 systems with 171 satellite factories.

4.2 Combined Partitioning Rules

Using the distribution analysis of registered capital and number of employees, the following partitioning rules were used to subset the catalog data by small, medium and large firms. The data set includes 1083 members but eliminate members not in the quartiles for both capital and number of employees. For example, a company with capital of 25 million and 15 employees does not fit the rule for combined quartile groupings (Table 4.5).

Table 4.5 —Partition of Association Members According to Combined Quartile Groupings Using Employees and Capital

Size	Rule	Number
Small	Capital < 8,000,000 & Employees < 18	610
Medium	(8,000,000 =< Capital < 29,000,000) & (18 =< Employees < 52)	182
Large	Capital >= 29,000,000 & Employees >= 52	291

4.3 Company Characteristics by Size

The following discussion uses distribution analysis of the part categories for small, medium and large auto part companies. The number of manufacturers in each part category is tabulated from self-reported specialties. That is, if three small companies claim that they are manufactures of engine parts, the resulting frequency count for engine parts equals three. The large companies have the greatest similarity among products followed by small companies. Medium size companies are characterized by a greater diversity in the types of auto parts manufactured and 50% of the medium size companies produce unique parts.

The data for medium size companies show that a large portion of companies specialize in the production of electromechanical devices, such as power windows and electrical coils for automobiles. Small companies, on the other hand, specialize in and labor-intensive production of small parts like screws. On the other hand, large size companies are producing large size parts that require capital-intensive machinery (stamping of automobile body parts) and building complicated integrated components such as transmissions.

4.4 Product Category Frequency

Table 4.6 shows the data from the transportation company parts association members re-coded according to the Yu Long Automobile Company Classification System. The company reports of manufacturing specialty were re-classified using this system and the frequency of the Yu-Long product codes were sorted. The results of the reclassification are shown in Figure 4.1. Table 4.7 takes the recoding of company

reports of manufacturing specialty one step further. That is, the Yu-Long codes were placed into trade show categories such as the Taipei Auto and Motorcycle Parts and Accessories (TAMPA) code. The results indicate that the Taiwan auto parts industry specializes in auto frames and parts, engine parts, and electrical parts.

Table 4.6 — the Top15 Part Categories for Automobile Components Industry

Rank	English	Chinese	Yu-Long Code	Frequency	TAMPA Code
1	Cylinder Body	汽缸體	11	250	1
2	Lights	燈類	26	187	5
3	Door Panel Parts	車門零件	80	153	4
4	Body Assembly	車身總成，車廂	60	147	4
5	Piston and Connecting Rod	活塞，連桿	12	119	1
6	Brake	剎車	41	107	3
7	Axle	輪軸	40	104	4
8	Switch and Relay	開關及繼電器	25	98	5
9	Electrical Parts, Terminals and Electric Appliance	電線組合，電子件，端子，電器類	29	93	5
10	Radiator and Fan	水箱，風扇	21	92	3
11	Mud Guard	檔泥板	63	92	4
12	Nut, Bolt, Screw, Gear	螺帽，螺栓，螺絲，齒輪	71	91	3
13	Console, Rear-view Mirror	置物箱，後視鏡	96	91	4
14	Carburetor	化油器	16	75	1
15	Wire Harness, Battery and Conduit	配線，電瓶，導管（線）	24	75	5

Table 4.7 —the Manufacturing Company Frequency of the Six Product Categories Defined by Taiwan Auto and Motorcycle Parts and Accessories (TAMPA)

Category	TAMPA Code	Total Frequency	Percentage
Automobile Frame and Parts	2328-232899	1,290	40.25%
Automobile Engine and Parts	2316-231680	682	21.28%
Body Electrical Parts	2330-233074	556	17.35%
Engine Fittings, Power Trains, Steering, Brakes	2320-232617	522	16.29%
Electrical Parts for Engine	2318-231883	133	4.15%
Pneumatic Tires, Tubes, Hubs	2332	22	0.69%
Total		3,205	100.00%

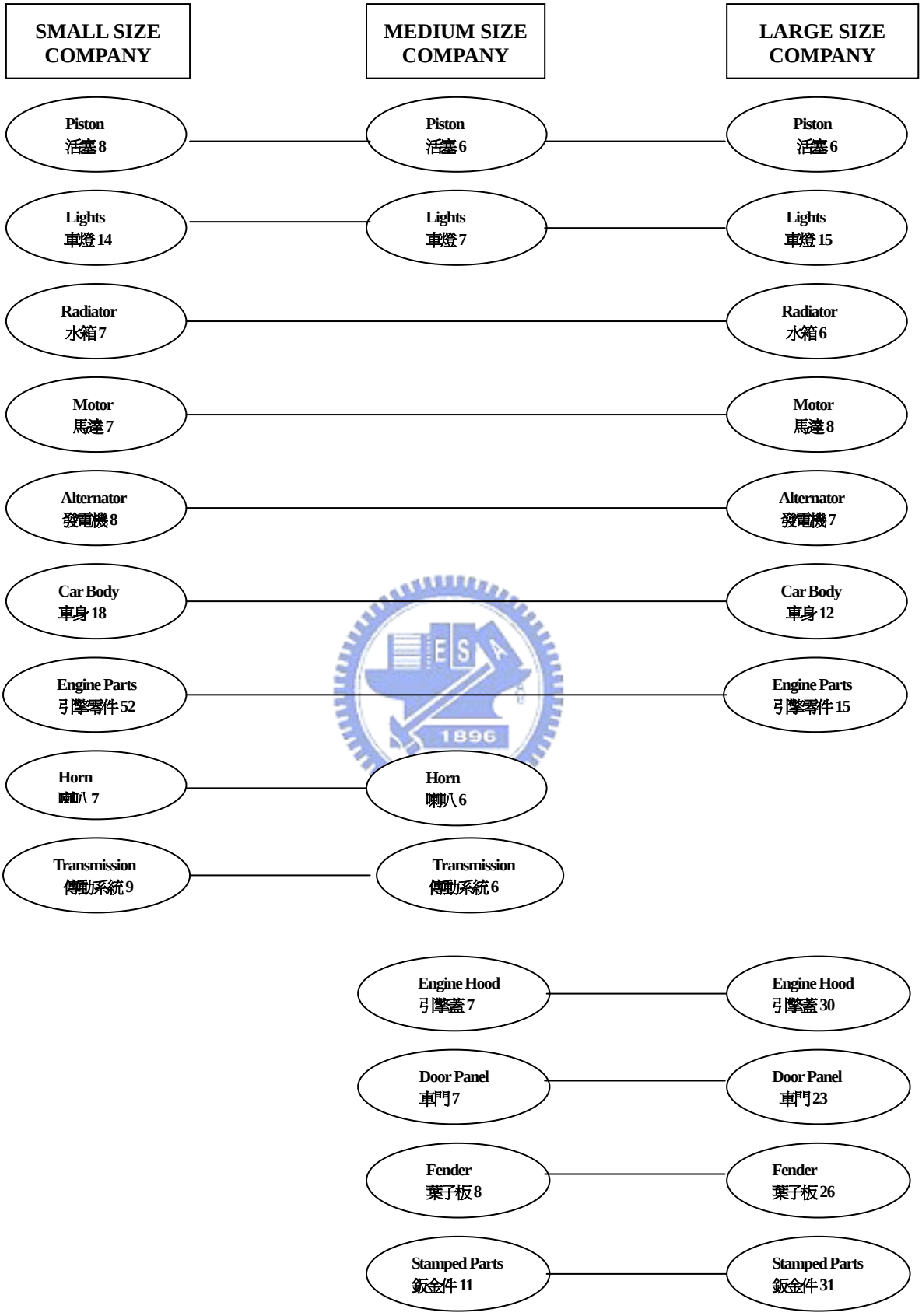


Figure 4.1 —Size Characteristics and Links between Automobile Component Suppliers and Manufacturers in Taiwan

4.5 Marketing Strategies

Most companies in this industry are Original Equipment Manufacturers (OEM), and as a result most domestic companies lack global marketing strategies. In addition, the down-stream companies are domestic automobile manufacturing companies and there is a strong partnership between the firms. The strong partnerships enable companies in this industry to survive through inter dependency. The Taiwan automobile components and assembly companies often participate in the international trade shows to find new buyers. They also advertise their products in related magazines and newspapers produced by the China Economic News Service. Domestic associations also act as an effective marketing channel by providing publications and membership directories.

A new marketing channel for companies is the Internet website. After rating the websites of domestic part providers, it was found that some websites for Taiwan companies employ relatively advanced product displays. In addition, the websites provide comprehensive information about the company mission, history and product specifications. Some websites provide an online ordering function just like Yu-Long Co (www.yulon-motor.com.tw). Common sales techniques used by this industry sector include inter-network sales, trade shows, overseas sales, joint ventures and technology transfer. Some firms also work with repair and part supplier houses to build the local distribution network.

5. Electronics Industry Profile

This research focuses on the product categories and classifications for personal digital assistants (PDAs), notebook computers, and computer cables. Table 5.1 introduces Taiwan's top 10 export electronic products in 2001. The data show that the portable digital automatic data processing machines (or PDAs) and notebook computers are ranked as the two most important export electronic products in 2001.

Table 5.1 — Taiwan's top 10 export electronic products in 2001

Unit: NT$ 1000, NA: Note Available

Rank	HS Code	Product	Amount	Unit
1	8473301090	Other parts and accessories of the machines of subheading No. 8471.10, 8471.20, and 8471.91-3	205,193,378	NA
2	8471300000	Portable digital automatic data processing machines, weighting not more than 10 kg	195,512,045	7,236,377
3	8471609090	Other input or output units, whether or not presented with the rest of a system	56,749,627	8,996,677
4	8473302100	Parts and accessories of the machines of division No. 84719010	26,915,893	NA
5	8473302900	Parts and accessories of the machines of subheading No. 8471.80 and 8471.90	18,976,732	NA
6	8473502000	Parts and accessories equally suitable for use with machines of subheading No. 8471.10, 8471.30, 8471.41, 8471.49, 8471.50, 8471.60 and 8471.70	18,736,746	NA
7	8471410000	Other digital automatic data processing machines, in the same housing with at least a CPU and an input and output unit	13,115,509	621,515
8	8471701030	Optical disc devices	6,626,976	3,602,745
9	8528219000	Other color video monitors	5,277,655	659,941
10	8471601000	Terminals	4,572,307	560,398

Source: Customs Import and Export Information of the R.O.C, 2001

Table 5.2 shows the Taiwan top 10 import electronic products in 2001. The data show that the export values for portable digital automatic data processing machines are much greater than the import values.

Table 5.2 — Taiwan's top 10 import electronic products in 2001

Unit: NT$ 1000, NA: Not Available

Rank	HS Code	Product	Amount	Unit
1	8471609090	Other input or output units, whether or not presented with the rest of a system	55,284,478	13,482,645
2	8471701010	Hard disc devices	31,742,569	8,853,187
3	8473301090	Other parts and accessories of the machines of subheading No. 8471.10, 8471.20, and 8471.91-3	25,050,017	NA
4	8471701030	Optical disc devices	13,870,954	6,604,896
5	8473502000	Parts and accessories equally suitable for use with machines of subheading No. 8471.10, 8471.30, 8471.41, 8471.49, 8471.50, 8471.60 and 8471.70	5,331,075	NA
6	8471701090	Other magnetic disc devices	5,238,029	1,671,812
7	8471701020	Soft disc devices	4,728,219	11,174,579
8	8471300000	Portable digital automatic data processing machines, weighing not more than 10 kg	3,612,983	107,503
9	8471500000	Digital processing units other than those of subheadings No. 8471.41 and 8471.49	3,425,897	51,996
10	8471410000	Other digital automatic data processing machines, comprising in the same housing at least a CPU and an input and output unit	3,067,140	16,589

Source: Customs Import and Export Information of the R.O.C, 2001

Table 5.3 shows the statistics for Taiwan information appliance (IA) products in 1999 and 2000. The growth rates for the estimated production units and values for thin clients and smart handheld devices (SHDs) in 2000 exceed 100%. The production growth rates for smart handheld devices and thin client growth exceed 100%.

Table 5.3 — Estimated statistics for Taiwan information appliances, 1999—2000

Product	Production Units in 1999	Estimated Production Units in 2000	Growth Rate	Production Values in 1999	Estimated Production Values in 2000	Growth Rate
Thin Client	305	674	121%	91.5	190	107%
Set-top Box	2,633	4,454	69%	650.7	909	40%
Screen Phone	35	49	40%	14.0	16	13%
SHD	442	1,550	250%	82.2	251	206%
Total	3,415	6,765	98%	838.4	1,361	62%

Source: Market Intelligence Center, Institute of Information Industry, 2001

The majority of the Taiwan notebook manufacturers sell to target markets in the US and Europe. The production of notebooks is much greater than the production of palmtop computers and electronic wires (Table 5.4). Notebooks are an export product with the export units and values 10 times larger than the production for the local supply chain. Table 5.4 shows the domestic sales, imports and exports of notebooks, palmtop computers, and electric wires in Taiwan.

Table 5.5 shows the production units and values for notebooks produced in Taiwan from 1998 to June 2001. Generally speaking, the production units and production values of notebooks in Taiwan reached a peak in 2000 and fell back to 1998 levels in 2001. These data show the global slow-down in production as well as the shift of some production to Mainland China after the year 2000.

Table 5.4 — Domestic sales, imports and exports of notebooks, palmtop computers, and electronic wires in Taiwan (01/2001- 10/2001). Unit: NT$ 1,000

ISIC Code	Product	Production Units	Market	Units	Values
2611025	Notebooks	10,092,764	Domestic	1,093,784	19,824,778
			Export	9,044,582	238,587,977
2611030	Palmtop computer	369,413	Domestic	315,370	989,740
			Export	45,858	240,841
2812210	Electronic wire	42,363	Domestic	20,846	2,175,433
			Export	22,903	3,395,762

Source: Issue 111 of the Information and Electron Industry Statistics Monthly, Department of Statistics, Ministry of Economic Affairs

Table 5.5 — Production units and values of notebooks in Taiwan

Unit: million US $

Year	Production Units	Growth Rate	Production Values	Growth Rate
1998	6,080,000	-	8,400	-
1999	9,710,000	53.7%	11,073	21.1%
2000	12,707,000	30.9%	13,548	22.4%
2001.01-2001.06	6,196,000	-4%	5,816	-16.9%

Source: Market Intelligence Center, Institute of Information Industry

Figure 5.1 depicts the growth of production units worldwide and in Taiwan. Figure 5.2 shows the increase of Taiwan's market share in the global notebook market and demonstrates the key role Taiwan plays in the global computer marketplace.

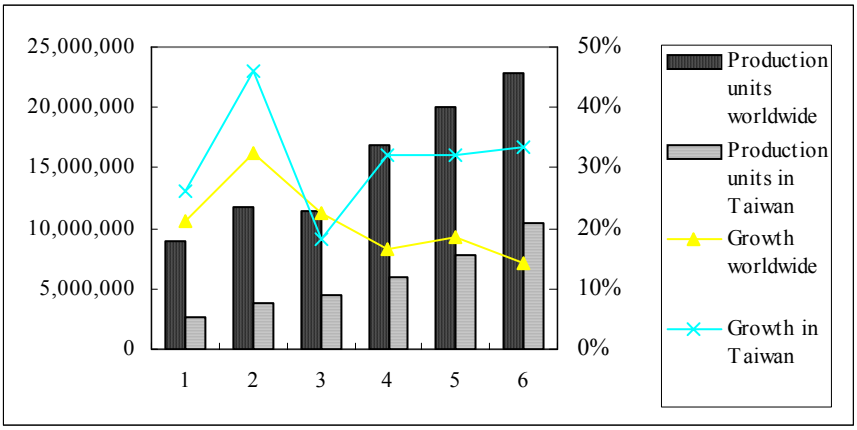


Figure 5.1 — Importance of the Taiwan notebook companies in the global market
Source: IDC, III, and MIC

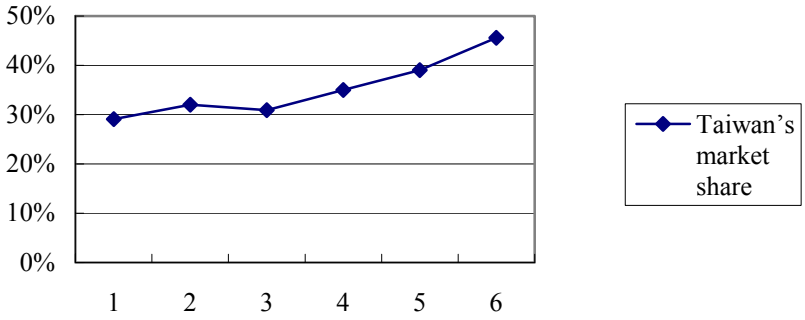
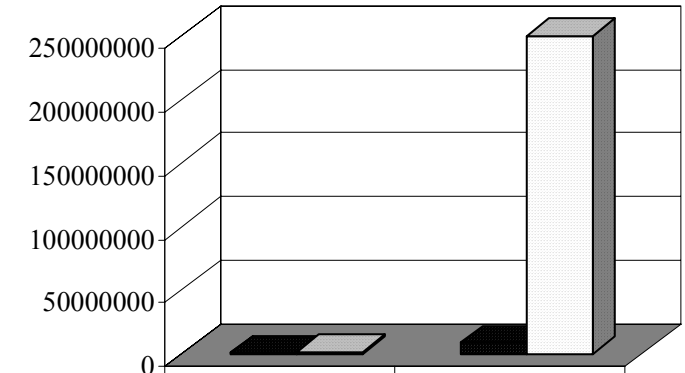


Figure 5.2 — Taiwan's market share in the global notebook market
Source: IDC, III, and MIC

The production units and production values of Taiwan PDA manufacturers showed a large increase in the year 2000. Figure 5.3 shows the growth of the production values of Taiwan PDA manufacturers in the year 2000 is three times greater than the year 1999.



	Production Units	Production Values
Year 1999	442000	8220000
Year 2000	1550000	250000000

Figure 5.3 — Production units and production values of the Taiwan PDA manufacturers in 1999 and in 2000

Source: Institute of Information Industry, 2001

Taiwan's smart handheld device (SHD) manufacturers have tripled the production values and the production units in 2000 as compared to 1999. We find the Taiwan SHD production values in 1999 are 82 million US $and in 2000 are 251M US dollars. Besides, the production units of the Taiwan SHD industry are 442,000 units in 1999 and 1,550,000 units in the year 2000.

6. IC Design Industry Profile

The Taiwan semiconductor industry has distinguished itself as a comprehensive industrial supply chain. The competitive advantage of the industry and the cluster effect of the channel members have made it famous in the world. The structure of semiconductor industry in Taiwan is comprehensive and has upstream, midstream, and downstream segments working cooperatively (Figure 6.1).

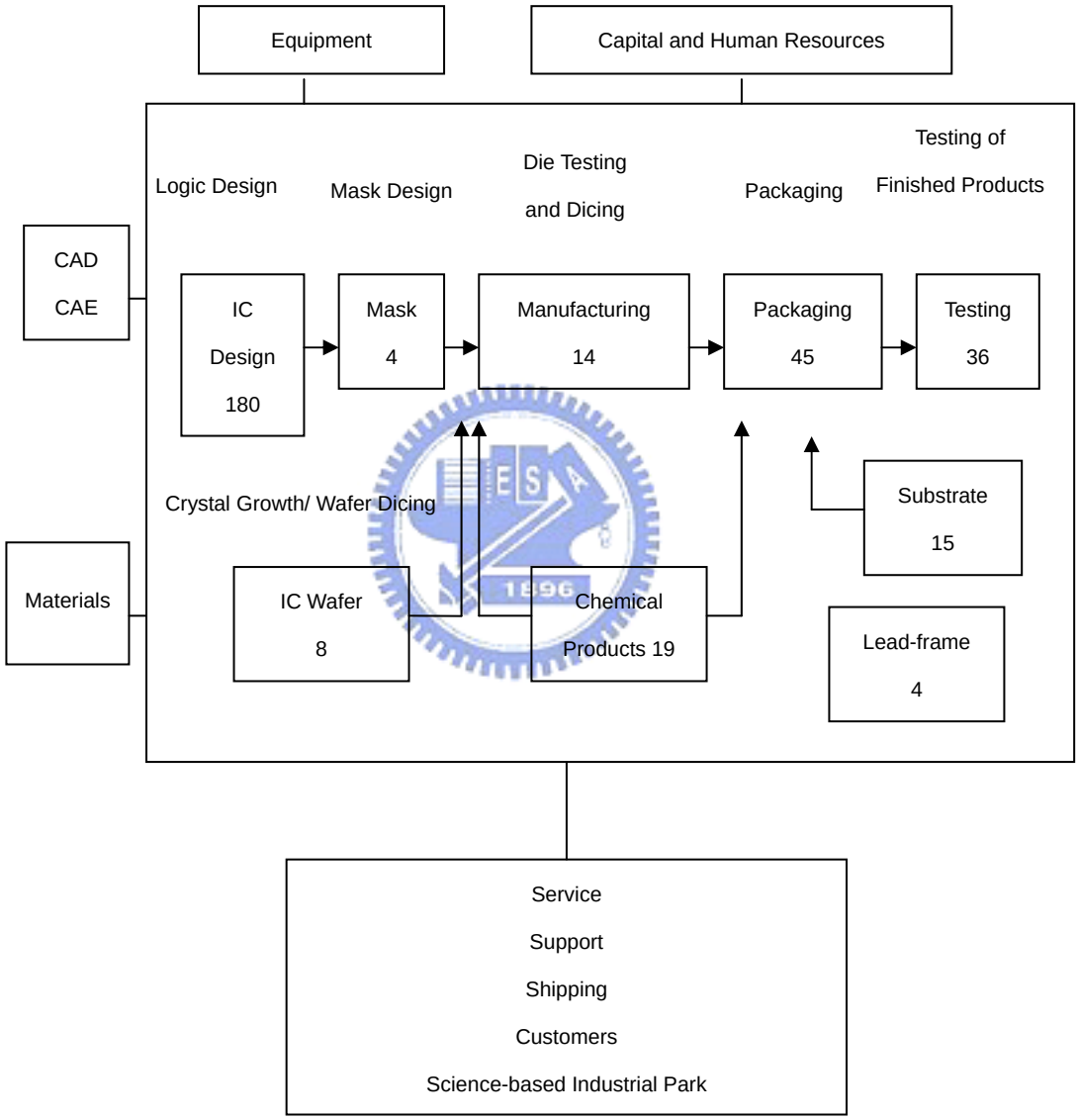


Figure 6.1 Structure of Taiwan Semiconductor Industry, ITRI, IEK (2003)

The increased manufacturing capacity in Asia, particularly in Taiwan, attributed to the success of the foundry model. Pure-play foundries supplied roughly 73 percent share of the worldwide market, with sales approaching US$10 billion in 2000. Mask ROM owns 56% of the global market share and IC packaging has 30.4% of the market share. Both are leaders in the global ranking. The IC Design Industry takes

26% of global market share following the leading country U.S.A. The global ranking of the manufacturing capability in Taiwan followed Japan and U.S.A. and is currently facing competition from China. Table 6.1 shows the competitive advantage of Taiwan's semiconductor industry in the global market. According to the report of ITRI IEK (2003), the 2002 revenue of the semiconductor industry in Taiwan reached $652.9 billion NT dollars. The revenue includes NT$147.8 billion for IC design, NT $ 378.5 billion for IC manufacturing, NT $94.8 billion for IC packaging, and NT $ 31.8 billion dollars for IC testing (Table 6.2). The high growth rate of the IC industry plays a key role in the economic development of Taiwan, and has established the industry's global position.

Table 6.1 Taiwan semiconductor industry's global market position

Product & Market Share	Global Market Share (%)	Global Ranking	Leading Country
Self Brand Name IC	5.5	4	U.S.A., Japan, Korea
DRAM	16.9	3	Korea, U.S.A.
SRAM	6.4	4	Japan, Korea, U.S.A.
Mask ROM	56.4	1	Taiwan
Design Industry	25.9	2	U.S.A.
Manufacturing Industry	7.4	4	U.S.A., Japan, Korea
Contract Manufacturing	72.9	1	Taiwan
IC Packaging Industry	30.4	1	Taiwan
Testing Industry	35.7	-----	-----
Manufacture Capabilities	14.7	3	Japan, U.S.A.

Data Source: ITRI, IEK (2003)

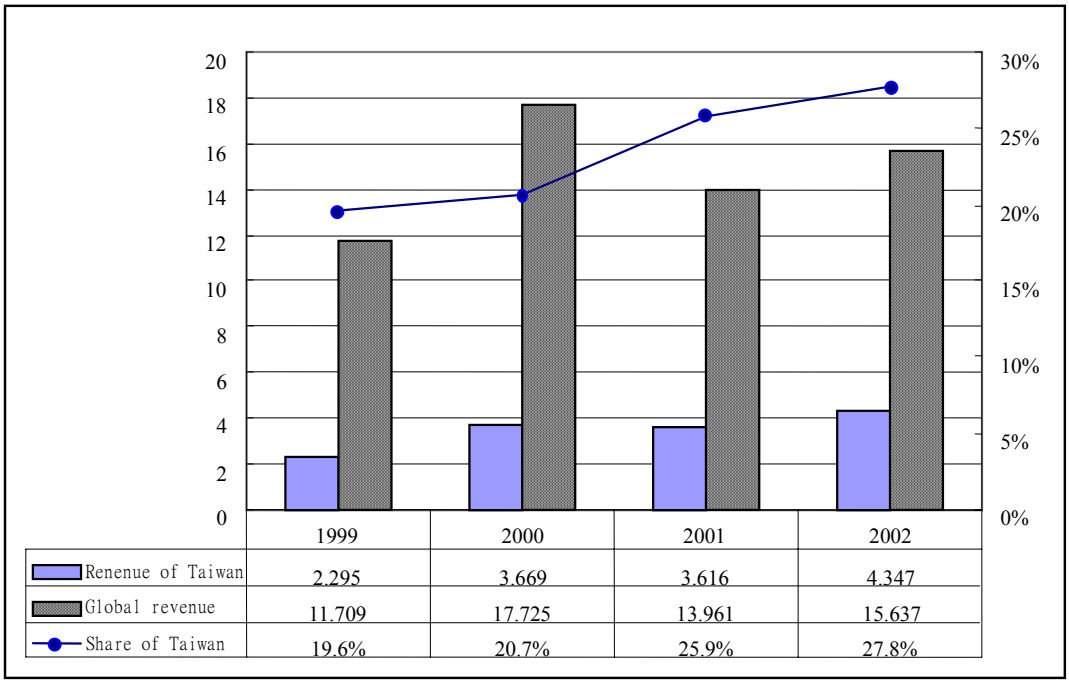
Table 6.2 Last five years revenue for Taiwan's semiconductor industry

Segment/Revenue (B NT$)	1998	1999	2000	2001	2002	2002/2001
Semiconductor Industry	283.4	423.5	714.4	526.9	652.9	23.9%
IC Design	46.9	74.2	115.2	122.0	147.8	21.1%
IC Manufacturing	169.4	264.9	468.6	302.5	378.5	25.1%
Foundry	93.8	140.4	296.6	204.8	246.7	20.5%
IC Packaging	54.0	65.9	97.8	77.1	94.8	23.0%
Taiwan IC Packaging	42.0	54.9	83.8	66.0	78.8	19.4%
IC Testing	13.1	18.5	32.8	25.3	31.8	25.7%
Total Market Value = Design +Manufacturing-Foundry	122.5	198.7	287.2	219.7	279.6	27.3%

Data Source: ITRI, IEK (2003)

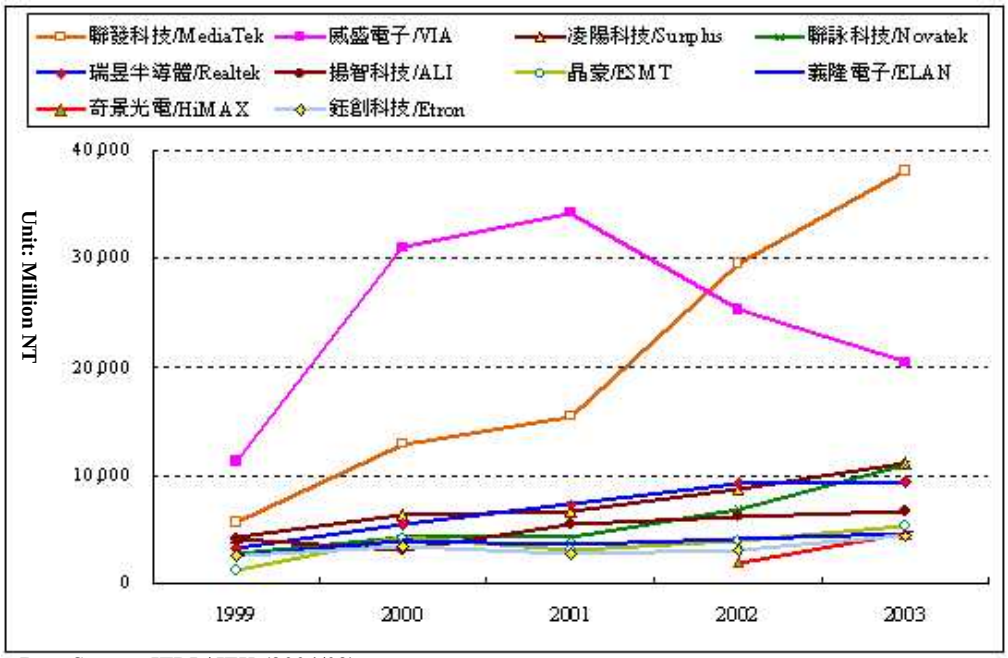
The revenue in 2002 of Taiwan integrated circuit (IC) design industry ranked second about 27.8 % in global market (ITIS, 2003). Table 6.2 showed the increasing ratio of global share. There are 180 IC design enterprises in the industry. MediaTek, VIA, Surplus, Novatek, RealTek, ALi, ESMT, ELAN, HiMAX, Etron are top 10 companies in the industry, and table 6.2 shows their revenue in recent five years from 1999 to 2003. IC-design industry in Taiwan has been prospering continuously thanks to various encouragement measures of the government and the support of auxiliary industries such as wafer processing, sealing, packing and testing.

Unit：$ Billion USD



	1999	2000	2001	2002
Renenue of Taiwan	2.295	3.669	3.616	4.347
Global revenue	11.709	17.725	13.961	15.637
Share of Taiwan	19.6%	20.7%	25.9%	27.8%

Figure 6.2 Market Share of Taiwan Fabless Designer in Global Market, ITRIEK-IT IS (2003/07)



Data Source: ITRI / IEK (2004/02)

Figure 6.3 Taiwan Top Ten IC Design Enterprises

In the end of 2002, the production value of Taiwan IC design industry was 147 billion NT$, with a growth rate of 21.1 % of the total production value in 2001. The growth rate predicted by ITIS for 2003 of IC design industry will be higher than 35% (Figure 6.4).

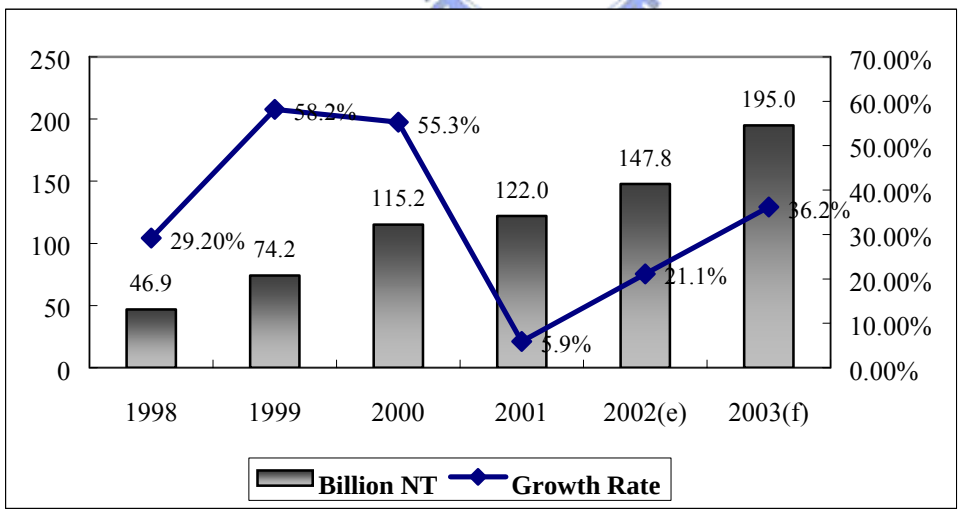


Figure 6.4 Revenue of Taiwan IC Design Industry, ITIS (2003/ 01)

IC Design industry is the up-stream in semiconductor industry, since its products must go through the process of polishing, production, sealing, packing and testing, and almost all the processes is handled by other corporations. In terms of processing, sealing, packing and testing at the last stage, products of IC design industry are now almost all outsource and processed in Taiwan (Table 6.3).

Table 6.3 Global Outsourcing Ratio of Taiwan IC Design Foundry

	In Taiwan	Singapore	Korea	North America	Other areas
1998	72.30%	24.90%	2.30%	0%	0.50%
1999	91.20%	5.80%	2.40%	0%	0.60%
2000	83.60%	1.90%	3.80%	9.90%	0.80%
2001	94.20%	1.00%	4.20%	0.00%	0.60%

Data Source：ITRI (2002. 3)

Over the past years, products of Taiwan IC-design industry have been chiefly applied in the field of information. In 1999 and 2001 applied in information and consumers products ranked Number One and Number Two among all kinds of products. Micro-components were the main products in IC design industry, accounted for 72.1% in 2001, while internal memory IC, logic IC, and analog IC covered the ratio about 16.3%, 7.5%, and 4.1% respectively (Table 6.4/ 6.5).

Table 6.4 Application of Product in Taiwan IC Design Industry

		Information	Communication	Consumer	Others	Total
Standard Product (ASSP)	1999	66.4%	11.5%	7.6%	0.7%	86.2%
	2000	62.9%	13.3%	9.6%	2.2%	88.0%
	2001	64.0%	11.5%	14.7%	1.7%	91.9%
Specific Customer (ASIC)	1999	2.7%	1.6%	9.3%	0.1%	13.7%
	2000	2.7%	2.3%	6.4%	0.6%	12.0%
	2001	1.7%	2.6%	3.3%	0.5%	8.1%
Total	1999	69.1%	13.1%	16.9%	0.8%	100.0%
	2000	65.6%	15.6%	16.0%	2.8%	100.0%
	2001	65.7%	14.1%	18.0%	2.2%	100.0%

Data Source：ITRI (2002.3)

Table 6.5 Taiwan IC Design Products

		Memory	Micro component	Logic	Analog	Total
Ratio (%)	1999	19.7%	67.4%	9.4%	3.5%	100.0%
	2000	24.0%	63.9%	8.8%	3.3%	100.0%
	2001	16.3%	72.1%	7.5%	4.1%	100.0%

Data Source：ITRI (2002.3)

7. Results and Catalog Analysis

The use of web sites and e-mail is different between small, medium, and large companies in Automobile Component and Assembly Industry (Figure7.1). As expected, few small companies are using computers for e-mail (about 5%) and only 2% have web sites. Only 25% of the medium size companies use e-mail but 12% of these companies have web sites (in particular those companies that produce electromechanical devices). The large companies are using e-mail and web sites but their usage level is still less than one third of the overall total of companies covered by the survey.

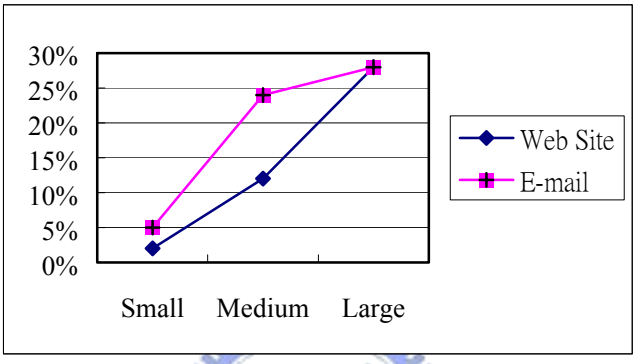


Figure 7.1 —E-mail and Web Site Usage by Company Size of Automobile Industry

7.1 The Analysis of Company Paper Catalog and E-Catalogs - Automobile Component and Assembly Industry

One hundred and two companies particicipated in a research study to have their paper catalogs evaluated. Of these 102 companies with paper catalogs, 39 also had catalogs on-line. Using the sample of 39 companies, statistics were generated to compare paper catalogs to the corresponding web-site catalogs. The objective of the research is to evaluate the following:

Are there differences in the number of categories between paper catalogs and website catalogs?

Are there any differences in the number of SKUs displayed in paper catalogs compared to the website catalogs?

Are there differences in the number of brand names used in paper catalogs compared to website catalogs?

Are there differences in the number of illustrations used in paper catalogs compared to website catalogs?

7.1.1 Product Categories in Paper Catalogs Compared to On-line Catalogs

In this analysis, the sample of companies that have both paper catalogs and web-site catalogs are studied. Let μ_1 and μ_2 represent the means of categories in paper catalogs and website catalogs, respectively.

1. H_0: $\mu_1 \leq \mu_2$
2. H_1: $\mu_1 > \mu_2$
3. $\alpha = 0.05$
4. From Table 7.1, P= 0.01842 < 0.05
5. Decision: Reject H_0. The data show that the number of categories in paper catalogs is greater than that in website catalogs (Figure 7.2).

Table 7.1 — Difference in categories between paper catalogs and website catalogs

	F18 (Catalog Categories)	F34 (Web Categories)
Mean	61.12820513	26.12820513
Variance	9403.588394	1177.851552
Numbers	39	39
Pooled variance	5290.719973	
Assumed mean difference	0	
df.	76	
t	2.124848458	
P(T<=t) single tail	0.018424968	
Cr. Pt.：single tail	1.665150648	
P(T<=t) double tail	0.036849935	
Cr. Pt.：double tail	1.991675163	

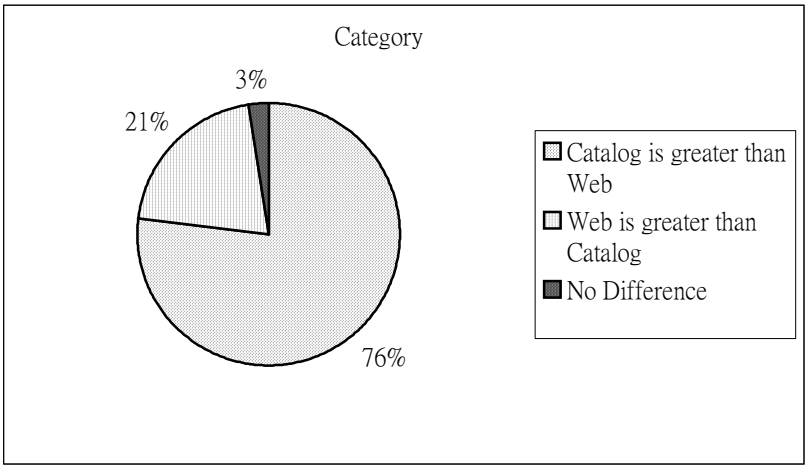


Figure 7.2 — Pie Chart Comparing Categories in Catalogs and on Web-sites of Automobile Industry

7.1.2 The Number of SKU's in Paper Catalogs compared to the Number of SKU's in Website Catalogs

Let μ_1 and μ_2 represent the means of SKUs in paper catalogs and website catalogs, respectively.

1. H_0: $\mu_1 - \mu_2 = 0$
2. H_1: $\mu_1 - \mu_2 \neq 0$
3. $\alpha = 0.05$
4. From Table 7.2, P= 0.82633>0.05

4.Decision: Fail to reject H_0. Below the 95% significant level, we are unable to conclude that the mean number of SKUs in paper catalogs and website catalogs are different (Figure 7.3).

Table 7.2 — Difference in SKUs between paper catalogs and website catalogs

	F19 (Catalog SKUs)	F35 (Web SKUs)
Mean	448.025641	376.4615385
Variance	1535871.762	2584746.939
Numbers	39	39
Pooled variance	2060309.351	
Assumed mean difference	0	
df.	76	
t	0.220164006	
P(T<=t) single tail	0.413166877	
Cr. Pt.：single tail	1.665150648	
P(T<=t) double tail	0.826333755	
Cr. Pt.：double tail	1.991675163	

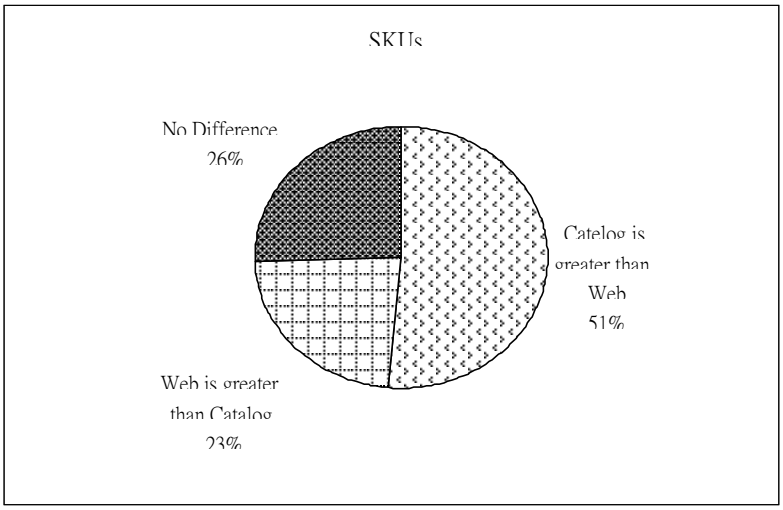


Figure 7.3 —Pie Chart of SKUs in Catalogs and on Websites of Auto. Industry

7.1.3 The Number of Brand Names in Paper Catalogs versus the Number of Brand Names Used in Website Catalogs

Let μ_1 and μ_2 represent the means of brand names in paper catalogs and website catalogs, respectively.

1. H_0: $\mu_1 - \mu_2 = 0$
2. H_1: $\mu_1 - \mu_2 \neq 0$
3. $\alpha = 0.05$
4. From Table 7.3, P= 0.91526 >0.05
5. Decision: Fail to reject H_0. Below the 95% significant level, we are unable to conclude that the means for brand names in paper catalogs and for web catalogs are different (Figure 7.4).

Table 7.3 — Difference in brand names between paper catalogs and website catalogs

	F21 (Catalog Brand Name)	F39 (WebBrand Name)
Mean	0.512820513	0.487179487
Variance	0.519568151	1.730094467
Numbers	39	39
Pooled variance	1.124831309	
Assumed mean difference	0	
df.	76	
t	0.106760107	
P(T<=t) single tail	0.457630305	
Cr. Pt.：single tail	1.665150648	
P(T<=t) double tail	0.91526061	
Cr. Pt.：double tail	1.991675163	

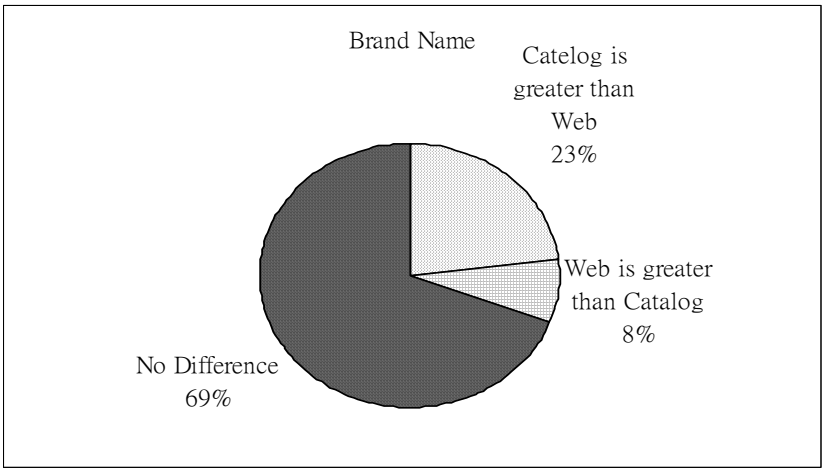


Figure 7.4 —Pie Chart of Brand Names in Catalogs and on Websites

7.1.4 Illustrations in Paper Catalogs Versus Illustrations in Website Catalogs

Let μ_1 and μ_2 represent the mean number of illustrations in paper catalogs and website catalogs, respectively.

1. H_0: $\mu_1 - \mu_2 = 0$
2. H_1: $\mu_1 - \mu_2 \neq 0$
3. $\alpha = 0.05$
4. From Table 7.4, P = 0.35875 > 0.05
5. Decision: Fail to reject H_0. Below the 95% significant level, we are unable to conclude that the mean number of illustrations in paper catalogs compared to web catalogs are different (Figure 7.5).

Table 7.4 — Difference in numbers of illustrations between types of catalogs

	F23 (Catalog Illustrations)	F39 (Web Illustrations)
Mean	63.51282051	182.9230769
Variance	7072.309042	645196.4939
Numbers	39	39
Pooled variance	326134.4015	
Assumed mean difference	0	
df.	76	
t	- 0.923337833	
P(T<=t) single tail	0.179376701	
Cr. Pt.：single tail	1.665150648	
P(T<=t) double tail	0.358753402	
Cr. Pt.：double tail	1.991675163	

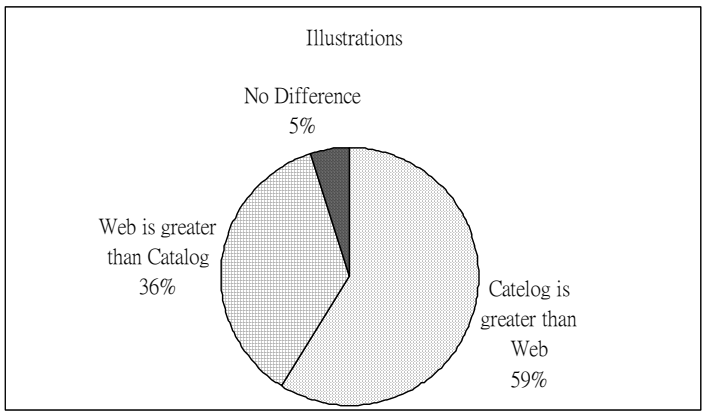


Figure 7.5 — Difference in Numbers of Illustrations between Paper Catalogs and Website Catalogs of Automobile Industry

Conclusion

There is a significant difference in the number of product categories described in paper catalogs versus on-line website catalogs. The number of product categories in

paper catalogs is significantly greater than the number in website catalogs (P= 0.02).
The data do not show a difference in the number SKUs in paper catalogs compared to website catalogs.
The data do not show a difference in the number of brand names used in paper catalogs compared to website catalogs.
The data do not show a difference in the number of illustrations used in paper catalogs compared to website catalogs.
Paper-based catalogs from 102 companies were collected for analysis. Among these 102 companies with paper catalogs, 39 companies also publish catalogs on-line. Using the sample of 39 companies, statistics were generated to compare paper catalogs to the corresponding web-site catalogs using a 95% significance level. The objective of the research is to evaluate the differences in the number of categories, SKUs, brand names, and illustrations used between paper catalogs and website catalogs.

There is a significant difference in the number of product categories described in paper catalogs versus on-line website catalogs. The number of product categories in paper catalogs is significantly greater than the number in website catalogs ($p = 0.02$). The data do not show a difference in the number of SKUs in paper catalogs compared to website catalogs ($p = 0.83$). Further, data do not show a difference in the number of brand names used in paper catalogs compared to website catalogs ($p = 0.91$), and there is no difference in the number of illustrations used in paper catalogs compared to website catalogs ($p = 0.36$).

The structure of this industry sector's paper catalogs, the way the products are ordered and displayed, and the ranking of catalogs are also studied. The results show that 54% of the catalogs in the sample have company mission statements, that 53% of the catalogs included a statement about the company history, and 46% of the catalogs have company awards or certification lists. Furthermore, 99% of the catalogs clearly show product categories which are used to attract buyers' attention to their manufacturing specialties. On the other hand, only 38% of the catalogs have product SKUs, indicating that too few companies are in a position to sell parts directly to a wider market.

The research showed that 95% of the paper catalogs have product illustrations, and almost every product category has at least one product illustration. In terms of language, 54% of the catalogs are in both English and Chinese indicating that half of the Taiwan automobile parts companies are actively targeting the international market. But 14% of the companies in this sector only target the local market with Chinese language catalogs. We also found that most Taiwan automobile parts companies' use

both Chinese and English, and some Taiwan automobile part companies are Japanese owned and their catalogs tend to use Japanese as well as English.

Analysis 82% of the returned paper catalogs display products by part categories, 8% of the catalogs display products by car model, and 6% of the companies do not display their products. Furthermore, it was determined that 64% of the returned catalogs do not use product dimensions or descriptions, and only one-third of the companies have identifiable SKUs in their company catalogs. Obviously, there is a need for standardized catalog content so that more companies can use Internet market places for global sales.

In total, about 35 companies have 0 to 10 product categories; 20 companies have 21 to 30 product categories; and 18 companies have 10 to 20 product categories. Thus, the overall number of product categories for the industry sector is below 30. In terms of stock keeping units, 80 companies have 0 to 100 product SKUs, and 10 companies have 101 to 200 product SKUs. Since most of the companies manufacture parts based on the hub companies' requirements and its relation to the C-S system, there are few SKUs. In addition, many of the companies are not using SKUs in their catalogs. The benchmark statistic shows that each company catalog has approximately 200 SKUs and 36 product categories.

The present nature of Taiwan automobile components and assembly industry clearly shows that this industry is OEM-oriented. As such, most of the companies do not have their own brands, and from the 80 catalogs of the total samples did not have brand names for products. Without brand names and without SKUs, the catalogs are used to show manufacturing capability rather than parts for sale. Further analysis showed that 80 catalogs have 0 to 5 product dimensions and 20 catalogs average 6 to 10 product dimensions. About 37 companies have 0 to 10 product illustrations in their catalogs, and on average each product category has at least one illustration.

Based on the above analysis, a catalog ranking is derived. Catalogs are ranked according to how much information is presented. Seven attributes are examined, including the mission statement, history statement, award or certification announcement, product category list, product SKUs list, product illustrations, and catalog language. In analyzing these seven attributes, catalogs are graded into four groups: great, highly acceptable, hardly acceptable, and bad. The grading showed that 38% of the returned catalogs are great; about 16% of the returned catalogs are highly acceptable; about 8% of the returned catalogs are hardly acceptable and about 38% of the returned catalogs are very poorly constructed.

Under the C-S system as Section 4.1 described, companies join the system and form supply chain relationship between enterprises in order to derive benefits from reduced purchase and production costs. The cooperative network is a good channel

for local industry to increase competitiveness and promote sales. The use of websites was described in Figure 1 and indicated that more than 70% of the companies in the industry are still without using the websites and e-mail. As the analysis in this section shows a high percentage of poorly constructed catalogs, we can conclude that enterprises can benefit from the usage of well-constructed e-catalogs. Most of the Taiwan enterprises are not gaining increased access to the global automobile supply chain. Global marketing strategies are necessary for the local enterprise in this new era. From the literature review, it was shown that the Internet website is a new market channel, and that the content of e-catalogs is very import to advertise the product and provide access new buyers. Obviously, the marketing strategy for Taiwan enterprises is to register in the C-S system and start building e-catalogs to increase sales.

7. 2 The Analysis of Company Catalogs and E-Catalogs - Electronics Industry

As part of the analysis, we studied the e-mail and website usage between groups of small, medium, and large size companies (Figure 7.6). The figure shows that the small and medium size companies are using fewer web sites and sending less e-mail than large size companies. The result is reasonable since large companies have more resources to develop their own e-content. Furthermore, as compared with website usage, more companies use e-mail for e-content publication due to its cost-effectiveness and global reach. Forty-nine companies answered our requests to send us paper catalogs for analysis. Of these 49 companies, 39 companies had both websites and paper catalogs. The data abstracted from the websites and the catalogs were compared to evaluate the following: the differences in the number of product categories, the number of SKUs displayed the usage of brand names and the illustrations used in paper catalogs and website catalogs.

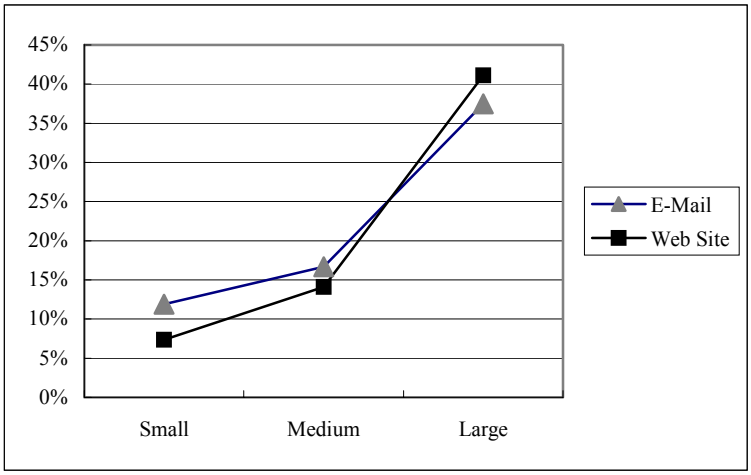


Figure 7.6 E-mail and Website usage by company size of Electronics Industry

Thirty-nine paper catalog categories versus 39 web catalog categories were tested for differences (with 95% significance level, P = 0.05) in electronics industry. There was a significant difference between the product categories (P = 0.034 < 0.05). Paper catalog SKUs versus web catalog SKUs (p = 0.34 > 0.05), paper catalog brand names versus. Web catalog brand names (p = 0.41 > 0.05), and paper catalog illustrations versus web catalog illustrations (p = 0.40 > 0.05) all failed to show significant differences.

In conclusion, there is a significant difference in the number of product categories described in paper catalogs versus on-line website catalogs. The number of product categories in paper catalogs is significantly greater than the number of categories shown in website catalogs. However, the data do not show a difference in the number of SKUs in paper catalogs compared to website catalogs or a difference in the number of brand names or illustrations used in paper catalogs compared to website catalogs.

7.2.1 Statistics Derived from Company Catalogs and Websites

Fourty nine companies particicipated in a research study to have their paper catalogs evaluated. Of these 49 companies, 39 companies have both websites and paper catalogs. The statistics from websites and catalogs were compared to evaluate the following:

(1). the differences in the number of categories between paper catalogs and website catalogs

(2). the differences in the number of SKUs are displayed in paper catalogs compared to website catalogs

(3). the differences in the number of brand names used in paper catalogs compared to website catalogs

(4). the differences in the number of illustrations used in paper catalogs compared to website catalogs

Paper Catalog Categories vs Web Catalog Categories (Paper catalogs: 39, rated websites: 39)

In this analysis, the sample of companies that have paper catalogs and websites were studied. The subset is studied to discern differences between catalogs and websites for the electronics industry researches.

Let μ_1 and μ_2 represent the means of categories in paper catalogs and website catalogs, respectively.

1. H_0: $\mu_1 - \mu_2 = 0$
2. H_1: $\mu_1 - \mu_2 \neq 0$

3. $\alpha = 0.05$
4. From Table 7.5, $P = 0.03489695 < 0.05$
5. Decision: Reject H_0. We are able to conclude that the mean number of categories for paper catalogs and website catalogs are different (Figure 7.7).

Table 7.5 — Difference in categories between paper catalogs and website catalogs

	F18 (Catalog Categories)	F34 (Web Categories)
Mean	15.86842105	9.564102564
Variance	298.5497866	36.35762483
Numbers	38	39
Pooled variance	165.705758	
Assumed mean difference	0	
df.	75	
t	2.148562961	
P(T<=t) single tail	0.017448479	
Cr. Pt.：single tail	1.665425771	
P(T<=t) double tail	0.034896958	
Cr. Pt.：double tail	1.992102625	

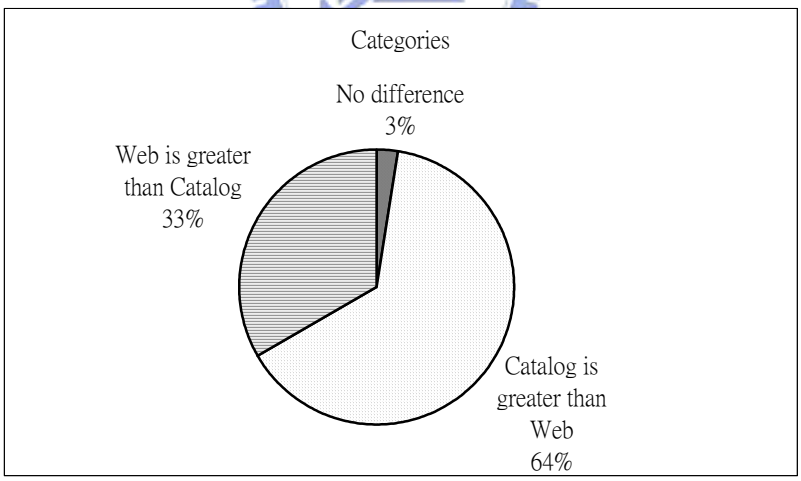


Figure 7.7 — Electronic Industry Pie Chart of Categories in Catalogs and on Websites

Paper catalog SKUs vs web catalog SKUs (Paper catalogs: 39, rated websites: 39)

Let μ_1 and μ_2 represent the mean number of SKU's in paper catalogs and website catalogs, respectively.

1. H_0: $\mu_1 - \mu_2 = 0$
2. H_1: $\mu_1 - \mu_2 \neq 0$
3. $\alpha = 0.05$

4. From Table 7.6, P = 0.673578>0.05
5. Decision: Fail to reject H_0. Given the 95% significance level, we are unable to conclude that the mean number of SKUs in paper catalogs and for web catalogs are different (Figure 7.8).

Table 7.6 — Difference in SKUs between paper catalogs and website catalogs

	F19 (Catalog SKUs)	F35 (Web SKUs)
Mean	75.15384615	85.35897436
Variance	11501.39676	11211.39406
Numbers	39	39
Pooled variance	11356.39541	
Assumed mean difference	0	
df.	76	
t	-0.422878415	
P(T<=t) single tail	0.336789064	
Cr. Pt.：single tail	1.665150648	
P(T<=t) double tail	0.673578128	
Cr. Pt.：double tail	1.991675163	

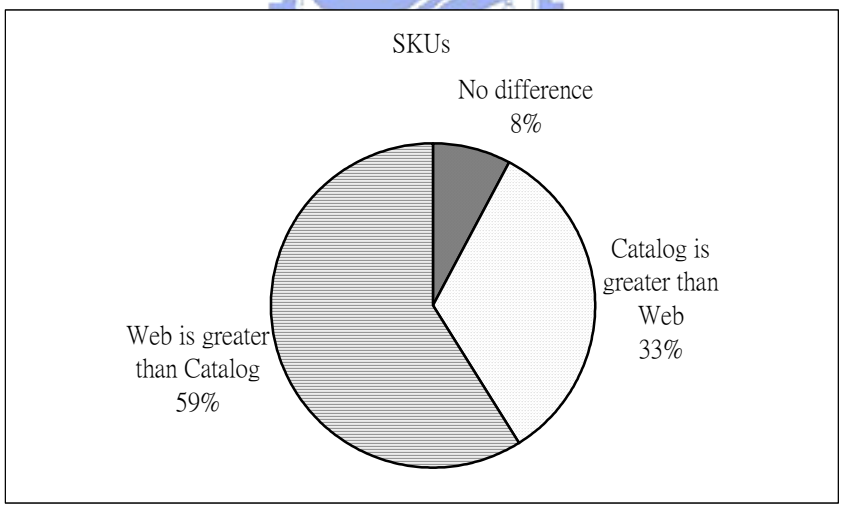


Figure 7.8 — Electronics Industry Pie Chart of SKUs in Catalogs and on Websites

Paper catalog brand names vs web catalog brand names (Paper catalogs: 39, rated websites: 39)

Let μ_1 and μ_2 represent the mean number of brand names in paper catalogs and website catalogs, respectively.

1. H_0: $\mu_1 - \mu_2 = 0$
2. H_1: $\mu_1 - \mu_2 \neq 0$

3. $\alpha = 0.05$
4. From Table 7.7, P = 0.828687151>0.05
5. Decision: Fail to reject H_0. Given the 95% significance level, we are unable to conclude that the mean number of brand names in paper catalogs and for web catalogs are different (Figure 7.9).

Table 7.7 — Difference in brand names between paper catalogs and website catalogs

	F21 (Catalog Brand Name)	F37 (Web Brand Name)
Mean	0.58974359	0.615384615
Variance	0.300944669	0.24291498
Numbers	39	39
Pooled variance	0.271929825	
Assumed mean difference	0	
df.	76	
t	-0.217132222	
P(T<=t) single tail	0.414343575	
Cr. Pt.：single tail	1.665150648	
P(T<=t) double tail	0.828687151	
Cr. Pt.：double tail	1.991675163	

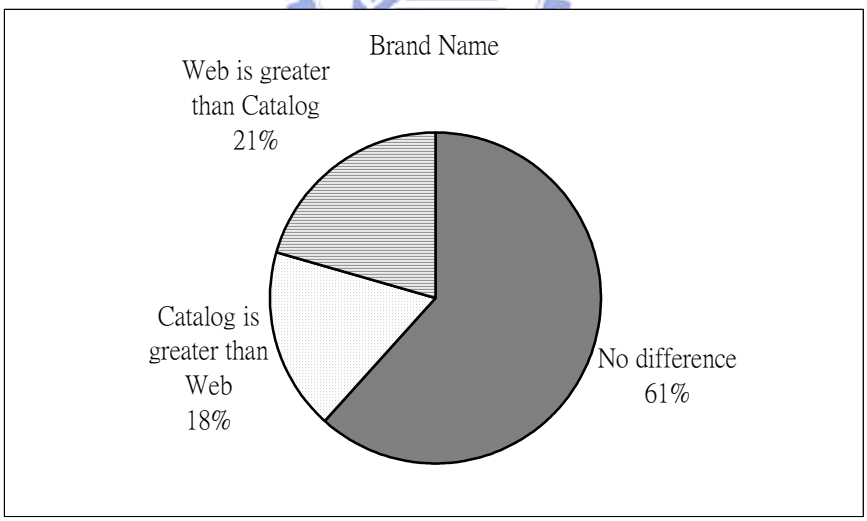


Figure 7.9 — Electronics Industry Pie Chart of Brand Names in Catalogs and on Websites

Paper catalog illustrations vs web catalog brand names (Paper catalogs: 39, rated websites: 39)

Let μ_1 and μ_2 represent the means of illustrations in paper catalogs and website catalogs, respectively.

1. H_0: $\mu_1 - \mu_2 = 0$
2. H_1: $\mu_1 - \mu_2 \neq 0$
3. $\alpha = 0.05$
4. From Table 7.8, P = 0.804468>0.05
5. Decision: Fail to reject H_0. Given the 95% significance level, we are unable to conclude that the mean number of illustrations in paper catalogs and for web catalogs are different (Figure 7.10).

Table 7.8 — Difference in illustrations between paper catalogs and website catalogs

	F23 (Catalog Illustrations)	F39 (Web Illustrations)
Mean	92.82051282	83.92307692
Variance	37499.83536	12523.12551
Numbers	39	39
Pooled variance	25011.48043	
Assumed mean difference	0	
df.	76	
t	0.248434825	
P(T<=t) single tail	0.402234036	
Cr. Pt.：single tail	1.665150648	
P(T<=t) double tail	0.804468072	
Cr. Pt.：double tail	1.991675163	

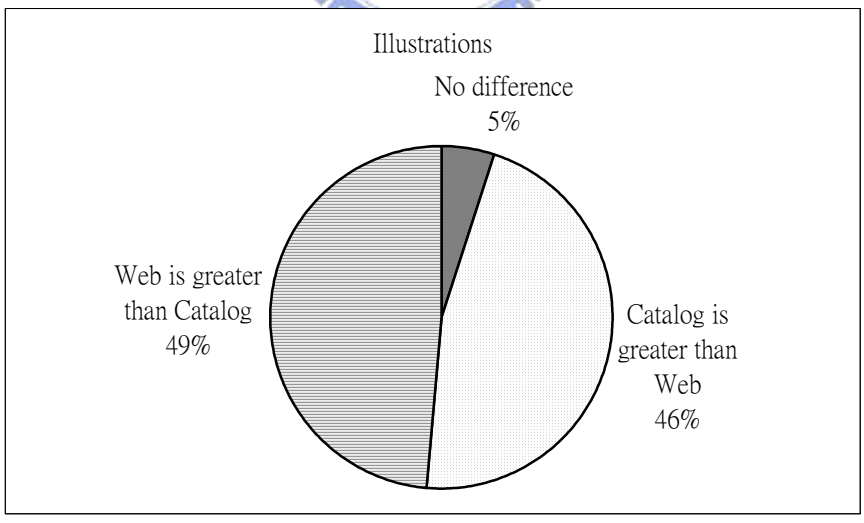


Figure 7.10 — Electronics Industry Pie Chart of Illustrations in Catalogs and on Websites

Conclusion

There is a significant difference in the number of product categories described in paper catalogs versus on-line website catalogs. The number of product categories in

paper catalogs is significantly greater than the number in website catalogs.
The data do not show a difference in the number of SKUs in paper catalogs compared to website catalogs.
The data do not show a difference in the number of brand names used in paper catalogs compared to website catalogs.
The data do not show a difference in the number of illustrations used in paper catalogs compared to website catalogs.

7.2.2 Catalog Analysis for Electronics Industry

We use the catalogs and websites of companies that produce notebooks, PDAs, and computer cables to derive statistics for analysis. The three industry sectors are discussed in regards to category numbers, SKUs (Stock Keeping Units) numbers, brand names, product dimensions, languages, illustrations, and company manufacturing types. These dimensions are then used to describe the catalogs' level of acceptability.

7.2.3 Analysis of Taiwan Notebook and PDAs Manufacturers Catalogs

After collecting the catalogs of 17 large companies that produce notebooks and PDAs, data were collected from the firm's paper catalogs as well as their website catalogs. After coding and processing the raw data, the following results were derived. First, notebook and PDA manufacturers classify their product into series or number groups that differentiate the groups based on a specific market attribute. In every group or series, there are differences that allow the customer to choose between attributes such as CPU type or RAM size. The same holds true for PDA products and series. Only very large firms such as Acer and SUS have more than 30 SKUs for notebooks and PDAs. Most companies have about 10 SKUs for notebooks and PDAs. Second, the product categories and dimensions are used to describe the product futures and the manner displayed in the catalogs is very similar between companies. The frequency counts for product categories are shown in 31% in one category, two categories 25% three categories 6% four categories 13% five categories 6% six categories 19%. Third, the number of product dimensions for the sample catalogs range between 10 to 30, and most catalogs use about 20 dimensions to describe their products. About half of the firms use their own brand names whereas the other halves are OEM companies. One important observation is that all of the companies are OEM yet half also have their own brands, indicating that being an OEM does not restrict the creation of brands.

More than half of the companies use English language catalogs with no Chinese. Thirty-eight percent use English and Chinese to introduce their products and 6% of the sample use English, Chinese and Japanese. Finally, we observe how many illustrations are used in the catalogs. The results show that most of the catalogs show illustrations according to the series of products. From the statistics, we see that most companies have less than 10 illustrations.

7.2.4 Analysis of Taiwan Computer Cable Manufacturers Paper Catalogs

We focus on companies that produce cables and study the way they manage their catalogs. Of the returned catalogs collected for this research, 30 were cable manufacturers. We found that most of Taiwan's cable manufacturers are OEM companies 90% of the 30 cable manufacturers that responded are OEM and 10% are both OEM and ODM. There are 97% of the companies do not have owned their brand name products and only 3% have one brand name. The data showed that 77% of the 30 cable manufacturer respondents are international companies and have factories abroad and the remaining 23% are local companies.

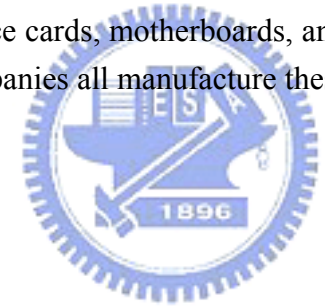
In regards to the way products were displayed, we compared the product categories, product SKUs, product illustrations, and catalog languages and so on. In the study about 63% of the cable manufacturers declare their company mission statements in the catalog and 37% do not. Thirty percent of the cable manufacturers introduce their company history and 70% do not. About 57% of Taiwan's electronics industry companies hold international awards and certifications and display their special awards and certifications in their catalogs. The catalog language used by Taiwan cable manufacturers is predominantly both English and Chinese. The second language of preference is English. Sixty-eight percent of the catalogs are published in English and Chinese and 27% are in English. Other catalog languages are Japanese and English or Japanese, English, and Chinese. It appears that Taiwan's cable manufacturers do not use dimensions to introduce products. The data shows that only 43% of the sample catalog display product's dimensions. Generally speaking, there are not many product categories in the cable industry. Based on a sample of 30 companies, most have less than 20 product categories. We shows that 22 companies have less than ten product categories, 4 companies have eleven to twenty, and about 3 companies have thirty-one to forty product categories. We also found that there are few product dimensions used by the cable industry. Among the sample catalogs, 20 companies have less than five product dimensions and 8 companies have six to ten product dimensions. Only 2 companies have over 10 product dimensions

The cable manufacturers that illustrate their products with the pictures are also few. Half of the sample catalogs use less than 40 pictures. We find the product illustration

numbers in the catalogs. Thirteen of the catalogs use no more than twenty pictures, 8 of them use twenty-one to forty pictures and 6 have forty-one to one hundred pictures. Only 3 companies use more than 101 pictures to display their products. The products SKUs for the cable industry are also limited. Most of the manufacturers have less than 100 SKUs of products. Among the sample, 10 companies have less than twenty SKUs, 6 companies have twenty-one to forty SKUs, 4 companies have sixty-one to eighty, and 1 company has eighty to one hundred SKUs. Four companies have over 101 SKUs.

7.2.5 Production Relationships between Companies

From the result of product categories derived product frequencies, it is clear that only large size companies have the resources and technology to manufacture notebooks. However, the large size companies outsource parts manufacturing mostly to small size companies. However, medium size companies have fewer important product categories than large and small size companies. Most medium size companies in this industry manufacture interface cards, motherboards, and desktop PCs. Actually, large, medium, and small size companies all manufacture these three products (Figure 7.11).



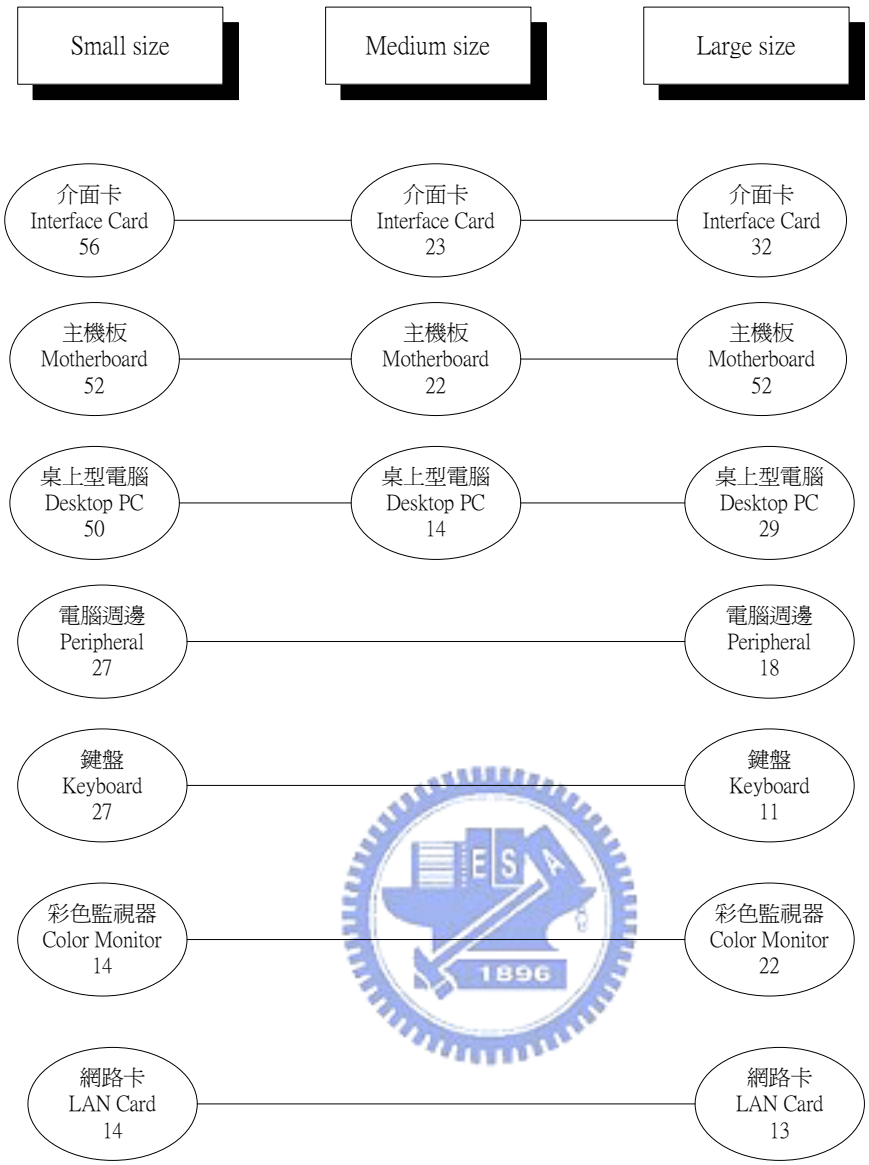


Figure 7.11 — Production relationships between different size companies in the Taiwan computer and peripherals industry

7. 3 The Analysis of Company Paper Catalogs and E-Catalogs – IC Design Industry

After investigating the websites in Taiwan IC Design Industry, the adoption of website is in the same status with overall Taiwan semiconductor industry. Most of the websites are in the "Promotion Stage" in this segment industry (Peng, Trappey, & Liu, 2004).

Table 7.9 Websites condition of IC Design industry in Taiwan

		Presence	Interaction	Transaction
Websites	152 / 84.4%	1 / 0.6%	101 / 56.1%	50 / 27.8%
W/O Websites	28 / 15.6 %	-----		
Total	180			

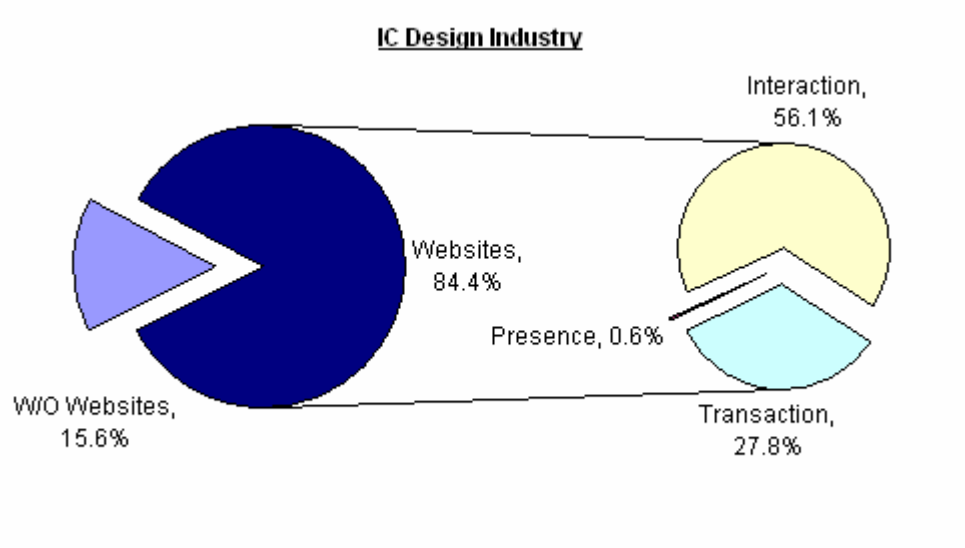


Figure 7.12 Websites classifications of IC Design industry in Taiwan
Source: Peng, Trappey, Liu, 2004

The IC design industry consists of 180 enterprises in Taiwan, about one fourth of the all design houses in the world, and 152 enterprises (84.4%) have their own websites. Using the e-commerce website classification schema code, there are 101 companies (56.1%) in the provision stage, 50 websites (27.8%) in the processing stage, and only one company (0.6%) in the promotion stage (Table 6.6/ Figure 6.5).

Twenty companies' paper catalog or company profiles are collected for analysis. Of these 20 companies, 2 companies were in the IC design industry. The data abstracted from the websites and the catalogs were compared to evaluate the following: the differences in the number of product categories, the number of SKUs displayed the usage of brand names and the illustrations used in paper catalogs and website catalogs.

Eighteen paper catalog categories versus 18 web catalog categories were tested for differences (with 90% significance level, $p = 0.1$) in IC design industry. There was no evidence to show significant difference between the product categories ($p = 0.16 > 0.1$). There was a significant difference between the paper catalog SKUs versus web

catalog SKUs ($p = 0.08 < 0.1$). Paper catalog brand names versus Web catalog brand names ($p = 0.67 > 0.1$), and paper catalog illustrations versus web catalog illustrations ($p = 0.95 > 0.1$) all failed to show significant differences.

In conclusion, there is a significant difference in the number of product SKUs described in paper catalogs versus on-line website catalogs. The number of SKUs in paper catalogs is significantly less than the number of SKUs shown in website catalogs. However, the data do not show a difference in the number of product categories in paper catalogs compared to website catalogs or a difference in the number of brand names or illustrations used in paper catalogs compared to website catalogs.

7.3.1 Statistics Derived from Company Catalogs and Websites

Eighteen IC design companies were evaluated in this research. The statistics from websites and catalogs were compared to evaluate the following:

(1). the differences in the number of categories between paper catalogs and website catalogs

(2). the differences in the number of SKUs are displayed in paper catalogs compared to website catalogs

(3). the differences in the number of brand names used in paper catalogs compared to website catalogs

(4). the differences in the number of illustrations used in paper catalogs compared to website catalogs

Paper Catalog Categories vs Web Catalog Categories (Paper catalogs: 18, rated websites: 18)

In this analysis, the sample of companies that have paper catalogs and websites were studied. The subset is studied to discern differences between catalogs and websites for the IC design industry researches.

Let μ_1 and μ_2 represent the means of categories in paper catalogs and website catalogs, respectively.

1. H_0: $\mu_1 - \mu_2 = 0$
2. H_1: $\mu_1 - \mu_2 \neq 0$
3. $\alpha = 0.1$
4. From Table 7.10, $p = 0.16 > 0.1$
5. Decision: Failed to reject H_0. We are not able to conclude that the mean number of categories for paper catalogs and website catalogs are different.

Table 7.10 — Difference in categories between paper catalogs and website catalogs

	Catalog Categories	Web Categories)
Mean	4.944444	4.055556
Variance	5.584967	11.11438
Numbers	18	18
Pearson coeff.	0.642506	
Assumed mean difference	0	
df.	17	
t	1.470722	
P(T<=t) single tail	0.079817	
Cr. Pt.：single tail	1.739606.	
P(T<=t) double tail	0.159634	
Cr. Pt.：double tail	2.109819	

Paper catalog SKUs vs web catalog SKUs (Paper catalogs:18, rated websites:18)

Let μ_1 and μ_2 represent the mean number of SKUs in paper catalogs and website catalogs, respectively.

1. H_0: $\mu_1 - \mu_2 = 0$
2. H_1: $\mu_1 - \mu_2 \neq 0$
3. $\alpha = 0.1$
4. From Table 7.11, $p = 0.076197 < 0.1$
6. Decision: Reject H_0. Given the 90% significant level, we can conclude that the mean number of SKUs in paper catalogs and for web catalogs are different.

Table 7.11 — Difference in SKUs between paper catalogs and website catalogs

	Catalog SKUs	Web SKUs
Mean	61.277778	78.77778
Variance	17304.21	15427.83
Numbers	18	18
Pearson coeff.	0.954329	
Assumed mean difference	0	
df.	17	
t	-1.88813	
P(T<=t) single tail	0.038099	
Cr. Pt.：single tail	1.739606	
P(T<=t) double tail	0.076197	
Cr. Pt.：double tail	2.109819	

Paper catalog brand names vs web catalog brand names (Paper catalogs:18, rated websites: 18)

Let μ_1 and μ_2 represent the mean number of brand names in paper catalogs and website catalogs, respectively.

1. H_0: $\mu_1 - \mu_2 = 0$
2. H_1: $\mu_1 - \mu_2 \neq 0$
3. $\alpha = 0.1$
4. From Table 7.12, p = 0.667577 > 0.1
5. Decision: Fail to reject H_0. Given the 90% significance level, we are unable to conclude that the mean number of brand names in paper catalogs and for web catalogs are different.

Table 7.12 Difference in brand names between paper catalogs and website catalogs

	Catalog Brand Name	Web Brand Name
Mean	0.722222	0.666667
Variance	0.212418	0.235294
Numbers	18	18
Pearson coeff.	0.350823	
Assumed mean difference	0	
df.	17	
t	0.437048	
P (T<= t) single tail	0.333789	
Cr. Pt.：single tail	1.739606	
P(T<= t) double tail	0.667577	
Cr. Pt.：double tail	2.109819	

Paper catalog illustrations vs web catalog brand names (Paper catalogs: 18 ated websites: 18

Let μ_1 and μ_2 represent the means of illustrations in paper catalogs and website catalogs, respectively.

1. H_0: $\mu_1 - \mu_2 = 0$
2. H_1: $\mu_1 - \mu_2 = 0$
3. $\alpha = 0.1$
4. From Table 7.13, p = 0.945565 >0.1
5. Decision: Fail to reject H_0. Given the 90% significance level, we are unable to conclude that the mean number of illustrations in paper catalogs and for web catalogs are different.

Table 7.13 Difference in illustrations between paper catalogs and website catalogs

	Catalog Illustrations	Web Illustrations
Mean	13.61111	13.22222
Variance	184.4869	552.3007
Numbers	18	18
Pearson coeff.	0.26602	
Assumed man difference	0	
df.	17	
t	0.069293	
P(T<= t) single tail	0.472783	
Cr. Pt.：single tail	1.739606	
P(T<= t) double tail	0.945565	
Cr. Pt.：double tail	2.109819	

Conclusion

There is a significant difference in the number of SKUs described in paper catalogs versus on-line website catalogs. The number of SKUs in paper catalogs is significantly lesser than the number in website catalogs.

The data do not show a difference in the number of product categories in paper catalogs compared to website catalogs.

The data do not show a difference in the number of brand names used in paper catalogs compared to website catalogs.

The data do not show a difference in the number of illustrations used in paper catalogs compared to website catalogs.

7.3.2 Catalog Analysis for IC Design Industry

The catalogs and websites of IC design companies were derived statistics for analysis in last section. The IC design companies are also discussed in regards to category numbers, SKU (Stock Keeping Unit) numbers, brand names, and illustrations. Unlike the automobile component and electronics industries, it is pretty hard to collect the paper catalog. Only twenty paper catalogs were collected through the help of many good friends described in the research method. Fifty-three product catalogs on the web were surveyed in the mean time. Actually there were two paper catalogs invalid of the twenty collected papers. At last 18 paper catalogs were compared with catalog on the web. There are different results with the previous two industries. There is a significant difference in the number of SKUs ($p = 0.07619$, $\alpha = 0.1$) not categories in

the IC design industry. Regards to the brandname and illustrations have the same results like the automobile component and electronics industry.

In order to find the reason of difference between IC desing industry and previous two industry some field interview were made. Media Tek owns the highest price in the stock market. Tony Feng the manager of Media Tek said that you can hardly find paper catalog in Media Tek. He could just find the annual report and gave me for reference. Their website is too simple to see any speciality of their product and promotion. Media Tek tries to provide total solution and it can't be shown in the tradition way of catalog. More interaction will be needed between engineer and customers. Such as system on chip (SOC), a lot of discussion should be done before the project. The paper catalog seems not so important in their business. Regards catalog on website is necessary to catch the pace of Internet and let their customer find them.

Sunplus and Elan are two top ten famous IC design companies. Their paper catalogs were foud completeness in twenty collected paper catalogs. The revenue of Sunplus is ranked third in IC design industry. Ping Huang is a senior specialist of customer service department at Sunplus. She described that this is the first year of their company to print completeness paper catalog. They used CD catalog more than five years. She found that paper catalog is the most convenient than CD catalog or catalog on web. Some of her customer prefer paper catalog in hand and can search all the related specification any time. Owing to the high delivery charge and inconvenient to customer, from 2004 the CD catalog will not be produced again. Sunplus sent paper catalogs to their 1400 old customers and got the good effect of the paper catalog. The paper catalog of Sunplus will be update one time per year and almost the same with catalog on the web. Catalog on the web is the cheapest way of showing their product. The web can put more detail pdf file, attract new customers anytime and anywhere, and can update any time to provide the new product and information. The customer of Sunplus can search their order on the web in near future of 2005. No further new catalog management system project will be executed in the next two years and without further analysis of the data about 5000 new visitors on the web. It is clear that paper catalog will not be replaced by catalog on the web in Sunplus now.

Dennis Liu public relationship manager of Elan said that Elan did't print paper catalog before 2004 just like other IC design companies. The paper catalog was well printed to join the exhibition show in March 2004 at Shang-Hai China. It's more convenient to introduce or deliver in the show than catalog on the computer. The part numbers in paper catalog are more than that on the web, because the future product was also placed on the paper catalog to promote in the exhibit show. Paper catalog can print product part number and the summary of specification. Nevertheless, catalog

on the web can put more detail in pdf file to enrich the content, and can revised anytime to show the new developed product real time easily. Paper catalog can't be replaced by catalog on the web. Paper catalog should be needed in some special situation such as customer visit, exhibit show, and seminar of new product ...etc. Catalog on the web can be accessed by new customer anytime anywhere. Two of them are complemenmtary in product promotion. Regard to the catalog management of Elan has a long way to go. The real problem is insufficient of resource. No one is fulltime to maintain and manage the catalog on the web. The effect should be better to invest more resource in catalog management.

Eric Jian a resaarcher of IC department at IEK ITRI observed that the paper catalog can be printed more dainty than catalog on the web. Some customerized product will not be shown on any types of catalog. Catalog on the web can attract new customer. That means some first contact via the Internet and e-mail. The formal visit should present a dainty paper catalog to the customer. All the engineer of customer can find part number through paper catalog and more detail information on the web. Some IC design companies gave a password to their familiar to get more data and some open their pdf or data to everyone. CD-ROM catalog is also a trend to use. Tangible catalog is still necessary in some situation especially face to face contact. In general, e-catalog will be the main stream in the Internet era but other types catalog paper catalog and CD-ROM can also play specific role.

7.4 The Analysis of E-Catalogs between Industries – Automobile Component and Assembly, Electronics, and IC Design Industry

This research compared the paper catalogs with e-catalogs of automobile component and assembly, electronics, and IC design industry seperately in this chapter. All the results were shown and discussed in chapter 7 and chapter 8. The analysis of e-catalogs between automobile component and assembly, electronics, and IC design industry were shown in the following sections to explore the use of e-catalogs by the three industries. Thirty-nine product catalogs on the website of the three industries were surveyed to compare the product categories, SKUs, brandname, and illustrations. The data were analyzed in statistics and uesd F-test to conclude the results in the following sections.

7.4.1 Comparison of Product Categories on Website

Let μ_1, μ_2, and μ_3 represent the means of categories in website catalogs of automobile component and assembly, electronics, and IC design industry respectively.

1. H_0: $\mu_1 = \mu_2 = \mu_3$

2. H_1: Not all the means are equal
3. $\alpha = 0.05$
4. From Table 7.14, df = (2, 114), F = 12.64355, p = 1.1E-05 < 0.05
5. Decision: Reject H_0. Given the 95% significance level, we conclude that the mean number of categories for web catalogs in different industries are different.

Table 7.14 Difference in Categories between industries of e-catalogs

Categories

Industry	NO.	Total	Mean	Variance
Auto.	39	1019	26.12821	1177.852
Electronics	39	373	9.564103	36.35762
IC design	39	159	4.076923	5.336032

ANOVA

Source of variance	SS	df	MS	F	p- value	Cr. pt
Between treatment	10279.59	2	5139.795	12.64355	1.1E-05	3.075854
Error (Within treatment)	46342.72	114	406.5151			
Total	56622.31	116				

Table 7.14.1 Categories ANOVA between autos & electronics industries of e-catalogs

Categories

Industry	No.	Sum.	Mean	Variance
Auto.	39	1019	26.12821	1177.852
Electronics	39	373	9.564103	36.35762

ANOVA

Source of Variance	SS	df	MS	F	p- value	Cr. pt
Between treatment	5350.205	1	5350.205	8.812658	0.004	3.966761
Within treatment	46139.95	76	607.1046			
Total	51490.15	77				

Table 7.14.2 Categories ANOVA between electronics and IC design industries of e-catalogs

Categories

Industry	No.	Sum.	Mean	Variance
Electronics	39	373	9.564103	36.35762
IC Design	39	159	4.076923	5.336032

ANOVA

Source of Variance	SS	df	MS	F	p- value	Cr. Pt
Between treatment	587.1282	1	587.1282	28.16391	1.07E-06	3.966761
Within treatment	1584.359	76	20.84683			
Total	2171.487	77				

Table 7.14.3 Categories ANOVA between IC design & autos industries of e-catalogs Categories

Industry	No.	Sum.	Mean	Variance
IC Design	39	159	4.076923	5.336032
Auto.	39	1019	26.12821	1177.852

ANOVA

Source of Variance	SS	df	MS	F	p- value	Cr. Pt
Between Treatment	9482.051	1	9482.051	16.02798	0.000144	3.966761
Within Treatment	44961.13	76	591.5938			
Total	54443.18	77				

7.4.2 Comparison of Product SKUs on Website

Let μ_1, μ_2, and μ_3 represent the means of SKUs in website catalogs of automobile component and assembly, electronics, and IC design industry respectively.

1. H_0: $\mu_1 = \mu_2 = \mu_3$
2. H_1: Not all the means are equal
3. $\alpha = 0.05$
4. From Table 7.15, df = (2, 114), F = 0.335197, p = 0.7159 > 0.05
5. Decision: Fail to reject H_0. Given the 95% significance level, we are unable to conclude that the mean number of SKUs for web catalogs in different industries are different.

Table 7.15 Difference in SKUs between industries of e-catalogs

SKUs

Industry	No.	Total	Mean	Variance
Auto.	39	3111	79.76923	27141.81
Electronics	39	3329	85.35897	11211.39
IC Design	39	2459	63.05128	8673.471

ANOVA

Source of variance	SS	df	MS	F	p- value	Cr. pt
Between treatment	10508.79	2	5254.393	0.335197	0.7159	3.075854
Error (Within treatment)	1787014	114	15675.56			
Total	1797523	116				

7.4.3 Comparison of Product Brandname on Website

Let μ_1, μ_2, and μ_3 represent the means of illustrations in website catalogs of automobile component and assembly, electronics, and IC design industry respectively.

1. H_0: $\mu_1 = \mu_2 = \mu_3$
2. H_1: Not all the means are equal
3. $\alpha = 0.05$
4. From Table 7.16, df = (2, 114), F = 12.7618, p = 9.97E-06 < 0.05
5. Decision: Reject H_0. Given the 95% significance level, we conclude that the mean number of brand name for web catalogs in different industries are different.

Table 7.16 Difference in Brand name between industries of e-catalogs

Brand name

Industry	No.	Total	Mean	Variance
Auto.	39	8	0.205128	0.167341
Electronics	39	24	0.615385	0.242915
IC Design	39	27	0.692308	0.218623

ANOVA

Source of variance	SS	df	MS	F	p- value	Cr. pt
Between treatment	5.350427	2	2.675214	12.7618	9.97E-06	3.075854
Error (Within treatment)	23.89744	114	0.209627			
Total	29.24786	116				

Table 7.16.1 Brand name ANOVA between autos & electronics industries of e-catalogs

Brand name

Industry	No.	Total	Mean	Variance
Auto.	39	8	0.205128	0.167341
Electronics	39	24	0.615385	0.242915

ANOVA

Source of	SS	df	MS	F	p- value	Cr. pt

variance						
Between treatment	3.282051	1	3.282051	16	0.000146	3.966761
Error (Within treatment)	15.58974	76	0.205128			
Total	18.87179	77				

Table 7.16.2 Brand name ANOVA between electronics and IC design industries of e-catalogs

Brand name

Industry	No.	Sum.	Mean	Variance
Electronics	39	24	0.615385	0.242915
IC design	39	27	0.692308	0.218623

ANOVA

Source of variance	SS	df	MS	F	p- value	Cr. pt
Between treatment	0.115385	1	0.115385	0.5	0.481663	3.966761
Error (Within treatment)	17.53846	76	0.230769			
Total	17.65385	77				

Table 7.16.3 Brand name ANOVA between IC design & autos industries of e-catalogs

Brand name

Industry	No.	Sum.	Mean	Variance
IC Design	39	27	0.692308	0.218623
Auto.	39	8	0.205128	0.167341

ANOVA

Source of variance	SS	df	MS	F	p- value	Cr. pt
Between treatment	4.628205	1	4.628205	23.98252	5.34E-06	3.966761
Error (Within treatment)	14.66667	76	0.192982			
Total	19.29487	77				

7.4.4 Comparison of Product Illustrations on Websites

Let μ_1, μ_2, and μ_3 represent the means of illustrations in website catalogs of automobile component and assembly, electronics, and IC design industry respectively.

1. H_0: $\mu_1 = \mu_2 = \mu_3$
2. H_1: Not all the means are equal

3. $\alpha = 0.05$

4. From Table 7.17, df = (2, 114), F = 1.322845, p = 0.270434 > 0.05

5. Decision: Fail to reject H_0. Given the 95% significance level, we are unable to conclude that the mean number of illustrations for web catalogs in different industries are different.

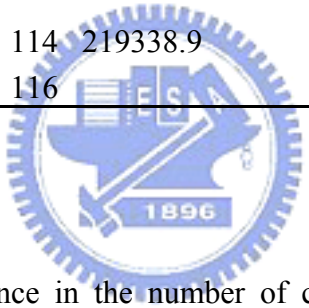
Table 7.17 Difference in Illustrations between industries of e-catalogs

Illustrations

Industry	No.	Total	Mean	Variance
Auto.	39	7134	182.9231	645196.5
Electronics	39	3273	83.92308	12523.13
IC Design	39	432	11.07692	297.0202

ANOVA

Source of variance	SS	df	MS	F	p- value	Cr. pt
Between treatment	580302.6	2	290151.3	1.322845	0.270434	3.075854
Error (Within treatment)	25004632	114	219338.9			
Total	25584935	116				



Conclusion

There is a significant difference in the number of categories described in on-line website catalogs between the three industries. Automobile component and assembly industry had the largest number of product category. IC design industry owned the least number of product categories in the three industries. The data do not show a difference in the number of SKUs in website catalogs between automobile component and assembly, electronics, and IC design industry. The data showed a significant difference in the number of brand names of website catalogs between automobile component and assembly, electronics, and IC design industry. IC design industry owned the highest numbers of brand name than the other industries. The data do not show a difference in the number of illustrations used in website catalogs between automobile component and assembly, electronics, and IC design industries.

7.4.5 E-Catalog Analysis for Automobile Component and Assembly, Electronics, and IC Design Industry

The e-catalog of automobile component and assembly, electronics, and IC design

industry were compared. This research found that the number of product categories has a significant difference ($F = 12.6$, $p = 1.1E\text{-}05 < 0.05$). ANOVA of each two industries were derived from Table 14.1 to Table 14.3. Table 14.1 showed the categories ANOVA between automobile component and assembly industry and electronics industry. A significant difference between the two industries ($F = 8.812658$, $p = 0.004 < 0.05$). The electronics and IC design industries also derived a significant difference ($F = 28.16391$, $p = 1.07E\text{-}06 < 0.05$). Regards to the IC design industry and automobile component and assembly industry got the same result ($F = 16.02798$, $p = 0.000144 < 0.05$). All the results showed that there is a significant difference between each two industries. Undoubtedly, there is a significant difference of categories between automobile component and assembly, electronics, and IC design industry. An automobile is composed by more than thousands of parts. It makes sense that the automobile component and assembly companies have the most number of product categories on the website than the other two industries.

Brand name also showed a significant difference ($F = 12.7618$, $p = 9.97E\text{-}06 < 0.05$) between automobile component and assembly, electronics, and IC design industry in ANOVA. Two of the industries were analyzed in ANOVA separately, too. Table 17.6.1 showed a significant difference ($F = 16$, $p = 0.000146 < 0.05$) of brand name between automobile component and assembly industry versus electronics industry. IC design industry and automobile component and assembly industry also had a significant difference ($F = 23.98252$, $p = 5.34E\text{-}06 < 0.05$). Regards to the electronics and IC design industries failed to reject H1 ($F = 0.5$, $p = 0.481663 > 0.05$) and showed that there were no difference in brand name between the two industries. In the observation of this study, it is reasonable for an IC design house much more needs to own a brand name than an automobile component company. There are upstream and downstream relationship between electronics and IC design industries. The result of no significant difference between the electronics and IC design industries is acceptable.

The other two analyses of SKUs and illustrations on e-catalogs were showed in Table 7.15 and Table 7.17. The data do not show a difference in the number of SKUs ($F = 0.335197$, $p = 0.7159 > 0.05$) and illustrations ($F = 1.3422845$, $p = 0.270434$) used in e-catalogs between automobile component and assembly, electronics, and IC design industry. Because of the peculiarity of Internet, product catalog on the website of each company can put all the SKUs and Illustrations on demand as they want. Thus, the results of no significant difference were understandable.

8. Discussion and Implication

From the advent of Internet, e-catalog is becoming a new marketing tool. This dissertation is trying to explore the use of e-catalogs by Taiwan industry. Taiwan Automobile component and assembly industry, electronics industry, and IC design industry were studied and discussed in this dissertation. Some summaries and comments of these three industries are described in this chapter.

8.1 Taiwan Automobile Component and Assembly Industry

The current state of catalog content for the transportation vehicle industry is as follows. The second state matched with the study of Chiger and Krap in 2003 that large companies likely locate more budgets to their website had both online and offline catalogs

1. Small and medium size companies are mostly OEM. These companies catalogs show company manufacturing specialties and the types (catagories) of products that they produce. Few small and medium size companies provide catalogs with clearly defined SKUs.
2. Large size companies produce catalogs with clearly defined SKUs. According to the survey conducted in this study, most large size companies have published both paper and electronic catalogs. Based on the statistical analysis of paper catalogs compared to electronic catalogs, the content does not differ significantly when comparing language types, the number of SKUs, the number of brand names, and the number of illustrations.
3. The statistics show there are about 600 small companies, 200 medium companies and 300 large companies. Based on estimations from the data, there are less than 50 SKUs per small company, 100 SKUs per medium company and 200 SKU's per large company. Given that less than one-third of the companies have identifiable SKUs in their company catalogs, the overall number of SKUs in this sector is less than 100,000 SKUs. Thus, the market value of e-catalog content is approximately one-half million US$ annually based on the unit price of US$5 per SKUs e-content creation.

Four key strategic issues are identified: market globalization, e-content quality, e-content convertibility, and alliance formation.

Taiwan's automotive part products have increasing potential due to market liberalization and global outsourcing. The industry must align with the trend and make its international presents known through e-catalogs.

According to the study of over 100 paper catalogs and 40 on-line catalogs, several problems were identified. Most catalogs suffer from non-standard part descriptions, errors in presentation and failure to use SKUs as a means to market and sell products.

Thus, the demand for high quality catalogs in both paper and electronic form is unsatisfied.

E-catalog creation and management must solve the above problems by enabling convertibility of content and providing a standard format based on SKUs. This study recommends the incorporation of standards and universally used code systems such as UNSPSC and the Schedule B Harmonized System for the industry's e-catalog initiative. Membership in organizations that set and derive standards is highly encouraged which is in accordance with Brooks argument that any company's successful e-commerce venture is getting its database in order and standardized in 2001.

Complete, high quality and convertible catalogs can only be effective when the content can be propagated through strategic alliances in marketplaces and enterprise procurement systems. Taiwan's automobile manufacturers, motorcycle manufacturers, and bicycle manufacturers should also participate in the creation and discussion of Chinese-to-English parts standards and e-marketplace development.

8.2 Taiwan Electronics Industry

According to the analysis of this study, the current status of catalog content for Taiwan's computer and peripherals industry are shown below:

All of the companies in this industry are OEM yet half also have their own brands. This fact indicates that being OEM does not restrict the creation of brands.

Large size companies use e-mail and websites more than medium and small size companies. They are capable of developing their own e-catalogs. Many companies have published both paper and electronic catalog it is in accordance with Brooks' argument. Some of the returned catalogs include e-catalogs. This indicates that many companies in this industry use CD-ROM as a tool to introduce themselves and to display products. The products are described in a highly acceptable way, since every company uses more than 10 dimensions to describe products.

Based on the results of the statistics, there are 488 small size companies, 156 medium size companies, and 248 large size companies in the Taiwan computer and peripherals industry. Thus, most companies in this industry sector are small and large size companies. Based on statistics of the association database, there are about 208 SKUs per large size company, 126 SKUs per medium size company, and 272 SKUs per small size companies. The market value of e-catalog content is approximately US$ 693,475 annually based on the unit price of US$ 5 per SKUs e-content creation.

From the statistics of the returned catalogs and website ratings, a SKU number is estimated for the computer cable industry sector. The estimated SKU number of each Taiwan computer cable manufacturer is 61. The overall number of SKUs in this sector

is about 54412 SKUs. The market value of e-catalog content is approximately US$ 272060 annually based on the unit price of US$ 5 per SKUs e-content creation.
The result of statistical analysis of paper catalogs compared to electronic catalogs, the content does not differ significantly when comparing SKUs, brand names, and illustrations. Also, there is a significant difference in the number of product categories between paper catalogs and electronic catalogs.

The following shows the current states that the Taiwan notebook, PDA, and computer cable manufacturers manage catalogs. According to the results of this study, it is clear that notebook is only manufactured by large size companies. The reason is that large size companies outsource parts to small size companies. However, medium size companies have fewer important product categories than large and small size companies. Most medium size companies in this industry manufacture interface cards, motherboards, and desktop PCs. Actually, large, medium, and small size companies all manufacture these three products.

Every company has few products in their catalogs and only includes notebooks and SHDs. The maximum number of SKUs is 29 and most companies' SKUs less than 10. Most companies have about 10 SKUs for notebooks and SHDs, while Acer and ASUS have more than 30 SKUs. Because the life cycle for high-tech products such as notebooks and PDAs are quite short, notebook and PDA manufacturers do not display all their products in catalogs. They tend to display current products.
Notebooks and PDAs are viewed as finished products, so the way to count the SKU number is to differentiate products based on the CPU types, LCD types, and RAM sizes. For example, CLEVO 2700C has several SKUs. The CPU types for the CLEVO 2700C are PIII 866 MHz, PIII 1GHz, and PIII 933 MHz.

The Taiwan computer cable industry does not have many SKUs and the companies in this industry do not illustrate and display their products very well. Also, some companies do not display products with dimensions, so it is hard for buyers to know if this product item is the one they are looking for. The product categories and product dimensions are also poorly described. Most of the product SKUs and product illustrations are less than 20. There are several results regarding to Taiwan's notebook, PDA, and computer cable industry.

The product descriptions are not user-friendly. Take the "notebook" for example. According to the definition of HS Code, "notebook" stands for portable digital automatic data processing machines, and "notebook" is used in Taiwan market for this product description. But there are some other synonyms such as hand-held computer, laptop computers, and pocket computers used in the international market. It means that foreign customers will be confused because of non-standard product descriptions and product names.

The current product classification systems in Taiwan such as the HS Code and the CCC Code have broad descriptions. Take the "notebook" for example again. According to the descriptions of the HS Code, "portable digital automatic data processing machines" include notebooks and palm-top computers (PDAs) and it includes many products. But, the Industrial Code used by ITRI and the UNSPSC system has more specific product classifications for "notebook".

The analysis results show that the Taiwan computer and peripherals industry has 105 notebook manufacturers, 48 smart handheld device manufacturers, and 98 computer cable manufacturers.

The statistics of the returned catalogs and website ratings show there are about 32 large size companies, 4 medium size companies, and 8 small size companies in the Taiwan notebook industry. Based on estimations from the data, there are about 26 SKUs per large size company, 13 SKUs per medium size company, and 6 SKUs per small size companies. Given the fact that notebook has short life cycle, the Taiwan notebook manufacturer only display current products in catalogs. Thus, the Taiwan notebook industry has few SKUs. The overall number of SKUs in this sector is about 1,000 SKUs. The market value of e-catalog content is approximately US$ 5,000 based on the unit price of US$ 5 per SKUs e-content creation per product cycle (less than 1/2 year).

Compared to the paper catalogs with the electronic catalogs for the product descriptions, computer cable manufactures do not use enough dimensions and illustrations. It will be difficult for customers to tell the differences between similar products. Cables in Taiwan are taken as common wires used for electronic machines not only for computer. The manufacturers also produce other electronic wires. It is difficult for international customers to find specialized computer cable manufacturers in Taiwan.

E-catalog creation and management have to solve the problems above by providing standard product descriptions and convertible catalog contents. It should also have consistency between the product definitions in Chinese and in English. Although most of Taiwan's notebook, PDA, and computer cable manufacturer are OEM, but some have their brand names. They also take Internet and marketing seriously especially for notebook and PDA manufacturers. For example, most of them have their website to introduce their products and some companies have CD-ROM catalogs to replace the paper catalogs. Thus, one of the best strategies for them is that they should propagate through strategic alliances both in marketplace and e-marketplace development.

8.3 Taiwan IC Design Industry

According to the analysis of this research, the current status of catalog contents for Taiwan's IC design industry is shown below:

1. The paper catalog is not used so common as electronics industry and automobile component and assembly industry. Many IC design companies have the idea stop publishing paper catalog again.
2. CD-ROM is a new type of catalog can put more information than paper catalog. It is lighter than paper catalog easy to carry but shipping expense is more expensive because of customs.
3. Most of the IC design companies about 152 companies (84.4%) have built their website in this industry. They all show their product catalog on the website to promote and interact on-line via e-mail. The product catalog on website can put more detail product information in pdf file. Customer can access the product catalog on the website in any place anytime. Some companies give their old customer password to access more detail or confidential information.
4. Paper catalog will not be replaced by e-catalog thoroughly. Paper catalog has the specific function and convenience in the exhibition show, the first visit to new customer, and handbook for old customers. That means paper catalog and e-catalog are complement for each other. Just as the argument of Brooks in 2001 when all the pieces of e-catalogs, CD- ROM catalogs and print catalog together, companies stand a better chance of gaining multiple benefits and achieve success in the Internet economy.
5. Most of the IC design companies just put their product catalog on the website now, but the catalog management is poorly. That means some paper catalogs were just transferred into electronic catalog on the website but without developing into a good system to serve customer and doing transaction on the website directly.
6. There was a significant difference between the paper catalog SKUs versus web catalog SKUs ($p = 0.08 < 0.1$). The number of SKUs in paper catalogs is significantly less than the number of SKUs shown in website catalogs. There were no evidence to show significant difference between the product categories ($p = 0.16 > 0.1$), paper catalog brand names versus Web catalog brand names ($p = 0.67 > 0.1$), and paper catalog illustrations versus web catalog illustrations ($p = 0.95 > 0.1$) all failed to show significant differences.
7. Catalog management is insufficient now. Further resources should be invested into the catalog management to fulfill customer satisfaction and on-line transaction. The result matched with the argument of SAQQARA in 2002 that catalog management remains the biggest technical challenges to e-procurement.

8.4 E-Catalog Comparison between Taiwan Automobile Component and Assembly, Electronics, and IC Design Industry

Thirty-nine e-catalogs of automobile component and assembly, electronics, and IC design industry were compared in this study. There are some results and conclusion derived.

1. There is a significant difference ($F = 12.6$, $p = 1.1E\text{-}05 < 0.05$) in the number of categories described in on-line website catalogs between the three industries. All the results showed that there is a significant difference between each two industries. Automobile component and assembly industry had the largest number of product category. IC design industry owned the least number of product categories in the three industries.
2. Brand name showed a significant difference ($F = 12.7618$, $p = 9.97E\text{-}06 < 0.05$) between automobile component and assembly, electronics, and IC design industry. The results showed no significant difference between the electronics and IC design industries ($F = 0.5$, $p = 0.481633 > 0.05$), but showed a significant difference between automobile component and assembly versus electronics ($F = 16$, $p = 0.000146 < 0.05$), and IC design industry ($F = 23.98252$, $p = 5.34E\text{-}06 < 0.05$).
3. The results did not show a difference in the number of SKUs ($F = 0.335197$, $p = 0.7159 > 0.05$) and illustrations ($F = 1.3422845$, $p = 0.270434 > 0.05$) used in e-catalogs between automobile component and assembly, electronics, and IC design industry.

Most catalogs are not using standard part descriptions, a significant hindrance to online searches. Manufacturers of these three industry sectors have to move forward the creation of electronic content that can be rapidly converted to other formats. Rapid conversion better enables manufacturers to port their electronic catalogs to different electronic market places.

Several benefits and challenges of e-catalogs were discussed in the literature review. The results showed that the e-catalog management was poor. Although many firms, especially IC design companies, drive a product differential strategy for custom-made product or niche market to avoid price competition. To set up a user-friendly e-catalog is crucial. Many guidelines are discussed and presented in the literature review. The use of unified e-catalog content should be better to expose prospective buyers.

8.5 Managerial Implication

The three industries in this research are very different. A manager should realize all the characteristics of their industry regards to customer relation, global reach, and qualifications. The firms automobile component companies produce industrial goods. They sell their parts to the automobile assembly companies. The automobile assembly

companies sell their cars through dealer and channels. That means the customers of this industry are all companies. The electronics industry is different. Most of the electronic components deal with other companies, but the end product like PC, NB, cellular phone, and palm could be sold to end user directly by their firms. That implies some companies have both enterprise customer and the individual customers. The IC design industry is part of the IC industry. Most of the firms sell their concept and idea to their customers. Some of them also ask the fab to manufacture their design and sell the product by itself. Industrial goods and consumer products should be different, and should have different catalogs and marketing promotion strategy. In this research that we find most of the firms produce tangible products except the IC design companies. Traditional ASIC could be called tangible product. The design service and customer owned tool might be called intangible products. The customer relation, global reach, and qualification are important in comparing the three industries. Table 8.1 tries to create a table of industry characteristics for the three industries.

Table 8.1 Industry characteristics

Industry	Auto Component & Assembly	Electronics	IC design
Product	Tangible	Tangible	Traditional ASIC 60% Design Service 18% Customer Owned Tool 22%
Customer relation	High	Medium & Low	ASIC – M & L Design – H COT - H
Global reach	Y	Y	Y
Qualification	ISO9000, ISO14000, UL, QS 9000	ISO9000, UL	ISO 9000

There is a similar result of automobile component and assembly industry and electronics industry in chapter seven. The categories of paper catalog are more than that on the e-catalogs. It's easy to understand that the paper catalog versus e-catalog will reach the same results. Although one traditional and one high-tech industry, all these two industries produce solid and tangible product. Owing to some similar characteristics, most companies are OEM, small and medium size, same culture, and using the similar business model. The manufacturers do not have rich resource to create and maintain a good e-catalog. The results prove that e-catalog is not just transferred directly form the paper catalog. In general, paper catalog is printed or revised once per year. Most of the company tries to put all the information into it. Nevertheless, e-catalog can be revised anytime cheaper and quicker. Maybe that is the reason why e-catalog does not need so many categories like paper catalog. A cataloger of these two industries should use the merit of e-catalog to save more money and

promote effectively and do more strategically thinking in the creating and maintaining e-catalogs.

There is a very different result that is reached from our findings. Given the 90% significant level, we conclude that the mean number of SKUs in paper catalogs and e-catalogs are different. Obviously, the SKUs on e-catalogs are more than the SKUs on the paper catalogs. The more SKUs are put on the paper catalog the more pages will be. There are some disadvantages of a heavy paper catalogs. It is costly, hard to carry, and inconvenient to deliver. The pages are always limited that some detail information must be omitted. E-catalogs are on the web using Internet as its channel. It is cheaper and can store more SKUs together with some detail pdf file on the Web. A marketing manager should use the new low cost promotion tool. Because the e-catalog on the website that anyone can find your SKUs anywhere 24 hours a day all over the world. In the interview of this study we got some message from the user that engineers prefer to own a paper catalog like a handbook in their work. Actually paper catalog is pretty convenient for the designer. That's an important advantage for the paper catalog. That means all the situations and characteristics of paper catalogs and e-catalogs should be considered in the catalog promotion strategy.

After comparing the e-catalogs of the Taiwan automobile component and assembly, electronics, and IC design industries that IC design companies owns the least categories and the most brandname on e-catalogs than the other two industries. It's easy to understand that the automobile component and electronics industries have more types of components and parts than IC design products. No one will doubt the result about categories. Nevertheless the IC design industry is a kind of knowledge-based service industry. The IC designer sells their idea and concept to their customers.

It's very different from the other two industries. Some intangible products, concept and idea, should be developed before the solid tangible product. Most of the firms must show their ability and core competence. Brandname seems to be the most effective image to customers in IC design industry. Just like the slogan "Intel inside" is a successful promotion strategy.

8.6 Limitation and Future Research

The collection of paper catalogs is not so easy because of their expensive cost. Most of the companies would not release paper catalog unless to their customers. But, it is pretty easy to reach the website and search their e-catalogs. That's why all the three industries can reach more e-catalogs than paper catalogs. Many companies will give a password to their customers that they can get into their website to get more detail and confidential information especially in IC design industry. Regarding to the IC design

industry that most of the companies claimed that the paper catalog would not be printed any paper catalog again from this year. Just like Mediatek that is the biggest IC design company does not print any paper catalog these years. Thus fewer paper catalogs can be reached from IC design industry than the other two industries. As a researcher can not reach the more detail information is hard to do more accurate analysis.

This study focuses the catalog of supply side. Customers' perspective to paper catalog versus e-catalog is an important point to the cataloger. What is the opinion of buyer and user? Is there any difference between paper catalog and e-catalog for customers? Which one is their preference? The perspective of the customer is valuable to design and maintain a good paper catalogs and e-catalogs. This research is studying the three industries. The products of automobile component and assembly and IC design industries are industrial products. Their customers are enterprise not individual consumers. Nevertheless the products of the electronics industry in this study include consumer product and industrial products. Is there any difference between consumer product and industrial components in using the e-catalogs? That needs further study in the future research.

9. Conclusion and Recommendations

This study has derived baseline statistics for Taiwan automobile component and assembly, Taiwan electronics companies, and IC design industry, concerning their usage of traditional product catalogs and the emergence of electronic or Internet-based catalogs. The differences of the usage in three industries are compared. The data collected provided information about companies and their catalog content. Conclusion and recommendations are presented besides a model of product promotion by catalogs is derived and shown in figure 9.1

9.1 Conclusion

The result shows that there is a significant difference in the number of product categories in automobile component and assembly and electronics industry, a significant difference of the SKUs in IC design industry between paper catalogs and website catalogs. There are significant difference in product categories and brand name of electronic catalogs (e-catalogs) between Taiwan automobile component and assembly, Taiwan electronics, and IC design industry. The result matched with the study of Chiger and Krap in 2003 that large companies likely locate more budgets to their website had both online and offline catalogs. Membership in organizations that set and derive standards is highly encouraged which is in accordance with Brooks argument that any company's successful e-commerce venture is getting its database in order and standardized in 2001. Catalog management is insufficient now. Further resources should be invested into the catalog management to fulfill customer satisfaction and on-line transaction. The result matched with the argument of SAQQARA in 2002 that catalog management remains the biggest technical challenges to e-procurement. CD-ROM is a new type of catalog can put more information than paper catalog. It is lighter than paper catalog easy to carry but shipping expense is more expensive because of customs. Paper catalog will not be replaced by e-catalog thoroughly. Paper catalog has the specific function and convenience in the exhibition show, the first visit to new customer, and handbook for old customers. That means paper catalog and e-catalog are complement for each other. Just as the argument of Brooks in 2001 when all the pieces of e-catalogs, CD- ROM catalogs and print catalog together, companies stand a better chance of gaining multiple benefits and achieve success in the Internet economy. Most catalogs are not using standard part descriptions, a significant hindrance to online searches. The use of unified e-catalog content should be better to expose prospective buyers. At last there are some limitations of this research and more research should be further studied in

the future.

9.2 Recommendations

This study explores the use of Internet based catalogs and provides some recommendations for promoting the use of e-catalog content to better expose prospective buyers to the items offer for sale by Taiwan automobile component and assembly, Taiwan electronics companies, and IC design companies. Due to market liberalization and global outsourcing, all the industries must align with the trend and make its international presents known through e-catalogs. The incorporation of standards and universally used code systems for the industry's e-catalog should be initiated. Manufacturers of these three industry sectors have to move forward the creation of electronic content that can be rapidly converted to other formats. Rapid conversion better enables manufacturers to port their electronic catalogs to different electronic market places.

Strategic alliances in marketplaces and enterprise procurement systems can propagate high quality and convertible catalogs effectively. However, e-catalog creation and management have to solve the problems above by providing standard product descriptions and convertible catalog contents. It should also have consistency between the product definitions in Chinese and in English. Catalog management needs more efforts, and further resources should be invested into the catalog management to fulfill customer satisfaction and on-line transaction.

The industrial policy of government contributes a lot to the development of Taiwan economy in the past fifty years. Undoubtedly, good industrial policy helps the development of Taiwan's industry and economy. The Internet leads another industrial revolution in the world. It changes some paradigm of the business model. The policy of government to the new marketing tool e-catalogs has enormous influence to Taiwan's industry and economy. How to develop a good industrial policy? That is a good issue to our government. The issue is worth to do more research to support the industrial policy for government and the development of Taiwan's industry.

There are many channels of paper catalogs and e-catalogs. E-mail and Internet are convenient and cheap. The enterprise resource planning (ERP) system is now popular in the operation between industries. How can we link e-catalog and paper catalog into ERP system successfully? It is a new issue for further study for researcher, cataloger, software designer, and marketing manager.

9.3 A Derived Catalog Promotion Model

The three industries are very different in Taiwan. Automobile component and assembly industry is so called a traditional industry has a long history in the world. Electronics industry is growing from 1970 till now. Most firms are OEM but owned

brand name and leading in the world. All the products of the two industries are tangible and solid. Products can be presented in paper catalog, CD ROM catalog, or e-catalog easily. The IC design industry has many design houses in the field. Many firms sell the standard product but some are not. The standard product just like the tangible product can be shown in the catalogs easily. Some custom-made product must discuss with customers frequently and is very hard to shown in the catalog. It's really important to show the ability of their company. The survey of this study finds that the IC design house should introduce more about the ability and performance of their R&D and engineering team to attract the order of intangible product. Besides, a service industry like IC design industry should transfer their service into a tangible product for customers. All the projects or program that have been complete finished should be transferred into SKUs. That should be more ease to communicate with customers, and to promote their service.

From the results that we just found the physical product catalogs were put on the paper and e-catalog. It seems that does not promote the company entirely. All the ideas of the engineer or company's core competence are intangible product should be transferred into tangible product to customers. The provider should provide tangible or intangible product to the customers. All of the products should be transferred into tangible product. Then put the product on paper catalogs or e-catalogs. Especially the ability or core competence should be shown on the catalog (paper catalog, CD- ROM, or e-catalog). The channels of paper catalogs to customers are personal visit, exhibition, agent, direct mail, and e-mail. E-catalog on website through Internet as its channel can exchange information and online transaction is a new marketing tool in the new era.

All the results and findings contribute to researchers in their research, to cataloger in developing catalogs, to managers in their marketing promotion decision, and to government in making industrial policy. However, the major contribution of this dissertation is the derived new model. A product promotion model by catalog is derived in figure 9.1. That is a whole picture for catalog promotion. No matter what kind of business you are, all the concept of this model can help a marketing manager to do their catalog promotion decision more comprehensive.

Since the advent of Internet era, e-catalog is becoming a new marketing tool. Who can use and manage it properly then get the benefit from it. Most of the companies in the three studied industries have built up its own website and e-catalogs. But, there is still a long way to set up a good catalog management system. None of the three industries will give up paper catalog no matter the traditional industry, automobile component and assembly industry, or high tech like electronics and IC design industries. The use of paper catalog is suitable than e-catalogs in some situation. How

to use paper catalog, CD ROM catalog, or e-catalog properly is a new strategic thinking in catalog management. This dissertation reveals some solution for reference.

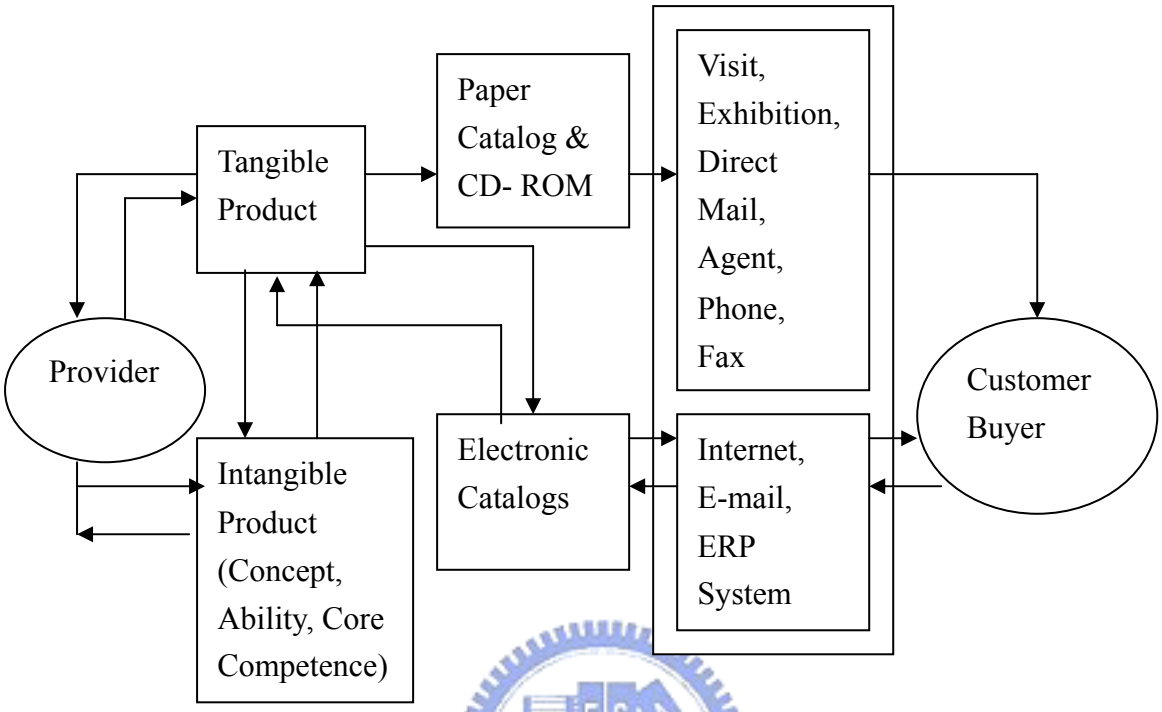


Fig 9.1 — Model of product promotion by catalogs

REFERENCES

1. Alexander, D., "Milking the Most from the Internet", Potentials in Marketing, Vol. 31 No.2, pp.15-19, February 1998.
2. APSIVA, "Catalog Management - How leading companies is gaining strategic advantage over their competitor", ASPIVA, Executive White Paper, May 2002.
3. Baron, J. P. Shaw, M. J. & Bailey, A. D. Jr., "Web-based E-catalog Systems in B2B Procurement", Communication of the ACM. Vol. 43, No. 5, pp. 94-100, May 2000.
4. Beaudry, L. M., "Catalog & Internet Purchasing Trend", Catalog Age, pp.5 –17, 2000.
5. Boyle, L., "Catalog vs. Solo Package", Target Marketing, Vol. 24 No. 6, pp. 23 –24, June 2004.
6. Brooks, L., "Don't Neglect Tried and True Marketing Strategies While Purchasing E-Catalog, Internet Sales Results", Health Industry Today, Vol. 64 No. 5, pp. 8-9, May 2001.
7. CETRA/TWTC1, "The Announcement of 2002 Taipei Int'l Auto/Motorcycle Parts & Accessories Show," May 2002. www.TaipeiTradeShows.com.tw/ampa.
8. CETRA/TWTC2, "The Directory of 2001 Taipei Int'l Auto/Motorcycle Parts & Accessories Show", May 2001.
9. CETRA, Taiwan Electronics Showcase, www.TaiwanTrade.com.tw; electronics.cetra.org.tw.
10. CETRA, Taiwan Hardware Showcase 2001, hardware.cetra.org.tw.
11. Chiger, S. and Katz, K., "Operations Benchmark 2003", Catalog Age, Vol. 20 No. 4, pp. 39- 44, April 2003.
12. Chiger, S. and Karp, S., "7th Annual Electronic Marketing Survey", Catalog Age, Vol. 20 No. 7, pp. 66, June 2003.
13. Corporate Synergy Development Center, www.csd.org.tw.
14. Cronenweth, S., "The Source for Online Interaction", Putman Media, 2002
15. Department of statistics, MOEA, Information and Electronics Industry Statistics Monthly, Issue 111, Taiwan Area, R.O.C., June 2001.
16. DGOC1, Monthly Statistics of Exports, the Republic of China, Taiwan District, December 2000. Statistical Department, Directorate General of Customs, M.O.F., the Republic of China, February 2001.
17. DGOC2, Customs Import Tariff and Classification of Import & Export Commodities of the Republic of China, the Directorate General of Customs, M.O.F., the Board of Foreign Trade, M.O.E.A, August 2001.
18. Essig, M., & Ulli, A., "Electronic procurement in supply chain management: An

information electronic-based analysis of electronic markets", The Journal of Supply Chain Management, pp. 43-49, fall 2001.
19. Gantner, 'The Business Process Link for Catalog Management", Gartner's Enterprise Application Packages Research, April 2001.
20. Gantner, "The Challenge of Catalog Management", Gartner's Enterprise Application Packages Commentary, March 2001.
21. General of Customs, M. O. F., the Board of Foreign Trade, Ministry of Economics Affairs, August 2002.
22. Georganyis, N. P., Koutsomitropoulos, D. A., Zafiris, P. A. & Papatheodorou, T. S., A., "A Review and Evaluation and Tools for Building E-Catalogs", Proceedings of the 35th Annual Hawaii International Conference on System Science
23. Gilbert, A., "E-Catalogs: Long Journey to Rewards", Informationweek.com. 51-52, August 2001.
24. Ginsburg, M., Gebauer, J. & Segev, A., "Multi-vendor electronic catalogs to support procurement: Current practice and future directions", Proceedings of 12th International Bled Electronic Commerce Conference, Bled, Slovenia.
25. Goldman Sachs Investment Research, September 1999.
26. Harrison-Walker, L. J., "If you build it, will they come? Barriers to international e-marketing", Journal of Marketing Theory and Practice, pp.12-21, spring 2002.
27. Industrial Development Bureau, MOEA, www.moeaidb.gov.tw.
28. Industrial Technology Research Institute Website, www.itri.org.tw.
29. ITRI/ITIS, Year 2001: The present situation and tend analysis of automobile, motorcycle, and bicycle industries, Industrial Technology Information Services, Report ITRIEK-0267-T402 (90), June 2001.
30. ITRI/ITIS, The survey report of the automobile industry in Taiwan and Mainland China, Report ITRIMI-151-S405 (86), ITRI/MIRL, July 1997.
31. ITRI/ITIS, Electronics Components Industry Yearbook, Industrial Technology Information Service, Report ITRIEK-0267-T 412(90), June 2001.
32. Kalakota, R. & Whinston, A. B., Frontiers of Electronic Commerce. Addison Wesley, N.Y, 1996.
33. Kilbane, D., "E-catalogs becoming a standard", Automatic ID News. pp. 19-20, August 1999.
34. Laakso, C., Product Catalog Content Management, Lake, Vesta and Bright Consulting Group, Inc., 2002.
35. Lee, C. S., "An Analytical Framework for Evaluating E-Commerce Business Models and Strategies", Internet Research, Vol. 11. Issue 4, January 2001.
36. Microelectronics Magazine, Electronics Industry Yearbook, Taipei Electronic

Components Suppliers' Association, May 2001.
37. Miller, C., "Riding the E-Wave", Printing Impression, Vol. 43 No. 7, pp. 28–30, December 2000.
38. Miller, P., "Using Web-Customer Data", Catalog Age, Vol. 18 No.1, pp.39, January 2001.
39. MRO Software, Conquering the Catalog Challenge, MRO Software, Inc. White Paper, April 2002.
40. Mullich, J., "E-Catalogs Bulk Up: The E-Catalogs are Starting to Deliver as Some Purchasing Agents Report Dramatic Cost Savings Using these Sites", Internet Week, Manhasset, pp. 43-46, March 2000.
41. Nicolai, B., "Web Prospecting: Catalog Selling", Catalog Age, Vol. 20 No. 13, pp. 39, December 2003.
42. Oberdorf, S., "Digital leverage - Technology Bring One-to-One Marketing within Reach", Catalog Age, Vol13 No. 7, pp. 171- 174, July 1996.
43. Official Directory of Computex Taipei 2001, Taipei International Computer Show, June 2001.
44. Palmer, J. W. & Griffith, D. A., "An Emerging Model of Web-site Design for Marketing", Communications of ACM, Vol. 41, No. 3, March 1998.
45. Peng, Y. C., Trappey, C.V. & Liu, N.Y., "Internet and E-Commerce by the Taiwan Semiconductor Industry" , Accepted by Industrial Management and Data System in June 3, 2004
46. Potomac, "Total EDI integration getting IT together for cutting-edge electronic commerce", EDI News, Vol. 12, No. 16, pp. 1-4, August 1998.
47. Sage, A., Wan, D., & Beam, C., "Designing electronic catalogs for business value: Result from the commerce net pilot", CITM Working Paper WP.95-1005, Hass School of Business University of California Berkeley, 1995
48. SAQQARA, SAQQARA Catalog Management Service for e-Procurement, SAQQARA Systems Inc, 2002.
49. Schmid, J., "The Importance of Tracking Source Code", Catalog Age; Vol19 No.3, pp.59 –60, March 2002.
50. Taipei Intl Auto/Motorcycle Parts & Accessories Show, www.taipeitradeshows.com.tw/campa/background.shtml#, 2002.
51. TEEMA, Index of Products, the Taiwan Electrical and Electronics Manufacturers' Association, January 2001.
52. TEEMA, 2001-2002 Membership Directories, the Taiwan Electrical and Electronics Manufacturers' Association, August 2001.
53. The Global Battle: Innovation and Technology. The Wall Street Journal. R6, September 2000.

54. Trappey, C.V., The Taiwan Electronics Market, Hwa-Tai Publisher, August 2000.
55. Trappey, C. V., Hou, J. L. & Peng, Y. C., “E-Catalogs: A New Marketing Tool for the Taiwan Electronics Industry Buyers and Sellers”, International Journal of Electronic Business Management, vol. 1, 2003
56. Trappey, C. V., Hou, J. L. & Peng, Y. C., "The Emergence of Automobile Component and Assembly Electronic Catalogs in Taiwan" Industrial Forum Vol. 5., no 4., 2003
57. TTP, “Auto Parts & Remodeling Accessories 2001”, Taiwan Trade Pages, March 2001.
58. TTVMA, 2001-2002 Membership Directories. Taiwan Transportation Vehicle Manufacturers Association, July 2001.
59. TWTC, “Taipei Parts & Motorcycles”, Taiwan Products, Vol. 31, Taipei World Trade Center Co., Ltd, November 2001.
60. Wang, Z. F., “The Information Technology Industry at Taiwan”, Wealth Group, December 2000.
61. Wood, R., “E-catalogs: Wares on the web”, Office World News, PP. 23-25, March 2001.

Appendix A: Automobile Component Product Category Frequency

English	Chinese	Code	Frequency	Main Category
Cylinder Body	汽缸體	11	250	1
Lights	燈類	26	187	5
Door Panel Parts	車門零件	80	153	4
Body Assembly	車身總成，車廂	60	147	4
Piston and Connecting Rod	活塞及連桿	12	119	1
Brake	剎車	41	107	3
Axle	輪軸	40	104	4
Other Tools and Parts	其他類:五金工具零件，其他車輛零件無法分類，鋁製品，鋼製品，機械工具等	00	100	
Switch and Relay	開關及繼電器	25	98	5
Electrical Parts, Terminals and Electric Appliance	電線組合，電子件，端子，電器類	29	93	5
Radiator and Fan	水箱，風扇	21	92	3
Mud Guard	檔泥板	63	92	4
Nut, Bolt, Screw, Gear	螺帽，螺栓，螺絲，齒輪	71	91	3
Console, Rear-view Mirror	置物箱，後視鏡	96	91	4
Carburetor	化油器	16	75	1
Wire Harness, Battery and Conduit	配線，電瓶，導管 (線)	24	75	5
Plastic Parts and Rubber Parts	塑膠件，橡膠件	70	75	4
Bumper and Guard Assembly	保險桿，防撞類	85	75	4
Stamped Parts	沖壓，鈑金件	58	74	4
Transmission System and Transmission Shaft	傳動系統，傳動軸	37	64	3
Engine Hood	引擎蓋	65	58	4
Eccentric Axle and Valve	偏心軸及汽門	13	56	1
Alternator and Starter	發電機，啓動馬達	23	56	2
Radio and Windshield Wiper	收音機，雨刷	28	53	5
Fueling System	燃油系	17	50	1
Air conditioner and Heater	冷氣機'暖氣機	27	50	5
Die, Fixture, Jig, Checking Gauge, Clamp, Clip	模，夾，治，檢具，夾片，管束	69	49	
Distributor	分電盤	22	48	2
Seat and Pedal	座椅，腳墊	88	45	4
Production, Test and Painting, Equipment Mold	生產設備，檢測設備，塗裝設備，模具	82	43	
Automatic Variable Speed Gear Box	自動變速箱	31	42	3
Engine Assembly	引擎總成	10	41	1
Oil Seal	油封	52	38	1
Car Burglar Alarm (Lock), Buzzer	防盜器 (鎖)，蜂鳴器	81	36	4
Cross Member	橫樑	51	35	4
Ornament Mark, Tools, Key and Lock, Cosmmetics for Automobile, Extinguisher	標誌，工具，鑰匙組，保養品，滅火器	99	35	4
Steering System	轉向系統	48	34	3
Silencer, Heat Insulator, Curtains	隔音，隔熱材料，窗簾	94	34	4
Strut of Trunk Lid and Roof	行李架，車頂	73	32	4
Forging Parts and Costing	鍛造件，鑄造件	59	31	4
Clutch	離合器	30	29	3
Motor and Pump	馬達類，幫浦類	35	29	2
Frame and Chassis	車架，底盤	50	29	4
Exhaust	排氣	20	28	3
Variable Speed Gear Box	變速箱	32	27	3

Appendix B: The Sample Company List for Suppliers and Distribution

Part Category	Representative Company	Local Distribution Channel	Oversea Distribution Channel
Tire	正新橡膠工業股份有限公司/Cheng Shin Rubber Inc., Ltd	Raw Material Suppliers→CHENG SHIN→Distributors, Agents, Automobile Maintenance Companies, Automobile Manufacturing Companies	MAXXIS Wheel Company (Cheng Shin Rubber USA, Inc., Suwanee, GA)
Electrical Parts	士林電機廠股份有限公司/Shihlin, Electric Engineering Corp.	Raw Material Suppliers→SEEC→ Automobile Manufacturing Companies	Oversea branches
Lights	堤維西交通工業股份有限公司/TYC Brother Industrial Co., Ltd	Raw Material Suppliers→TYC→Business Partners and Automobile Manufacturing Companies	Oversea branches, distributors, and allied partners
Aluminum Alloy Wheels, Steel Wheels	源恆工業股份有限公司/ Yuan Feng Industrial Co., Ltd.	Raw Material Suppliers→Yuan Feng→ Automobile Manufacturing Companies	
Exhaust Assembly, Steel Pipe, Body Parts, Pedal, Engine Parts	協祥機械工業股份有限公司/ Shye-Shang	Raw Material Suppliers→Yuan Feng→ Automobile Manufacturing Companies	Oversea plant and foreign technology cooperators
Telematics	怡利電子工業股份有限公司/E-lead Electronic Company	Raw Material Suppliers→E-lead→Distributors, Agents, Automobile Manufacturing Companies	Oversea plant, venders, agents, distributors, and car manufacturing companies.
Lights, Wind Plate, Fan, Grille, Spare Tank	銘洋交通器材製造股份有限公司/Ming Yang Traffic Industrial Co., Ltd	Raw Material Suppliers→Ming Yang→Distributors, Agents, Automobile Manufacturing Companies	Agents and warehouses
Pulley, Piston, Water Pump	台灣保來得股份有限公司/ Porite Taiwan Co., Ltd.	Raw Material Suppliers→Porite Taiwan→Automobile Manufacturing Companies	Headquarter is in Japan. Oversea Warehouses, plants, branch offices.

Appendix C: Yu-Long Coding Sheet

	0	1	2	3	4	5	6	7	8	9
1	引擎總成 Engine Assembly	汽缸體 Cylinder Body	活塞 Piston 連桿 Connecting Rod	偏心軸 Eccentric Axle 汽門 Valve	歧管 Manifold	潤滑系統 Lubrication System	化油器 Carburetor	燃油系統 Fueling System	引擎控制 Engine Control	調速器 (柴油) Governor
2	排氣 Exhaust	水箱 Radiator 風扇 Fan	分電盤 Distributor	發電機 Alternator 啓動馬達 Starter	配線 Wire Harness 電瓶 Battery 導管(線) Conduit	開關 Switch 繼電器 Relay	燈類 Lights	冷氣機 Air Conditioner 暖氣機 Heater	收音機 Radio 雨刷 Windshield Wiper	電線組合 電子件 Electrical Parts 端子 Terminal, 電器類 Electrical Appliance
3	離合器 Clutch	自動變速箱 Automatic Variable Speed Gear Box	變速箱 Variable Speed Gear Box	齒輪箱 Gear Box	變速箱控制 Variable Speed Gear Box Control	馬達類 Motor 幫浦類 Pump	手剎車 Hand Brakes	傳動系統 Transmission System 傳動軸 Transmission Shaft	後驅動器 Rear Drive	驅動軸 Drive Axles
4	輪軸 Axle	剎車 Brake	凸輪軸 Camshaft 上臂 Upper Arm 下臂 Lower Arm	墊片類 Seal, Gasket, Washer, Packing, 孔蓋 Cap Cover 扣具 Cargo Lash	水管 Water Hose 管類 Pipe, Hose, Tube	空氣剎車 Air Brake	剎車總泵 Brake Master Cylinder 剎車油管 Brake Hose	動力剎車 Power Brake	轉向系統 Steering System	動力轉向 Power Steering
5	車架 Frame 底盤 Chassis	橫樑 Cross Member	油封 Oil Seal	空氣懸吊 Air Suspension.	懸吊 Suspension	-	避震器 Shock Absorber	輪胎 Tire	鈑金件 Stamped Parts	鍛造件 Forged Parts 鑄造件 Cost Parts
6	車身總成 Body Assembly	前車身 Front Body	水箱護罩 Radiator Grill	檔泥板 Mud Guard	牆板 (內龜) Hood Ledge	引擎蓋 Engine Hood	通風罩 Ventilation Boot	隔板 Partition	儀表板 Instrument Panel	模、夾、治、檢具 Die, Fixture, Jig,, Gauge, 夾片 Clamp 管束 Clip
7	塑膠件 Plastic Parts 橡膠件 Rubber Parts	螺帽 Nut 螺栓 Bolt 螺絲 Screw 齒輪 Gear	玻璃類 Glass	行李架 Strut of Trunk Lid 車頂 Roof	車底板 Floor Panel	大樑 Frame Assembly	側身車件 *Side Body Components*		粉末冶金 Powder Metallurgy	氣囊 Air Bag
8	車門零件 Door Panel Parts	防盜器 (鎖) Car Burglar Alarm (Lock), Buzzer	生產，檢測，及塗裝設備， Production, Test & Painting Equipment, Mold	邊窗 Side Windows	行李箱 Trunk	保險桿 Bumper 防撞類 *Guard Assy*	安全帶 Seat Belt	-------	座椅 Seat 腳墊 Pedal	油土與基準模型 Clay Model and Master Model
9	橫拉桿接頭 Tie-Rod End	天窗 Sun Roof	外冷氣機 Out-side Air Conditioning	-----	隔音材料 Silencer 隔熱材料 Heat Insulator 窗簾 ***Curtains***	車身固定架 Support-Rad. 車柱 Pillar	置物箱 Console 後視鏡 Rear-view Mirror	擾流板 Spoiler	-	標誌， Ornament Mark 工具 Tools 鑰匙組， Key and Lock 保養品， Cosmetics for Automobile 滅火器 Extinguisher

00:其他類:五金工具零件，其他車輛零件無法分類，鋁製品 Aluminum Spare Parts，鋼製品 Steel Spare Parts，機械工具 Mechanical Tools 等。

Appendix D: Companies List for Catalog Coding

Coding No	公司	地址	電話	傳真	資本額	員工人數	主要產品	主要汽車	認證	創立時間	E-mail	Website	Source
1	中國精密	桃園縣平	03-45261	03-45262	199000000	190	10, 42, 11,	引擎, 凸	QS 9000	1968.10	cpd@cp-d	www.cp-d	台灣區車
3	和勝企業	桃園縣龜	03-48333	03-48303	190000000	295	85, 58, 51,	保險桿,	ISO 9002	1969.05			台灣區車
4	友永股份	苗栗縣三	037-8728	037-8747	195000000	114	21, 21, 35	水箱, 副	QS 9000/	1987.01	u2318298@ms19.hin		台灣區車
5	台灣鋼圈	桃園縣楊	03-47814	03-47589	180000000	68	40	輪圈	CAPA/IS	1979.08	topytw@ms4.hinet.n		台灣區車
6	正新橡膠	彰化縣大	04-85251	04-85264	##########	2,660	57	輪胎	DOT/EC	1967.01	cst001@m	www.cst.c	台灣區車
7	中發工業	新竹縣湖	03-59832	03-59818	240000000	66	54, 24, 71	平衡桿,	ISO 9002	1987.08			台灣區車
8	五洲汽門	台北縣三	02-267115	02-267156	60000000	82	10, 13	汽車用引	擎、汽門	·		http://ww	台灣區車
9	勝利工業	台北縣汐	02-26943	02-26946	70000000	150	23	發電機	ISO 9001	1966.01			台灣區車
10	新三興股	新竹縣湖	03-59832	03-59811	320000000	460	60, 80, 88,	車體對	這	ISO 9002	1987.04	masaaki.s	www.arac	台灣區車
12	開發工業	高雄縣仁	07-34272	07-34273	340000000	520	56	避震器	ISO 9001	1969.05	kaifa@ms14.hinet.ne		台灣區車
13	明昌輪業	屏東縣新	08-72280	08-72299	230336000	160	13	時規鏈條	ISO 9002	1974.11	mcchain(	www.mcc	台灣區車
14	春翔企業	桃園縣龜	03-48978	03-47031	140000000	150	21, 11, 65,	水箱支架	ISO 9002	1997.07			台灣區車
15	銘位實業	台南縣仁	06-2663	06-26641	77000000	80	26	燈類	ISO 9002	1980.04	bigtime@ms7.hinet.n		台灣區車
17	台灣普利	新竹縣湖	03-59816	03-59818	810000000	436	57	輪胎	QS 9000/	1954.10	bsfc@ms2	www.brid	台灣區車
18	南章實業	南投市南	049-2511	049-2511	70000000	150	52, 70	油封, 橡	ISO 9002	1981.07	jefflee.mtp@ms2.hin		台灣區車
19	江興鍛鋼	台中市西	04-35920	04-35944	310087000	120	52	鍛造件	ISO 9002	1980.09	caiang@ms5.hinet.ne		台灣區車
20	台灣保來	苗栗縣竹	037-5811	037-5810	359336000	626	11, 42, 11,	引擎零件	ISO 9002	1968.03	porite01@	www.porit	台灣區車
22	鉅全工業	台南縣仁	06-27918	06-27082	52500000	193	12	活塞	ISO 9002	1973.08	jcpiston@	www.higc	台灣區車
23	萬道工業	桃園縣龜	03-47771	03-47768	102500000	140	40	輪圈	ISO 9002	1994.06			台灣區車
24	豐裕股份	新竹縣湖	03-59837	03-59828	200000000	208	85, 48, 62,	保險桿,	ISO 9002	1987.03			台灣區車
25	金鍛工業	台北縣蘆	02-24925	02-24925	60900000	80	12, 71, 13,	各種汽機	ISO 9002	1985.03	kingduan(	www.king	台灣區車
26	今仙電機	台北市北	02-25078	02-25079	94000000	94	26, 96	喇叭, 煙	CNS/ISO	1968.09	imasen@cml.hinet.n		台灣區車
27	台惟工業	新竹縣湖	03-59836	03-59827	160000000	216	37,32	前輪驅動軸及等速萬向頭				http://ww	台灣區車
28	協欣金屬	桃園縣大	03-38083	03-38092	497000000	235	65, 60, 80,	引擎蓋,	ISO 9002	1990.10	chinasal@ficnet.net		台灣區車
29	精確實業	桃園縣龜	03-47775	03-47775	240000000	182	52, 59	鍛造件,	ISO 9002	1993.10	uatc@ms15.hinet.net		台灣區車
30	弘本工業	桃園縣龜	03-47722	03-47797	70000000	119	17, 21,	油箱, 副	ISO 900	1983.07	ufj10829@ms7.hinet.		台灣區車
31	造漢股份	桃園縣蘆	03-32237	03-32240	180000000	220	17, 25, 25,	油箱, 管	ISO 9002	1973.08	chlong@	www.chac	台灣區車
32	江申工業	桃園縣楊	03-47831	03-47543	500000000	330	11, 50, 50,	引擎支撐	QS 9000	1955.10			台灣區車
33	上越鉛業	桃園縣龜	03-47609	03-47609	180000000	155	40, 57	汽車輪圈	ISO 9002	1997.07	meritco@	http://ww	台灣區車
34	瑞興發工	高雄市岩	07-34376	07-34236	140000000	200	17, 40, 24,	油箱, 輪	ISO 9002	1959.04			台灣區車
35	泰豐輪胎	桃園縣平	03-45221	03-46163	##########	750	57	輪胎	ISO 9001	1955.11	sales@fed	www.fed	台灣區車
36	台灣日鍛	桃園縣八	03-36511	03-36557	91083000	125	13, 13	汽門, 13	ISO 9002	1968.08	nittan@mail.ttn.com.		台灣區車
37	協祥機械	新竹縣湖	03-59839	03-59852	730000000	400	12, 11, 13,	曲軸皮帶	ISO 9002	1973.06	ssmi@ssn	http://ww	台灣區車
38	成宇工業	桃園縣蘆	03-32107	03-32197	198400000	156	50, 50, 85,	底盤及其	ISO 9002	1988.12			台灣區車
39	全興工業	彰化縣花	04-76221	04-76202	197600000	856	54, 96, 80,	平衡桿,	QS 9000/	1953.06	tony@email.gsk.com		台灣區車
40	富海工業	桃園縣楊	03-46427	03-46427	220000000	146	40	輪圈	VIA/ ISO	1993.06	pth84250@ms16.hinc		台灣區車
41	裕器工業	新竹縣湖	03-59812	03-59822	194670000	320	27, 40, 62,	空氣清	ISO 9002	1978.09	yki88@ms	www.yuel	台灣區車
42	宏得螺絲	桃園縣蘆	03-32249	03-32241	70000000	46	71, 52	螺帽螺	QS 9002	1965.12	funda@saturn.seed.n		台灣區車
43	亨通國際	桃園縣平	03-45241	03-45127	195000000	285	21, 41, 41,	水幫浦,	ISO 9001	1954.04	clhkin@ms14.hinet.n		台灣區車
44	化新精密	台北市大	02-27913	02-27927	120000000	189	13, 11, 14,	汽門導	醫	ISO 9000	1971.10	farhsing@ms21.hinet		台灣區車
45	裕盛工業	苗栗縣三	037-8718	037-8741	288000000	160	28, 74, 86,	天線, 地	ISO 9002	1969.04			台灣區車
46	正道工業	台南縣仁	06-2664	06-26640	##########	500	12, 12, 42,	活塞, 連	CNS/FOF	1964.11	rightway@ms16.hinc		台灣區車
47	朝陽電裝	新竹縣湖	03-59843	03-59843	50000000	90	25	開關類	ISO 9002	1987.12	cy861201@ms19.hin		台灣區車
48	穎西工業	桃園縣平	03-49856	03-49856	85000000	159	40, 63, 80,	輪弧, 擋	QS 9000/	1991.12	yteks@acer.net		台灣區車
49	聯成金屬	桃園縣龜	02-29958	02-29957	80000000	400	17, 11, 65,	油箱, 油	BVQI/ISO	1955.01			台灣區車
50	泰元鋼業	桃園縣龜	03-47343	03-47343	200000000	80	54, 37, 71,	平衡桿,	ISO 9002	1970.05	tigercom@ms27.hinc		台灣區車
51	富勤模具	台中縣大	04-69311	04-69311	735000000	264	17, 11, 65,	油箱, 引	ISO 9001	1990.01	ftt001@ms2.hinet.net		台灣區車
52	介鋼機械	台中縣沙	04-61500	04-61500	60000000	70	42, 11, 11,	凸輪軸,	ISO 9002	1976.02	jcmc1234(	www.jcm	台灣區車
53	中華大同	台北縣平	02-22423	02-22423	120000000	74	11, 12, 12,	引擎皮	QS 9000	1984.06	daido@ms29.hinet.n		台灣區車
54	和大工業	台中縣大	04-49121	04-49111	465179000	260	12, 12, 32,	飛輪, 飛	ISO 9002	1973.01	ginny-dai(	www.hota	台灣區車
55	台灣易茂	台北縣新	02-29018	02-29029	430000000	948	24	電瓶	QS 9000/	1966.03	yua110@	www.yuas	台灣區車
56	春源鋼鐵	台北市復	02-25018	02-25050	##########	167	65, 73, 50,	引擎蓋,	ISO 9002	1966.01	ak500@cysco.com.tw		台灣區車
57	源恆工業	台中縣大	04-69916	04-69953	911800000	550	40	輪圈	VIA/ QS	1978.06	enco@ros	www.rost	台灣區車
58	六和機械	桃園縣平	03-45321	03-45325	##########	922	11, 17, 14,	引擎零件	QS 9000/	1971.06	mail@lioh	www.lioh	台灣區車
59	新進工業	台南縣永	06-25321	06-25326	170000000	110	22, 24, 22,	分電盤,	UL/CSA/	1954.06	shinchin@	www.sci.c	台灣區車
60	華豐鋼鐵	台北縣新	02-29963	02-29966	70000000	87	52	鍛造件	CE/ISO 9	1975.08	hwafong(	www.hwa	台灣區車
61	台灣火星	台北市松	02-27173	02-27173	64000000	26	22, 28, 28,	火星塞,	ISO 9002	1984.06	ngk@tpts5.seed.net.t		台灣區車

Appendix E: Catalog and Web Coding Database – Auto. Industry

Catalog Coding #	Company Name	F15	F16	F17	F18	F19	F20	F21	Brand Name	F22	F23	F24	F25	Common I	Website	E-mail	F31	F32	F33	F34	F35	F36	F37	F38	F39	Web
	正新橡膠工業股份								MAXXIS, Cheng Shin																	
6	股份有勝利工業股份	0	0	2	64	548	6	2	Tire	2	64	2	2	規格各外徑	www.cst.com.tw		1	0	2	39	238	6	1	2	38	規格
9	有限公明星輪業股份	0	0	2	170	0	21	0		1	148	2	1	?	http://www.vicivicsales@v		0	1	2	38	103	4	0	1	38	
13	有限公銘鐘實業股份	0	1	2	36	605	11	0		1	100	2	2	MCC Chai	www.mccchain.com	mccchain@	0	0	2	34	446	7	0	7	34	MCC
15	有限公江興鍛壓工業股份	0	0	2	64	146	6	2	BIGITIME, BIGIE	1	64	2	2	Housing, F	http://bigtime.co	bigtime@m	1	0	2	4	0	0	0	1	0	
19	股份有萬道工業股份	0	1	2	2	0	0	0		3	2	2	1		http://www.cor	caiang@m	1	1	2	5	21	0	0	3	5	
23	有限公金鍛工業股份	0	0	0	77	350	5	1	WP Sports	1	76	2	2	SIZE, ET,	www.walpax.c	walpax@m	0	0	0	82	0	293	5	1	1	82
25	有限公遵鋁股	1	0	2	6	47	0	0		3	9	2	1		http://www.kin	kingchun@	1	1	2	46	0	0	0	3	46	
31	份有限上越鋁業股份	0	0	2	21	0	0	0		1	21	2	1		http://chaolong	chlong@m	0	1	0	75	0	0	0	1	75	
33	有限公富海工業股份	0	1	2	72	194	6	2	MR Racing, M	1	72	2	3	Model, Siz	http://www.mameritco	@m	0	0	0	6	268	4	6	3	150	size
40	有限公	1	0	2	85	####	6	1		1	85	2	2	PROTECH	http://www.pth	pth@pthwl	0	0	2	116	0	0	1	7	116	
41	裕器工介鐵機械股份	1	1	2	15	0	0	0		3	15	2	2		www.yuki.com	webmaster	1	1	2	13	0	0	0	3	13	
52	有限公和大工業股份	1	1	2	3	0	0	0		3	0	2	1		http://www.jon	jcmc1234@ms8.hinet.net		0	0		0		0			
54	有限公台灣易通電池	1	1	2	77	0	0	1	HIT	3	77	2	2		http://www.hot	sales@hota	0	0	0	9	0	0	0	1	9	
55	股份有源恆工業股份	0	0	2	5	174	7	1	YUASA	3	6	2	1	Type, Cap	http://www.yua	yua113@y	1	1	2	101	0	11	1	3	2	格子
57	有限公六和機械股份	0	0	2	78	835	5	1	Rosta	1	78	2	1	Type No, I	http://www.ros	enco@rost	0	1	2	84	326	5	0	3	84	size,
58	有限公新進工業股份	0	0	2	22	36	4	1	HOMARK	2	22	2	1	Type, NO,	http://www.lich	export@lichc	0	0		0		0			
59	有限公華豐鋼鐵鍛造廠股份	0	0	2	21	141	6	0		1	169	2	1	BUTTON,	www.sci.com.t	shinchin@	0	1	2	10	10,000		0	1	5,000	
60	有限公穎明工業股份	1	1	2	9	0	0	0		3	9	2	2		http://hwafong	hwafong@	1	1	2	33	0	0	0	3	33	
63	有限公	0	0	2	9	135	10	0		3	8	2	2		http://www.fas	tynhiten@ms27.hinet.net		0	0		0		0			

Appendix F: Company List for Website Rating - Auto. Industry

公司	地址	電話	傳真	資本額	員工人數	主要產品	主要汽車	認證	創立時間	E-mail	Website	Source
正新橡膠	彰化縣	04-85251	04-85264	7849883000	2,660	57	輪胎	DOT/ECE	1967.01	cst001@n	www.cst.c	台灣區車
明昌輪業	屏東縣	08-72280	08-72299	230336000	160	13	時規鏈	ISO9002	1974.11	mcchain	www.mcc	台灣區車
勝新工業	台北縣	02-26943	02-26946	70000000	150	23	發電機	ISO9001	1966.01			台灣區車
銘鈺實業	台南縣	06-26631	06-26641	77000000	80	26	燈類	ISO9002	1980.04	bigtime@ms7.hinet.n		台灣區車
江興鍛壓	台中市	04-35920	04-35944	310087000	120	52	鍛造件	ISO9002	1980.09	caiang@ms5.hinet.ne		台灣區車
萬道工業	桃園縣	03-47771	03-47768	102500000	140	40	輪圈	ISO9002	1994.06			台灣區車
金鍛工業	台北縣	02-24925	02-24925	60900000	80	12, 71, 13	各種汽	ISO9002	1985.03	kingduan	www.king	台灣區車
造隆股份	桃園縣	03-32237	03-32240	180000000	220	17, 25, 25,	油箱	ISO9002	1973.08	chlong@	www.cha	台灣區車
上越鋁業	桃園縣	03-47609	03-47609	180000000	155	40, 57	汽車輪	ISO9002	1997.07	meritco@	http://www	台灣區車
富海工業	桃園縣	03-46427	03-46427	220000000	146	40	輪圈	VIA/ISO	1993.06	pth84250@ms16.hin		台灣區車
裕器工業	新竹縣	03-59812	03-59822	194670000	320	27, 40, 62,	空氣清	ISO9002	1978.09	yki88@ms	www.yuel	台灣區車
介錩機械	台中縣	04-61500	04-61500	60000000	70	42, 11, 11,	凸輪軸	ISO9002	1976.02	jcmc1234	www.jcm	台灣區車
和大工業	台中縣	04-49121	04-49111	465179000	260	12, 12, 32,	飛輪	ISO9002	1973.01	ginny-dai	www.hota	台灣區車
台灣湯淺	台北縣	02-29018	02-29029	430000000	948	24	電瓶	QS9000/	1966.03	yua110@	www.yuas	台灣區車
源恆工業	台中縣	04-69916	04-69953	911800000	550	40	輪圈	VIA/QS	1978.06	enco@ros	www.ros	台灣區車
六和機械	桃園縣	03-45321	03-45325	1047420000	922	11, 17, 14,	引擎零件	QS9000/	1971.06	mail@lioh	www.lioh	台灣區車
新進工業	台南縣	06-25321	06-25326	170000000	110	22, 24, 22,	分電盤	UL/CSA/	1954.06	shinchin@	www.sci.c	台灣區車
華豐鋼鐵	台北縣	02-29963	02-29966	70000000	87	52	鍛造件	CE/ISO9	1975.08	hwafong(	www.hwa	台灣區車
穎明工業												
南吉交通	台南縣	06-27813	06-27818	660000000	170	65, 60, 80,	引擎蓋	CAPA/ISO	1975	nanjhi@	www.nanj	台灣區車
瑞利企業	高雄縣	07-34383	07-34251	1765073000	800	17, 11, 65,	油箱	ISO9001	1970.06	pso@juili.	www.juili.	台灣區車
台灣德	台北市	(02)2703	(02)2325	16000000	90	11, 25	其他汽車引擎零組件,汽車修			trisco@tr	http://ww	工研院ITI
三龍企業	台北縣	02-22683	02-22683	60000000	247	16, 17, 21,	空氣濾	ISO9001	1963.06	sanlong@	http://www	台灣區車
全興方向	彰化縣	04-79801	04-79885	122000000	120	36, 48, 32,	手剎車	ISO9001	1986.06	thsw@ms	www.thsw	台灣區車
士林電機	台北市	02-28342	02-28366	5008531000	2,000	17, 21, 22,	燃油	ISO9002	1955.11	hwang@s	www.seec	台灣區車
台灣松下	台北縣	02-22235	02-22271	3103000000	5,400	27, 92, 92,	冷氣	ISO9001	1962.10	inetc90@panasonic.p		台灣區車
東陽實業	台南市	06-35605	06-35556	3883000000	1,400	65, 85, 63,	引擎蓋	ISO9002	1967.10			台灣區車
永華機械	桃園縣	03-36831	03-36833	85000000	375	95, 56	支柱總	ISO9002	1964.11	yunghwa@ms4.hinet		台灣區車
瑞祺實業	台南縣	06-36607	06-36607	50000000	50	41, 41, 41,	剎車來令	ISO9002	1964.10	d3660771	www.swit	台灣區車
皇田工業	台南縣	06-23310	06-23112	180000000	199	27, 96	空調	QS9000/	1979.12	efax@chs	www.sun.	台灣區車
南港輪胎	台北市	02-27071	02-27065	2086560000	1,112	57	輪胎	ISO1400	1959.01	nankang(	www.nank	台灣區車
統一工業	台南縣	06-25321	06-25351	902120000	1,010	24	電瓶	QS9000/	1972.10		www.zyib	台灣區車
胡連精密	台北市	02-26940	02-26942	195000000	151	24, 82, 69	配線	ISO9002	1977.08			台灣區車
儒億科技	台南市	02-22990	02-22990	455400000	350	25, 80, 80,	開關類	QS9000	1982.03	gmpc@g	www.gm	台灣區車
漢原技研	桃園縣	03-32222	03-32231	48667000	30	89, 69	油封	QS9000/	1987.06			台灣區車
富合企業	台南縣	06-25403	06-25403	60000000	70	11, 13, 14,	皮帶張	ISO9002	1987.04	s2540311@ms14.hin		台灣區車
豐祥鑫	台北縣	02-22028	02-22051	60000000	105	17, 58, 48,	燃油管	ISO9002	1974.04			台灣區車
同致電子	桃園縣	03-32229	03-32262	60000000	228	80, 81, 25,	中央門	QS9000/	1979.12	tunghih@	www.asia	台灣區車
耿鼎企業	桃園縣	03-32440	03-32442	868739000	329	58, 69	鈑金件	ISO9002	1986.03	webmaste	www.gor	台灣區車

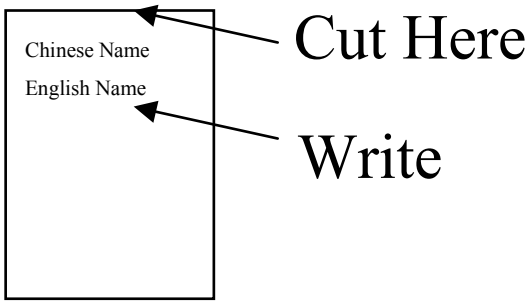
Appendix G: Top 15 Product Category Frequency – Electronics Industry

English	Chinese	Count
Other output peripherals	其他輸出入週邊設備	331
Mainboard	主機板	245
Other interface cards	其他介面卡	140
Computer cables	電腦連接線	98
Color mintor	彩色監視器	84
Interface card	介面卡	76
LAN card	網路卡	76
Interface equipment for computer	電腦週邊設備	75
Keyboard	鍵盤	75
Notebook computer	筆記型電腦	72
Computer	電腦	72
Modem	數據機	62
Electronic mouse	滑鼠	55
Desktop PC	桌上型電腦	50
Personal computer	個人電腦	42

Appendix H: Procedure for Coding Vendor Catalogs

When catalogs are received from the mail survey, each envelope is cut-open using scissors. On the top of the envelope, write the English and Chinese names of the companies and assign a number. Place the envelop in the receiving file box.

Figure A.1 Label each vendor catalog envelope as it is received.



As the catalogs are received, each must be coded. The attached code sheet is used to identify the content within each catalog. Using the code sheet and a catalog, fill out the information as accurately as possible.

As the catalogs are received and coded, enter the data into the Excel spreadsheet database of vendors. The data is entered into the correct fields {F1, F2, F3, … , Fj} as shown in Figure 2 and according to the description ruler. The description ruler identifies the names of the fields within each database record {R1, R2, R3, … , Rn} as well as the type of data stored in the field. Each company occupies one record but has the same multiple fields even though some fields may be left blank if there is no information to put in the field.

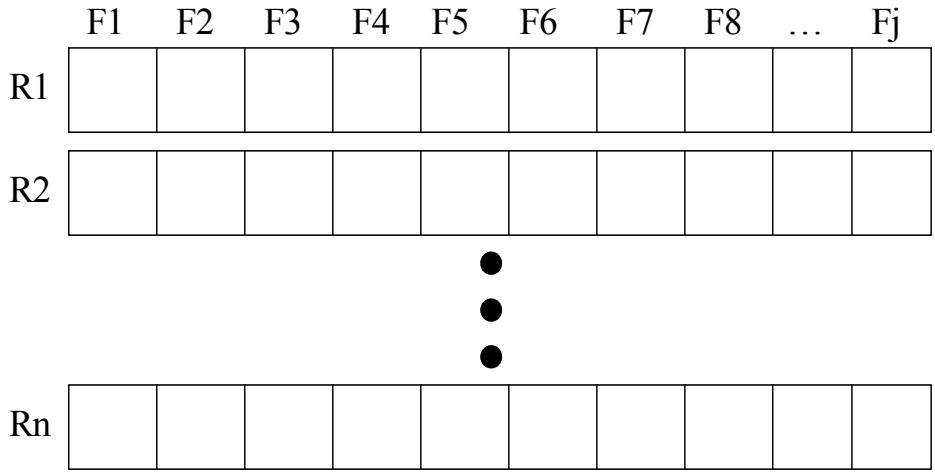


Figure 2 Each vendor occupies a record (R) with each field (F) containing ordered information about the vendor.

When the code sheet is complete and the data entered into the database, staple the code sheet to the outside of the envelope and on the backside from the envelope label.

Description Ruler for Vendor Catalog Database

F#	Description	Data Type	Length
F1	Company Name (Chinese)	Character	C10
F2	Company Address (Chinese)	Char/Num	C/N30
F3	Phone	Numeric	I10
F4	Fax	Numeric	I10
F5	Capital	Numeric	I10
F6	Employees	Numeric	I5
F7	ISO Certification Number (TTVMA)	Alpha/Numeric	A/N10
F8	Established Date	Numeric	I5
F9	Estimated SKUs (by phone survey)	Numeric	I5
F10	Company Listed Auto Part Categories	Numeric	I5
F11	Contact Person	Alpha/Character A/C20	
F12	E-mail Address	Alpha/Numeric	A/N25
F13	Website Address	Alpha/Numeric	A/N35
F14	Association Data Source	Character	C10
F15	Catalog Company Mission	Numeric	I2
F16	Catalog Company History	Numeric	I2
F17	Catalog Company Awards	Numeric	I2
F18	Catalog Product Categories	Numeric	I3
F19	Catalog Product SKU's	Numeric	I5
F20	Catalog Product Dimensions	Alpha	A35
F21	Catalog Brand Names	Numeric	I2
F22	Catalog Language	Numeric	I2
F23	Catalog Product Illustrations	Numeric	I2

Catalog Code Sheet

Catalog Number: _____

Company Name: _____

I#	F#	Description	Data Code Desc.	Code
1.	F15	Catalog Company Mission	0 No, 1 Yes	___
2.	F16	Catalog Company History	0 No, 1 Yes	___
3.	F17	Catalog Company Awards	0 No, 1 Local, 2 Intn'l	___
4.	F18	Catalog Product Categories	Numeric	____
5.	F19	Catalog Product SKU's	Numeric	____
6.	F20	Catalog Product Dimensions	Numeric	____
7.	F21	Catalog Brand Names	Numeric	____
8.	F22	Catalog Language	1 English, 2 Chinese 3 E/C, 4 Japanese, 5 E/C/J, 6 C/J	___
9.	F23	Catalog Product Illustrations	Numeric	____
10.	F24	Type Company	1 Local, 2 Intn'l	___

11. F25 Manufacturing Type 1 OEM, 2 OEM/ODM, 3 ODM ___

Common Dimension Descriptions

_____

_____

_____

Website Code Sheet

Website URL: _____

Company Name: _____

I#	F#	Description	Data Code Desc.	Code
1.	F31	Website Company Mission	0 No, 1 Yes	___
2.	F32	Website Company History	0 No, 1 Yes	___
3.	F33	Website Company Awards/ Certification	0 No, 1 Local, 2 Intn'l ISO	___
4.	F34	Website Product Categories	Numeric	____
5.	F35	Website Product SKUs	Numeric	____
6.	F36	Website g Product Dimensions	Numeric	____
7.	F37	Website Brand Names	Numeric	____
8.	F38	Website Language	1 English, 2 Chinese, 3 E/C, 4 Japanese, 5. E/C/J, 6. C/J	____
9.	F39	Website Product Illustrations	Numeric	____

10. Common Dimension Descriptions _____

Appendix I: Table Product catalog of IC design companies on the Web

No.	Company	Categories	Level	SKUs	Brand name	Illustration	Patent	Remark
1.	Sunplus/凌陽	12	4	332	0	0		#:◎
2	SIS/矽統	6	3	77	1	93		
3	Realtek/瑞昱	3	6	58	1	3		#
4	Winbond/華邦	6	5	365	1	4		
5	Elan/義隆	5	5	207		5	111	
6	Etron/鈺創	3	3	38	1	8		
7	Muchip/嘉矽	4	2	0	1	1		Contact sales for more info.
8	ICreat/我想	2	4	11	1	6		
9	MediaTek/聯發科	2	3	7	1	5		
10	華星							* !
11	JTEK/捷泰	3	2	3	1	1		*
12	竹懋							* !
13	Socle/虹晶	7	3	52	1	5		S:3
14	Holtek/盛群	11	4	441	0	3		
15	Prolific/旺玖	4	3	59	1	47		
16	AIC/沛亨	3	4	91	1	13		
17	C-Media/驊訊	3	4	12	1	15		
18	ARTi/亞全	5	4	30	1	33		#
19	ALTERA	Foreign Co.						
20	Sevic/智動	0	0	0	0	0		No Web
21	MOS Design	2	4	203	0	1		一華
22	Chip Design	3	4	93	0	1		其朋
23	Xtramus/拓瑪	3	3	5	1	15		
24	CHESEN/巨盛	3	3	26	1	15		
25	Genesys Logic	7	5	31	0	7		創惟
26	Trumpion/創品	2	4	16	1	18		
27	ALI/楊智	5	4	32	1	38		
28	SmartASIC	3	4	13	1	2		晶磊
29	UltraChip/晶宏	3	4	30	0	0		
30	MediaReality	2	3	17	1	1		晶捷
31	ICMedia/銳相	3	4	21	0	18		
32	CoAsia/擎亞	2	2	0	1	1		Service
33	Averlogic/凌泰	2	3	79	1	20		
34	Gigarams/京典	4	3	10	1	3		

No.	Company	Categories	Level	SKUs	Brand name	Illustration	Patent	Remark
35	Etrend/益銓	5	3	14	1	10		
36	HiMAX/奇景	5	3	46	0	5		
37	Sonix/松翰	6	5	154	1	3		
38	Sitronix/矽創	2	5	40	1	19		
39	OTI/翰邦	5	4	13	1	17		
40	King Billion	2	3	132	1	3		駿億
41	Tenx/十速	3	2	0	1	1		
42	Terax/力原	4	2	0	0	3		
43	eMemory/力旺	3	4	6	0	2		
44	UTRON/宇慶	2	3	73	0	1		
45	Alpha/佑華	7	5	27	1	9		
46	ElecVision/	1	3	4	0	2		宜霖
47	AMIC/迅慧	3	4	235	0	2		
48	Actrans/前迅	3	3	14	0	0		
49	Ulead/勇領	3	2	87	0	2		
50	E-CMOS/飛虹	4	4	41	0	1		
51	PixArt/元相	1	3	6	1	6		
52	PMC/常益	2	4	10	1	5		

#: Data sheet need password

◎ Own confirm sheet

S: service

* In ITRI Open LAB

! : No Web

Appendix J: Table Product Paper catalog of IC design companies

No.	Company	Categories	Key tech.	SKUs	Brand name	Illustration	Patent	Remark
1.	Sunplus/ 凌陽	7		283	1	29		
2	SIS/ 矽統	9		4	1	17		
3	Realtek/ 瑞昱	3		400	1	34		
4	Winbond/ 華邦	6						
5	Elan/ 義隆	6		292	1	33	49	
6	Etron/ 鈺創	3		6	1	18	106	
7	Muchip/ 嘉矽	4		0	1	18		
8	iCreat	4		8	1	2		
9	MediaTek/聯發科	3		0	0	3		Annual report
10	華星	6		0	0	0		*
11	JTEK/ 捷泰	4		0	0	0		*ability
12	竹懋	2		0	0	0		*
13	Socle/ 虹晶	3		27	1	13		
14	Holtek/ 盛群	11		441	0	0		Selection guide
15	Prolific/ 旺玖	5	17	0	1	22		*
16	AIC/ 沛亨	6			1	8		Company profile
17	C-Media/ 驊訊	3		11	1	6		
18	HiMark/ 亞全	5		31	1	41		
19	ALTERA	3			1			ppt. file for one product
20	Sevic/ 智動	3		0	1	1		

- Located in ITRI open lab

Appendix K: List of Taiwan IC Design companies

一華半導體/MOS Design

北縣三重市重新路五段 609 巷 10 號 6 樓之 5

TEL:(02)22783733 FAX:(02)22783633

成立日期：1988.07 資本額：3 億元

總經理：吳修文 業務聯絡：郭坤林

www.mosdesign.com.tw

八達創新/8aTechnologies

台北市敦化南路二段 267 號 12 樓之 3

TEL:(02)27396485 FAX:(02)27396486

成立日期：2000.05 資本額：2 億元

總經理：姚立和 總經理：張瑋心

www.8atech.com

力原通訊/Terax Communication

新竹科學園區研發二路 12 號 1 樓

TEL:(03)5798528 FAX:(03)5798651

成立日期：2000.08 資本額：2.5 億元

總經理：黃振昇 業務聯絡：王榮德

www.terax.com.tw

十速科技/TenX

新竹市大學路 21 號

TEL:(03)5737682 FAX:(03) 5737632

成立日期：1997.01 資本額：3.08 億元

總經理：王永耀 業務聯絡：陳建中

www.tenx.com.tw

上元科技/ADMtek

新竹科學園區力行路 2 號 2 樓

TEL:(03)5788879 FAX:(03)5788701

成立日期：1997.01 資本額：4.92 億元

總經理：李鴻裕 業務聯絡：張毅平

www.admtek.com.tw

九暘電子/ICPlus

新竹市光復路二段 2 巷 47 號 10 樓

TEL:(03)5750275 FAX:(03)5750475

成立日期：1997.07 資本額：9.84 億元

總經理：羅瑞祥 業務聯絡：陳淵泉

www.icplus.com.tw

力旺電子/eMemory

新竹科學園區力行一路 12 號 3 樓

TEL:(03)5631616 FAX:(03)5632525

成立日期：2000.09 資本額：4 億元

總經理：徐清祥 業務聯絡：張雪華

www.ememory.com.tw

力華電子/Syntronix

新竹科學工業園區力行一路 12 號 5 樓

TEL:(03) 5631986 FAX:(03) 5631980

成立日期：2001.07 資本額：1 億元

總經理：吳中浩 業務聯絡：王彩霞

www.syntronix.com.tw

三合微科/SamHop

台北縣新店市民權路 100 號 7 樓

TEL:(02)22182820 FAX:(02)22183320

成立日期：1992.08 資本額：1.2 億元

總經理：劉立中 業務聯絡：蔡麗雪

www.samhop.com.tw

天鈺/Eureka

新竹科學園區創新一路 12 號 6 樓

TEL:(03)5799255 FAX:(03)5799253

成立日期：1995.07 資本額：4.13 億元

總經理：邱淑慧 業務聯絡：彭義雄

www.eureka.com.tw

太欣半導體/Syntek Design

新竹科學園區工業東四路 24-2 號 3 樓

TEL:(03)5773181 FAX:(03)5778010

成立日期：1983.06 資本額：28.93 億元

總經理：王國肇 業務聯絡：邱火生

www.skt.com.tw

世紀民生科技/Myson-Century

新竹科學園區工業東三路 2 號

TEL: (03)5784866 FAX: (03)5780734

成立日期：2001.10(合併日)資本額：22.42 億

總經理：湯宇方 業務聯絡：楊毅成

www.myson.com.tw

加達士科技/Gatax

台北市內湖區瑞光路 583 巷 26 號 7 樓之 1

TEL:(02)26578829 FAX:(02)26573700

成立日期：2000.05 資本額：2.05 億元

總經理：顏素蘭 業務聯絡：林琮祐

www.gatax.com.tw

台晶科技/TM Technology Inc.

新竹科學園區研發一路 3 號

TEL:(03)5787720 FAX:(03)5787166

成立日期：1994.07 資本額：12.28 億元

總經理：吳亮中 業務聯絡：葉紫惠、鄭義芳

www.tmteck.com.tw

台灣類比/AAT

台北縣中和市中和路 460 號 3 樓

TEL:(02)22326367 FAX:(02) 22326334

成立日期：1999.03 資本額：1.1 億元

總經理：劉紹宗 業務聯絡：李深地

www.aatech.com.tw

巨盛電子/CHESEN

台北縣中和市建八路 16 號 11 樓之 1

TEL:(02)82265589 FAX:(02)82265181

成立日期：1986.12 資本額：2.6 億元

總經理：張盛發 業務聯絡：張盛發

www.chesen.com.tw

方陣科技/Sino Matrix

新竹縣竹東鎮中興路四段 195 號 52 館 313 室

TEL:(03)5828560 FAX:(03)5828359

成立日期：1998.05 資本額：0.52 億元

總經理：張基平 業務聯絡：趙奕祿

世紀創新/Innochip

新竹科學園區工業東四路 24-2 號 5 樓 B 區

TEL:(03)6663077 FAX:(03)6661339

成立日期：2000.09 資本額：0.69 億元

總經理：顏宏儒 業務聯絡：鄒馥霞

www.innochip.com.tw

台灣三星電子/Samsung

台北市基隆路一段 333 號 30F3001 室

TEL:(02)27589588 FAX:(02)27577311

成立日期：1994.11 資本額：2.72 億元

董事長：洪完勳 業務聯絡：陳佳瑩

www.samsung.com

台灣恩益禧/NEC

台北市復興北路 363 號 7 樓

TEL:(02)27192377 FAX:(02)27195951

成立日期：1990.03 資本額：1.0 億元

總經理：大村光男 業務聯絡：萩原亨

www.nec.com.tw

巨有科技/PGC

台北市內湖路一段 88 號 8 樓

TEL:(02)26582233 FAX:(02)26580915

成立日期：1991.08 資本額：3.03 億元

總經理：賴志賢 業務聯絡：賴志賢

www.pgc.com.tw

巨華積體電路/APLUS

台北市大安路一段 75 巷 7 號 6 樓之 3

TEL:(02)27818277 FAX:(02)27815779

成立日期：1992.07 資本額：0.28 億元

總經理：郭杉燦 業務聯絡：蘇旭源

www.aplusinc.com.tw

巨馳國際/E-COM

台北市中正區青島東路 7 號 2 樓之 1

TEL:(02)23970618 FAX:(02) 23979888

成立日期：1992.03 資本額：1.72 億元

總經理：鄭少偉 業務聯絡：余明芳

www.eecom.com.tw

立錡科技/RichTek

新竹縣竹北市台元街 20 號 5 樓

TEL:(03) 5526789 FAX:(03) 5526611

成立日期：1998.09 資本額：1.56 億元

總經理：謝叔亮 業務聯絡：袁子豪

www.richtek.com

吉聯積體電路/G-Link

新竹科學園區工業東四路 24-2 號 6 樓

TEL:(03)5782833 FAX:(03)5780582

成立日期：1995.05 資本額：11 億元

總經理：張　浩 業務聯絡：薛光前

www.glintech.com.tw

宇慶科技/UTRON

新竹科學園區研發二路 11 號 1 樓

TEL:(03)5777882 FAX:(03)5777919

成立日期：1993.04 資本額：9.8 億元

總經理：郭正忠 業務聯絡：陳維仁

www.utron.com.tw

安國國際科技/Alcor Micro Corp.

台北市內湖區港墘路 200 號 4 樓之 1

TEL:(02)87511984 FAX:(02)26597723

成立日期：1999.11 資本額：2.45 億元

總經理：張琦棟 業務聯絡：汪立威

www.alcormicro.com

旭展電子/Topshine

台北市內湖區洲子街 68 號 5 樓

TEL:(02)87973677 FAX:(02)87973667

成立日期：1995.10 資本額：3.61 億元

總經理：郭明煌 業務聯絡：江志平

www.topshine.com.tw

正盈半導體/TIWIN

新竹科學園區展業二路 24 號 2 樓

TEL:(03)5636031 FAX:(03)5644823

成立日期：2000.02 資本額：0.65 億元

總經理：李尚倫 業務聯絡：賴志豪

www.tiwin.com.tw

兆宏電子/Magic Pixel Inc.

新竹科學園區研新三路 3 號 4 樓

TEL:(03)6668822 FAX:(03)6668811

成立日期：2002.12 資本額：2 億元

總經理：黃念祖 業務聯絡：林寶珠

合邦科技/ AVID

新竹科學園區園區二路 11 號 4 樓

TEL:(03)5795222 FAX:(03)5787789

成立日期：1996.01 資本額：4.5 億元

總經理：陳錦塘 業務聯絡：羅志明

www.avid.com.tw

安拓科技/Atonics, Inc.

台北市瑞光路 513 巷 31 號 8 樓

TEL:(02)26271660 FAX:(02)26271631

成立日期：2002.04 資本額：2.01 億元

總經理：江鵬傳 業務聯絡：王敏君

安普生科技/Ampson

新竹市東大路二段 76 號 7 樓之 1

TEL:(03)5354787 FAX:(03)5326676

成立日期：2000.07 資本額：0.35 億元

總經理：林逸彬 業務聯絡：莊評州

www.ampson.com.tw

佑華微電子/Alpha

新竹市光復路二段 295 號 9 樓之 1

TEL:(03)5736660 FAX:(03)5736661

成立日期：1992.07 資本額：4.9 億

總經理：林振興 業務聯絡：翁啓培

www.ealpha.com.tw

宏三/F3

新竹科學園區工業東九路 7 號 2 樓

TEL:(03)5775535 FAX:(03)5775532

成立日期：1997.04 資本額：1.59 億元

總經理：歐陽爲賢 業務聯絡：張哲鋒

www.f3.com.tw

沛亨半導體/AIC

新竹科學工業園區工業東九路 9 號 4 樓

TEL:(03)5772500 FAX:(03)5772510

成立日期：1992.01 資本額：2.85 億元

總經理：李明儒 業務聯絡：鍾杰輝

www.analog.com.tw

迅杰科技/ENE

新竹科學園區展業一路 9 號 4 樓之 1

TEL:(03)6662888 FAX:(03)6662999

成立日期：1998.05 資本額：2.37 億元

總經理：翁佳祥 業務聯絡：何祖瑜

www.ene.com.tw

亞全科技/ARTi

新竹科學園區新安路 8 號 5 樓

TEL:(03)5633056 FAX:(03) 5632886

成立日期：1994.01 資本額：4.5 億元

總經理：高俊傑 業務聯絡：許文宏

www.himark.com.tw

京典矽旺/Gigarams

桃園縣中壢市環北路 398 號 22 樓之 3

TEL:(03)4226719 FAX:(03)4220597

成立日期：1999.05 資本額：2.5 億元

總經理：李昇勳 業務聯絡：余佳妮

www.gigarams.com.tw

其樂達科技/Cheertek Corp.

新竹科學園區力行路 2-1 號 5 樓之 2

TEL:(03) 6667777 FAX:(03) 6667999

成立日期：2001.12 資本額：4 億元

總經理：葉垂奇 業務聯絡：張玉涵協理

www.cheertek.com.tw

我想科技/iCreate

新竹科學園區科技五路 6 號 5 樓

TEL:(03)5790000 FAX:(03)5790088

成立日期：2000.03 資本額：4.51 億元

總經理：葉振倫 業務聯絡：簡孝倫、許憲斌

www.icreate.com.tw

育陞半導體/Winson

新竹縣竹北市新泰路 35 號 7 樓之 8

TEL:(03)5544099 FAX:(03) 5544900

成立日期：1998.10 資本額：0.36 億元

總經理：郭圭偉 業務聯絡：陳美琪

www.winson.com.tw

迅慧科技/HBA

新竹市水利路 81 號 8 樓之 9

TEL:(03) 5169119 FAX:(03) 5169118

成立日期：2000.04 資本額：3.6 億元

總經理：程德康 業務聯絡：黃義欽

www.hba.com

亞信電子/ASIX

新竹科學園區新安路 8 號 4 樓

TEL:(03)5799500 FAX:(03)5639799

成立日期：1995.05 資本額：3.7 億元

總經理：王春旗 業務聯絡：李肇棠

www.asix.com.tw

其朋半導體/Chip Design

新莊市五股工業區五權二路 26 號 4 樓之 3

TEL:(02)22994908 FAX:(02)22990133

成立日期：1985.01 資本額：1.5 億元

總經理：林士棠 業務聯絡：郭平福

www.cdt.com.tw

奇景光電/HiMAX

臺南縣科學園區南科八路 12 號 1 樓

TEL:(06)5050880 FAX:(06)5050891

成立日期：2001.06 資本額：6.24 億元

總經理：吳炳昇 業務聯絡：陳美伶

www.himax.com.tw

宜霖/ElecVision

新竹科學園區研發二路 28 號 2 樓

TEL:(03)5798602 FAX:(03)5794589

成立日期：1996.09 資本額：2 億元

總經理：林瑞建 業務聯絡：張世慶

www.elecvision.com

旺玖科技/Prolific

竹東鎮中興路四段 195-20 號 52 館 5 樓 527R

TEL:(03)5832798 FAX:(03)5832796

成立日期：1997.10 資本額：2.2 億元

總經理：張景棠 業務聯絡：李秋明

www.prolific.com.tw

明導資訊/Mentor Grathics

台北市基隆路一段 333 號 16 樓 1603 室

TEL:(02)87252000 FAX:(02)27576027

成立日期：1986.09 資本額：0.14 億元

總經理：茅　華 業務聯絡：黃德祥

www.mentorg.com.tw

泛訊科技/PSI

新竹縣竹北市光明九路 325 號

TEL:(03)5545370 FAX:(03)5516479

成立日期：2000.06 資本額：1 億元

總經理：陳春木 業務聯絡：戴瑞師

矽基科技/Silicon Based

新竹科學園區研發一路 23 號 1 樓

TEL:(03)5777897 FAX:(03)5779832

成立日期：1995.07 資本額：4.6 億元

總經理：張瑞鈐 業務聯絡：張逸勳

www.sbt.com.tw

金麗半導體/RDC

新竹科學園區力行路 2-1 號 6 樓之 1

TEL:(03)6662866 FAX:(03)5631498

成立日期：1997.08 資本額：3 億元

總經理：易建男 業務聯絡：吳永宗

www.rdc.com.tw

拓碼科技/Xtramus

台北縣中和市中正路 959 號 8 樓

TEL:(02)82276611 FAX:(02)82276622

成立日期：2001.07 資本額：1.4 億元

總經理：卓玉文 業務聯絡：陳嫈華

www.xtramus.com

易亨電子/Anachip

新竹科學園區工業東四路 24-2 號 2 樓

TEL:(03)5678234 FAX: (03)5678368

成立日期：2001.12 資本額：4 億元

總經理：曹一扶 業務聯絡：林福成

www.anachip.com

松翰科技/Sonix

新竹縣竹北市縣政五街 32 巷 8 號 9 樓

TEL:(03)5510520 FAX:(03)5510523

成立日期：1996.07 資本額：9.48 億元

總經理：鮑世嘉 業務聯絡：潘銘鍠

www.sonix.com.tw

矽成積體電路/ICSI

新竹科學園區科技五路 2 號

TEL:(03)5780333 FAX:(03)5783000

成立日期：1990.09 資本額：22.54 億元

總經理：韓光宇 業務聯絡：邱坤壽

www.icsi.com.tw

矽創電子/Sitronix

新竹縣竹北市縣政五街 32 巷 8 號 4 樓

TEL:(03)5534376 FAX:(03)5534375

成立日期：1998.01 資本額：2.5 億元

總經理：毛穎文 業務聯絡：王　崴

www.sitronix.com.tw

長茂科技/EverMore

新竹科學園區研發一路 7 號 2 樓

TEL:(03)5642060 FAX:(03)5798303

成立日期：1997.05 資本額：1.2 億元

總經理：莊武章 業務聯絡：許文賢

www.emt.com.tw

亮發科技/InCOMM

台北市內湖區堤頂大道二段 475 號 9 樓

TEL:(02)26599609 FAX:(02)26599603

成立日期：2001.01 資本額：2.54 億元

總經理：羅海槎 業務聯絡：羅海槎

www.incomm.com

前訊系統/Actrans System

新竹科學園區工業東四路 9 號 2 樓

TEL:(03)5778366 FAX:(03)5778369

成立日期：2000.08 資本額：4.26 億元

總經理：陳秋峰 業務聯絡：許輝民

www.actrans-inc.com

勁取科技/AccFast

新竹科學園區園區二路 60 號 2 樓

TEL: (03)6662756 FAX: (03)6662758

成立日期：1999.06 資本額：2.2 億元

總經理：曾繼雄 業務聯絡：劉雲山協理

www.accfast.com.tw

威瀚科技/VIA Networking

台北縣新店市中正路 531 號 5 樓

TEL:(02)22182078 FAX:(02)22198461

成立日期：2002.06 資本額：2 億元

總經理：陳文琦 業務聯絡：孫一正

恆禹科技/Henwood

台北市長春路 137 巷 8-2 號 4 樓

TEL:(02)25810808 FAX:(02)25673198

成立日期：1998.06 資本額：1.1 億元

總經理：孫正運 業務聯絡：林郁芯

www.henwood.com

科統科技/KOL

新竹市金山七街 1 號 9 樓

TEL:(03)5639666 FAX:(03)5639669

成立日期：2000.09 資本額：1.95 億元

總經理：方宏基 業務聯絡：彭瓊雯

www.koltek.com.tw

冠宇國際電子/IC Nexus

台北市中正區南昌路二段 103 號 11 樓

TEL:(02)33652020 FAX:(02)33652121

成立日期：1999.12 資本額：0.25 億元

總經理：廖哲倫 業務聯絡：李心湄

www.icnexus.com.tw

勇領科技/Ulead Technology

新竹市自由路 111 號 8 樓之 1

TEL:(03)5345968 FAX:(03)5345986

成立日期：2000.03 資本額：2.2 億元

總經理：蘇江津 業務聯絡：蘇進欽、林志杰

www.uleadtek.com.tw

威盛電子/VIA

台北縣新店市中正路 533 號 8 樓

TEL:(02)22185452 FAX:(02)22185453

成立日期：1992.09 資本額：119.18 億元

總經理：陳文琦 業務聯絡：李聰結

www.viatech.com.tw

威騰光電/VIA Optical Solution

台北縣新店市中正路 527 號 10 樓

TEL:(02)22185452 FAX:(02)22186282

成立日期：2002.02 資本額：17.5 億元

總經理：陳文琦 業務聯絡：陳式榕

www.viatech.com.tw

洛高企業/ROCO

台北市永吉路 33 號 2 樓

TEL:(02)27660156 FAX:(02)27615691

成立日期：1985.04 資本額：0.05 億元

總經理：蔡文彬 業務聯絡：蔡文彬

roco@ethome.net.tw

科雅科技/Goyatek

新竹科學園區研發二路 25 號 3 樓

TEL:(03)5631051 FAX:(03)5631052

成立日期：1998.10 資本額：2.1 億元

總經理：張正榮 業務聯絡：高文麟

www.goya.com.tw

紅隼科技/Red Falcon

台北市仁愛路四段 122 巷 63 號 6 樓之 4

TEL:(02)27097718 FAX:(02)27097705

成立日期：2000.01 資本額：0.1 億元

總經理： 業務聯絡：駱宏通

www.redfalcon.com.tw

美商傑爾系統/Agere Systems

台北市信義路四段 456-458 號 14 樓

TEL:(02)27255858 FAX:(02)27233838

成立日期：2001.03 資本額：0.1 億元

總經理：沈明坤 業務聯絡：陳彥良

www.agere.com

茂達電子/ANPEC

新竹科學園區力行路 2 號 5 樓

TEL:(03)5642000 FAX:(03)5642050

成立日期：1997.01 資本額：4.64 億元

總經理：陳日昇 業務聯絡：張宏碩

www.anpec.com.tw

虹晶科技/Socle Technology

新竹市光復路二段 287 號 14 樓之 2

TEL:(03)5163166 FAX:(03)5163177

成立日期：2001.07 資本額：2.5 億元

總經理：劉育源 業務聯絡：丁祥鴻

www.socle-tech.com.tw

飛虹積體電路/E-CMOS

新竹科學園區研新二路 1 號

TEL:(03)5783622 FAX:(03)5783630

成立日期：1987.11 資本額：4.2 億元

總經理：劉淙漢 業務聯絡：王元成

www.ecmos.com.tw

倚強科技/SQ

台北市士林區承德路四段 150 號 6 樓

TEL:(02)66111177 FAX:(02)66106777

成立日期：1992.10 資本額：1.53 億元

總經理：沈聯傑 業務聯絡：鄒佳融

www.sq.com.tw

美商巨積/LSI Logic

台北市民生東路三段 156 號 10 樓

TEL:(02)27187828 FAX:(02)27188869

成立日期：1988.12 資本額：0.25 億元

總經理：夏慶志 業務聯絡：夏慶志

www.lsilogic.com

致新科技/GMT

新竹科學園區園區二路 11 號 6 樓

TEL:(03)5788833 FAX:(03)5784289

成立日期：1996.07 資本額：2.54 億元

總經理：吳錦川 業務聯絡：吳錦川

www.gmt.com.tw

虹冠電子/Champion

新竹科學園區園區二路 11 號 5 樓

TEL:(03)5679979 FAX:(03)5679909

成立日期：1998.12 資本額：8.7 億元

總經理：譚永禾 業務聯絡：李恆春

www.championmicron.com.tw

飛利浦/Philips

台北市忠孝西路一段 66 號 23 樓

TEL:(02)23887666 FAX:(02)23824411

成立日期：1970.04 資本額：82.51 億元

總　裁：范歐世 業務聯絡：

www.philips.com.tw

香港商意法半導體/STM

台北市大安區敦化南路二段 207 號 20 樓

TEL:(02)23788088 FAX:(02)23789188

成立日期：1985.07 資本額：0.04 億元

總經理：傅錦祥 業務聯絡：林麗玲

www.st.com

凌泰科技/AverLogic

台北市內湖區成功路二段 514 號 4 樓

TEL：(02)27915050 FAX：(02)27912132

成立日期：1998.10 資本額：2.55 億元

總經理：張敦凱 業務聯絡：王建智

www.averlogic.com.tw

凌航科技/Goldkey

新竹科學園區展業二路 18 號 6 樓

TEL:(03)5633188 FAX:(03)5635198

成立日期：1998.07 資本額：4.27 億元

總經理：胡鈞隆 業務聯絡：林璟博

www.goldkey.com.tw

凌越/Topro

新竹科學園區展業一路 10 號 5 樓

TEL:(03)5632515 FAX:(03)5641728

成立日期：1997.10 資本額：5 億元

總經理：林明觀 業務聯絡：穆世義

www.topro.com.tw

原相科技/PixArt

新竹科學園區創新一路 5 號 5 樓

TEL:(03)5795317 FAX:(03)5795305

成立日期：1998.07 資本額：4 億元

總經理：黃森煌 業務聯絡：李維疆

www.pixart.com.tw

泰視科技/TASC

台北縣汐止市新台五路一段 75 號 15 樓

TEL:(02)26983007 FAX:(02)26983008

成立日期：1997.12 資本額：4.5 億元

總經理：許宜泉 業務聯絡：樊益人

www.tascorp.com.tw

益芯科技/CMSC

新竹科學園區研發二路 9 號 2 樓

TEL:(03)5634866 FAX:(03)5634863

成立日期：2001.07 資本額：1.95 億元

總經理：陳仲羲 業務聯絡：岳恆德副總

www.cmsc.com.tw

益詮/Etrend

台南縣科學園區南科三路 5 號 3 樓

TEL:(06)5050170 FAX:(06)5050175

成立日期：1997.10 資本額：1.9 億元

總經理：謝錦銘 業務聯絡：呂明誠經理

www.etrend.com.tw

凌翔科技/WavePlus

台北市內湖區新湖二路 347 號

TEL:(02)87921856 FAX:(02)87922041

成立日期：1999.12 資本額：1.75 億元

總經理：張曉詩 業務聯絡：楊鴻博

www.waveplus.com.tw

凌陽科技/Sunplus

新竹科學園區創新一路 19 號

TEL:(03)5786005 FAX:(03)5786006

成立日期：1990.08 資本額：69.49 億元

總經理：陳陽成 業務聯絡：盧漢華、蘇國欽

www.sunplus.com.tw

振瑋科技/Media Scope

台北縣中和市中山路二段 351 號 4 樓之 10

TEL:(02)82276582 FAX:(02)22286833

成立日期：2000.03 資本額：1.0 億元

總經理：鄭敬齡 業務聯絡：

www.mstcweb.com

泰鼎尖端科技/TTI

新竹科學園區力行路 8 號 3 樓

TEL:(03)5670680 FAX: (03)5670314

成立日期：1997.10 資本額：2 億元

總經理：張忠恆 業務聯絡：秦宜石副總

www.trident.com.tw

益勤科技/ZyDAS

新竹科學園區創新二路 6 號 3 樓

TEL:(03)5773309 FAX: (03)5773767

成立日期：2000.03 資本額：2.5 億

總經理：洪乃權 業務聯絡：莊哲明

荃文科技/CTC

新竹市民權路 266 號 9 樓之 1

TEL:(03)5311161 FAX:(03)5338403

成立日期：1996.08 資本額：0.3 億元

總經理：蔡子曜 業務聯絡：蔡子曜

www.ctcasic.com.tw

陞達半導體/Star

新竹科學園區力行路 17 號 6 樓

TEL:(03)5678855 FAX:(03)5679225

成立日期：2002.10 資本額：1.5 億元

總經理：王明宗 業務聯絡：李　煜

崇貿科技/System General Corp.

台北縣新店市寶興路 45 巷 8 弄 1 號 3 樓

TEL:(02)29173005 FAX:(02)29111283

成立日期：1989.12 資本額：2.5 億元

總經理：楊大勇 業務聯絡：林宗德副總

www.sg.com.tw

康奈科技/Conwise

新竹科學園區園區二路 44 號 2 樓

TEL: (03)5779880 FAX: (03)5779870

成立日期：1999.05 資本額：2 億元

總經理：陳瑞昌 業務聯絡：廖寶旺

www.conwise.com.tw

晨星半導體/Mstar Semiconductor

新竹縣竹北市台元街 26 號 4 樓之 1

TEL：(03)5037269 FAX：(03)5526009

成立日期：2002.07 資本額：1.33 億元

總經理：楊偉毅 業務聯絡：吳三槐

www.mstarsemi.com.tw

祥釆科技/Holylite

新竹市東光路 55 號 9 樓之 5

TEL:(03)5734589 FAX:(03)5734690

成立日期：1992.09 資本額：0.21 億元

總經理：林緒德 業務聯絡：林緒德

通泰積體電路/Tontek Design

台北縣中和市建一路 166 號 6 樓(F 棟)

TEL:(02)82265916 FAX:(02)82265929

成立日期：1986.01 資本額：3.7 億元

總經理：陳進培 業務聯絡：陳永修

www.tontek.com.tw

偉詮電子/Weltrend

新竹科學園區工業東九路 24 號 2 樓

TEL:(03)5780241 FAX:(03)5770419

成立日期：1989.07 資本額：18.96 億元

總經理：林錫銘 業務聯絡：蔡東芳

www.weltrend.com.tw

常憶科技/PMT

新竹科學園區展業一路 10 號 8 樓

TEL：(03)5633616 FAX：(03)5633696

成立日期：1998.10 資本額：4 億元

總經理：王筱瑜 業務聯絡：陸秀芝

www.pmt.com.tw

捷誠科技/COMAX

新竹科學園區創新一路 5-1 號 4 樓

TEL:(03)5678636 FAX:(03)5678637

成立日期：1999.03 資本額：1.38 億元

總經理：林正民 業務聯絡：呂慶隆

www.comaxsi.com.tw

盛群半導體/Holtek

新竹科學園區研新二路 3 號

TEL: (03)5631999 FAX: (03)5631189

成立日期：1998.12 資本額：17.51 億元

總經理：高國棟 業務聯絡：楊仁祥

www.holtek.com.tw

笙泉科技/Megawin

新竹市埔頂路 99 巷 3 號 7 樓之 1

TEL:(03)5750050 FAX:(03)5750070

成立日期：1999.06 資本額：2.75 億元

總經理：溫國良 業務聯絡：常　彬

www.megawin.com.tw

連邦科技/BSI

新竹科學園區園區二路 40 號 2 樓

TEL:(03)5798801 FAX:(03)5794728

成立日期：1996.04 資本額：9.79 億元

總經理：汪持先 業務聯絡：蔡東和

www.bsi.com.tw

翊傑科技/EE Solutions

新竹科學園區園區二路 9 號 8 樓

TEL:(03)5678568 FAX:(03)5678611

成立日期：1999.03 資本額：1.4 億元

總經理：蘇進成 業務聯絡：蘇進成

www.e2-solutions.com.tw

創品電子/Trumpion

台北市大同區承德路一段 17 號 11 樓

TEL：(02)25587855 FAX：(02)25550557

成立日期：1998.03 資本額：1.97 億元

總經理：歐憲昌 業務聯絡：張臨政

www.trumpion.com.tw

創傑科技/ISSC

新竹科學園區工業一路 2-1 號 3 樓

TEL: (03)5778385 FAX: (03)5778501

成立日期：1999.05 資本額：2 億元

總經理：林京元 業務聯絡：張寶全

www.issc.com.tw

創意電子/Global Unichip Corp.

新竹科學園區研發二路 26 號 2 樓

TEL: (02)5646600 FAX:(02) 5646000

成立日期：1998.01 資本額：6.25 億元

總經理：賴俊豪 業務聯絡：鄭世暉

www.globalunichip.com

富微科技/ADD

台北市松山區南京東路三段 287 號 13 樓

TEL: (02)27132800 FAX: (02)27132805

成立日期：1995.04 資本額：1.89 億

總經理：莊　偉 業務聯絡：初炳銘

www.addmtek.com

敦茂科技/DenMOS

新竹科學園區力行路 19 號 8 樓

TEL: (03)5795888 FAX: (03)5665898

成立日期：2001.03 資本額：5.43 億元

總經理：大嶌正敏 業務聯絡：高玉光

www.denmos.com.tw

傑倫科技/Gerent

新竹縣竹東鎮中興路四段 830 號 4 樓

TEL: (03)5832858 FAX: (03)5831618

成立日期：2000.08 資本額：2.6 億元

總經理：楊士斌 業務聯絡：羅文虎

www.gerent.com.tw

創惟科技／Genesys Logic

台北縣新店市北新路三段 205 號 12 樓

TEL：(02)89131888 FAX：(02)89131688

成立日期：1997.04 資本額：4.49 億元

總經理：施宏林 業務聯絡：黃金城

www.genesyslogic.com.tw

創詠科技/Trumpwave

新竹市學府路 37 號 4 樓

TEL:(03)5166011 FAX:(03)5166015

成立日期：2001.03 資本額：0.15 億元

總經理：溫文種 業務聯絡：郭文鴻

富晶半導體/FSC

台北縣淡水鎮中正東路二段 27 號 28 樓

TEL: (02)28094742 FAX: (02)28094874

成立日期：1995.09 資本額：1.95 億元

總經理：俞再均 業務聯絡：胡瑞芬、田乃婷

www.fsc.com.tw

揚智科技/ALI

台北市內湖路一段 246 號 2 樓

TEL: (02)87522000 FAX: (02)87511001

成立日期：1993.06 資本額：14.15 億元

總經理：吳欽智 業務聯絡：劉爵群

www.ali.com.tw

普邦科技/Acute

新竹科學園區園區二路 42 號 2 樓

TEL: (03)5790680 FAX: (03)5775606

成立日期：1998.11 資本額：1.69 億元

總經理：余基祥 業務聯絡：陳英俊

www.acutecomm.com.tw

普誠科技/Princeton

台北縣新店市寶橋路 233-1 號 2 樓

TEL: (02)29162151 FAX: (02)29174598

成立日期：1986.05 資本額：9.08 億元

總經理：姜長安 業務聯絡：江志澄

www.princeton.com.tw

晶展科技/G-Design

新竹科學園區研發二路 13 號 2 樓

TEL: (03)5799081 FAX: (03)5797393

成立日期：2000.08 資本額：2.19 億元

總經理：朱建彰 業務聯絡：經玉華

www.g-designtech.com.tw

晶通電子/Gemstone

台北市中正區衡陽路 102 號 6 樓

TEL: (02)23886868 FAX: (02)23882699

成立日期：1999.12 資本額：1.06 億元

總經理：趙步雲 業務聯絡：魏榮瑞

www.gemstone.com.tw

晶磊半導體/SmartASIC

台北市內湖區洲子街 68 號 3 樓

TEL: (02)87977889 FAX: (02)87976829

成立日期：1998.03 資本額：4.74 億元

總經理：梁啓成 業務聯絡：劉憲祺

www.smartasic.com

智原科技/Faraday

新竹科學工業園區力行一路 10-2 號

TEL: (03)5787888 FAX: (03)5787889

成立日期：1993.06 資本額：17.09 億元

總經理：林孝平 業務聯絡：林志明

www.faraday.com.tw

智微科技/Jmicron Technology

新竹科學園區展業二路 18 號 4 樓

TEL:(03)5797389 FAX:(03)5799566

成立日期：2001.11 資本額：2 億元

總經理：劉立國 業務聯絡：謝榮禧

www.jmicron.com.tw

晶宏半導體/UltraChip

台北市內湖區洲子街 70 號 3 樓

TEL：(02)87978947 FAX：(02)87978910

成立日期：1999.08 資本額：5.4 億元

總經理：徐豫東 業務聯絡：游兆祺

www.ultrachip.com

晶捷科技/Media Reality

台北市內湖區陽光街 365 巷 39 號 3 樓

TEL: (02)66061178 FAX: (02)66061288

成立日期：1999.12 資本額：4.5 億元

總經理：梁瑞娟 業務聯絡：王立民

www.mrti.com.tw

晶豪/ESMT

新竹科學園區力行五路 9 號 5 樓

TEL: (03)5781970 FAX: (03)5781971

成立日期：1993.06 資本額：13.75 億元

總經理：陳興海 業務聯絡：盧聖初

www.esmt.com.tw

智合科技/Joing

新竹縣竹北市新泰路 35 號 B 棟 7 樓之 5

TEL: (03)5553545 FAX: (03)5553546

成立日期：1998.01 資本額：0.9 億元

總經理：張成才 業務聯絡：張成才

www.joingtk.com.tw

智森科技/Giga Solution

新竹科學園區新安路 6 號 5 樓

TEL: (03)6116168 FAX: (03)5630100

成立日期：2000.03 資本額：4.5 億元

總經理：陳良波 業務聯絡：簡正宇

www.giga-solution.com

絡達科技/Airoha

新竹科學園區力行六路 5 號

TEL: (03)6128188 FAX: (03)6118833

成立日期：2001.08 資本額：2 億元

總經理：呂向正 業務聯絡：黃育菁

www.airoha.com.tw

華矽半導體/MosArt

台北縣板橋市民生路一段 33 號 23 樓

TEL：(02)29599180 FAX：(02)29599323

成立日期：1993.06　　資本額：3.83 億元

總經理：鍾兆恩　　業務聯絡：李若偉

www.mosart.com.tw

甯翔科技/FRONTAND

新竹市光復路二段 101 號清大育成中心 314 室

TEL: (03)5741086　　FAX: (03)5741096

成立日期：2000.07　　資本額：0.4 億元

總經理：陳榮祥　　業務聯絡：劉治傑

www.frontand.com.tw

新德科技/Neotec

新竹縣竹北市民權街 17 巷 7 號 1 樓

TEL: (03)5537688　　FAX: (03)5537789

成立日期：1998.06 資本額：2.19 億元

總經理：葉進男　　業務聯絡：馮元俊

www.neotec.com.tw

瑞佑科技/Raio

新竹科學園區研新三路 3 號 1 樓

TEL: (03)5637888　　FAX: (03)5637666

成立日期：1999.08　　資本額：1.12 億元

總經理：張　程　　業務聯絡：郭婷揚

www.raio.com.tw

瑞頡科技/M-SQUARE

新竹科學園區工業東九路 2 號 4 樓

TEL: (03)6661028　　FAX: (03)6661928

成立日期：2001.06　　資本額：2 億元

總經理：林明興　　業務聯絡：康義興

www.msquaretech.com

義隆電子/ELAN

新竹科學園區創新一路 12 號

TEL: (03)5639977　　FAX: (03)5639966

成立日期：1994.05　　資本額：32.92 億元

總經理：葉儀皓　　業務聯絡：鍾榮達

www.emc.com.tw

視傳科技/VXIS

新竹科學園區展業一路 9 號 5 樓-1

TEL: (03)5630888　　FAX: (03)5630889

成立日期：1999.02　　資本額：2.93 億元

總經理：陳睿緒　　業務聯絡：李照國

www.vxis.com.tw

圓創科技/Aimtron

新竹科學園區展業二路 10 號 2 樓

TEL:(03)5630878　　FAX: (03)5630879

成立日期：1998.12　　資本額：1.3 億元

總經理：陳慧玲　　業務聯絡：宋燕謙

www.aimtron.com.tw

源捷科技/SOTA

新竹科學園區研發二路 12 號 2 樓

TEL: (03)5643939　FAX: (03)5643737

成立日期：1997.07　　資本額：　2 億元

總經理：魏益盛　　業務聯絡：吳啓澤

www.sota.com.tw

瑞昱半導體/Realtek

新竹科學園區工業東九路 2 號 1 樓

TEL: (03)5780211　　FAX: (03)5776047

成立日期：1987.10　　資本額：52.78 億元

總經理：邱順建　　業務聯絡：蔡榮進

www.realtek.com.tw

義統電子/Etoms

新竹科學園區創新一路 12 號 6 樓

TEL: (03)6661766　　FAX: (03)6661765

成立日期：2001.12 資本額：1.5 億元

總經理：黃志國　　業務聯絡：朱亞民

www.etomscorp.com

義聯科技/ELANsat

新竹科學園區創新一路 12 號 5 樓

TEL：(03)5635105　　FAX：(03)5635107

成立日期：2000.06　　資本額：2 億元

總經理：鄒治平　　業務聯絡：楊盛隆

www.elansat.com

群立積體電路/Micron Design

台北縣新店市寶高路 5 號

TEL: (02)29128099 FAX: (02)29128421

成立日期：1986.12 資本額：1.99 億元

總經理：林子敬 業務聯絡：林子敬

www.lance.com.tw

聖晶科技/IATEC

台北市中山區龍江路 23 號 5 樓

TEL：(02)27311335 FAX：(02)27311336

成立日期：2000.06 資本額：1 億元

總經理：陳貽榮 業務聯絡：陳雪玫

www.iatec.com.tw

詮華電子/Aslic Micro

台北市內湖區瑞光路 583 巷 30 號 6 樓

TEL: (02)26586809 FAX: (02)26586450

成立日期：1987.06 資本額：1 億元

董事長：邱正宗 業務聯絡：黃敏哲

www.aslic.com.tw

雷凌科技/Ralink

新竹科學園區科技五路 2 號 4 樓

TEL:(03)5678868 FAX:(03)5678818

成立日期：2001.11 資本額：3.63 億元

總經理：高榮智 業務聯絡：晁中明

www.ralinktech.com.tw

鈺創科技/Etron

新竹科學園區科技五路 6 號

TEL: (03)5782345 FAX: (03)5779001

成立日期：1991.02 資本額：21.84 億元

總經理：盧超群 業務聯絡：李訓豐

www.etron.com.tw

碩頡科技/Beyond Innovation

台北市南京東路三段 136 號 5 樓

TEL: (02)27785939 FAX: (02)27781050

成立日期：1999.11 資本額：0.9 億元

總經理：蔣文傑 業務聯絡：江少雄

www.bitek.com.tw

群聯電子/Phison

新竹縣竹東鎮中興路四段 669 號 2 樓

TEL: (03)5833899 FAX: (03)5833666

成立日期：2000.11 資本額：1.73 億元

總經理：潘健成 發言人：邱淑華

www.phison.com

誠致科技/Trendchip

新竹縣竹東鎮中興路四段 195-61 號 53 館 112 室

TEL: (03)5910108 FAX: (03)5910156

成立日期：2001.05 資本額：3.68 億元

總經理：方新舟 業務聯絡：林慧貞

www.trendchip.com.tw

達盛電子/ubec

新竹市東光路 192 號 3 樓之 2

TEL:(03)5729898 FAX:(03)5718599

成立日期：2002.07 資本額：3.6 億元

總經理：翟駿逸 業務聯絡：陳琴德

www.ubec.com.tw

鼎威研發/Digiwell

新竹科學園區展業一路 1 號 4 樓

TEL：(03)5782910 FAX：(03)5639464

成立日期：2002.05 資本額：1 億元

總經理：謝勳章 業務聯絡：許恆博

www.digiwell.com.tw

嘉矽電子/MuChip

台北市內湖區瑞光路 583 巷 21 號 5 樓之 3

TEL: (02)87977666 FAX: (02)87977667

成立日期：2000.02 資本額：2.8 億元

總經理：陳仁嘉 業務聯絡：劉晏蓉

www.muchip.com

精拓科技/FIT

新竹縣竹北市新泰路 31 號 7 樓

TEL:(03)6562727 FAX:(03)6560537

成立日期：2002.05 資本額：2.59 億元

總經理：陳神寶 業務聯絡：馬致遠

www.fintek.com.tw

聚積科技/Macroblock Inc.

新竹市埔頂路 18 號 6 樓之 4

TEL: (03) 5790068 FAX: (03) 5790069

成立日期：1999.06 資本額：0.91 億元

總經理：楊立昌 業務聯絡：曾淑棻

www.mblock.com.tw

慧傳科技/Telewise

新竹市光復路二段二巷 47 號 10 樓之 3

TEL:(03)5723090 FAX:(03)5723057

成立日期：2002.08 資本額：1.5 億元

總經理：曾慶義 業務聯絡：賴貞如

www.telewise.com

銳相科技/IC Media

台北市內湖區洲子街 61 號 6 樓

TEL: (02)26577898 FAX: (02)26578751

成立日期：1999.09 資本額：1.9 億元

總經理：吳炳松 業務聯絡：陳志勇

www.ic-media.com.tw

翰邦科技/OTI

新竹縣竹北市光明六路 85 號 1 樓

TEL: (03)5537511 FAX: (03)5555804

成立日期：2000.08 資本額：0.6 億元

總經理：張銘得 業務聯絡：黃新泓

www.oti.com.tw

環宇中華積體電路/WinLead

新竹市水利路 81 號 8 樓之 1

TEL: (03)5169091 FAX : (03)5169092

成立日期：1997.10 資本額：0.8 億元

總經理：朱楚潟 業務聯絡：楊景成

聯信科技/URI

新竹科學園區力行六路 3 號 5 樓

TEL：(03)5782258#58960 FAX：(03)5630496

成立日期：2001.12 資本額：1 億元

總經理： 周淳朴 業務聯絡：邱錦增

www.uri.com.tw

德州儀器/TI

台北縣中和市興南路一段 142 號

TEL: (02)29435141 FAX: (02)22411309

成立日期：1969.05 資本額：39 億元

總經理：李同舟 業務聯絡：彭榮興

www.ti.com/sc

摩托羅拉電子/Motorola

台北市大安區仁愛路四段 296 號 9 樓

TEL: (02)27058000 FAX: (02)27050077

成立日期：1985.04 資本額：39.68 億元

總經理：丁肇玢 業務聯絡：游佩筠

www.motorola.com.tw

積丞科技/IPLIB

新竹市水利路 81 號 10 樓之 17

TEL: (03)5169288 FAX: (03)5169283

成立日期：2001.11 資本額：0.6 億元

總經理：周永發 業務聯絡：林建良

www.iplib.com

擎亞國際科技/CoAsia

台北市內湖區洲子街 69 號 9 樓

TEL: (02)26582020 FAX: (02)26580101

成立日期：1997.11 資本額：2.7 億元

總經理：張鴻誠 業務聯絡：徐蕙敏

www.coasia.com.tw

聯合聚晶/IST

台北市內湖區堤頂大道二段 201 號 7 樓

TEL: (02)87977911 FAX: (02)87977915

成立日期：1999.10 資本額：3 億元

總經理：蘇崇文 業務聯絡：吳善曉

www.ist4u.com

聯笙電子/AMIC

新竹科學園區力行六路 5 號 6 樓

TEL: (03)5679966 FAX: (03)5679977

成立日期：1997.07 資本額：11.89 億元

總經理：陳焜錄 業務聯絡：金也明

www.amictechnology.com

聯傑國際/Davicom

新竹科學園區工業東九路 7-2 號 3 樓

TEL: (03)5798797 FAX: (03)5794770

成立日期：1996.10 資本額：8 億元

總經理：石銘堂 業務聯絡：李廷鑫

www.davicom.com.tw

聯詠科技/Novatek

新竹科學園區創新一路 13 號 2 樓

TEL: (03)5670889 FAX: (03)5770132

成立日期：1997.05 資本額：28.8 億元

總經理：王守仁 業務聯絡：李明添

www.novatek.com.tw

聯聖科技/MicroLinks

高雄市新興區中正三路 55 號 21 樓

TEL: (07)2225678 FAX: (07)2225675

成立日期：1995.07 資本額：1.58 億元

總經理：郭志鳴 業務聯絡：黃雅珍

www.mltc.com.tw

鴻揚光電/m-Display

新竹縣竹東鎮中興路四段 195 號 52 館 4 樓 407 室

TEL:(03)5910161 FAX:(03)5833540

成立日期：2002.12 資本額：0.25 億元

總經理：劉鴻達 業務聯絡：蔡千群

www.m-display.com.tw

瀰士科技/Memes Technology

台北市中正區羅斯福路二段 102 號 11 樓之 1

TEL:(02)77246666 FAX:(02)77247712

成立日期：2002.07 資本額：0.15 億元

總經理：倪其良 業務聯絡：

www.wiforce-tc.com

聯發科技/MediaTek

新竹科學園區創新一路 13 號 1 樓

TEL: (03)5670766 FAX: (03)5787610

成立日期：1997.05 資本額：46.04 億元

總經理：卓志哲 業務聯絡：孫永康

www.mtk.com.tw

聯陽半導體/ITE

新竹科學園區創新一路 13 號 3 樓

TEL: (03)5798658 FAX: (03)5794803

成立日期：1996.05 資本額：9.81 億元

總經理：胡鈞陽 業務聯絡：張培原

www.ite.com.tw

駿億電子/ King Billion

新竹縣竹北市台元街 26 號 8 樓之 1

TEL: (03)5526168 FAX : (03)5526188

成立日期：1997.11 資本額：3.07 億元

總經理：黃正華 業務聯絡：簡心怡

www.kingb.com.tw

點晶科技/Silicon Touch

新竹科學園區工業東四路 40 號 2 樓

TEL: (03)5727171 FAX: (03)5727390

成立日期：1996.12 資本額：1.5 億元

總經理：金際遠 業務聯絡：陳盈守

www.siti.com.tw

驊訊電子/C-MEDIA

台北市市民大道四段 100 號 6 樓

TEL:(02)87731100 FAX:(02)87732211

成立日期：1991.12 資本額：2.29 億元

總經理：鄭期成 業務聯絡：蔡晶武

www.cmedia.com.tw

Autobiography

Yung-Chuan Peng is a senior manager at the Industrial Technology Research Institute (ITRI) and secretary general of Taiwan Electronic Connector Association (TECA). He received an MBA degree from the Management of Technology Department at the National Chiao-Tung University (NCTU) in 1997, and is also a part time lecturer currently teaching marketing related courses at Chung Hua University. E-commerce and marketing are his major research area.

E-mail: Y.C.Peng@itri.org.tw