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企業經營社群影響之實證研究

An Empirical Study on the Effects of an Enterprise Fan Page

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摘要

社群網站是目前蓬勃發展的網路應用服務，其多樣化功能與高互動性不僅影響使用者生活習慣也促進其購買行為。越來越多企業投入大量成本經營社群網站，希望從中得到好處，但仍有部分企業質疑經營社群無法替企業帶來實質效益。本研究目的在探討經營社群是否可以帶給企業效益。藉由大量文獻探討，提出了六個關於社群效益的假設。透過四階段研究來驗證假設，第一階段蒐集了全球 16 個跨國企業資料加以分析，得到了一個概略性的了解; 第二階段蒐集了 58 個跨國企業的資料進行社群能力與產品銷售之關聯性分析;第三階段研究將焦點放回台灣企業，蒐集了電信、航空、銀行以及便利商店四個產業中 11 個企業資料進行社群能力與產品銷售的關聯性分析;第四階研究段針對第三階段的 11 個企業進行社群經營與企業效益的分析。

本研究發現，經營社群與提升顧客滿意度以及提高品牌知名度上關聯性較低；而在航空，銀行以及便利商店產業中，經營社群可以提高整體收益。此外，企業提供具有 1)較低價位、2)較低耐受度的產品或服務以及 3)消費者參與度較低的購買決策較容易受到社群經營影響。更進一步發現，企業以提升顧客成長以及強化顧客忠誠度為目標去經營社群會獲得較高的成功率，也較容易得到實質效益。

關鍵字：社群網路，Facebook，粉絲專頁，企業績效

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Abstract

Most of the major enterprises have invested in social networks to provide services, promote products, or communicate with customers. However, to date no clear understanding on the effects of the social networks on business performance has emerged. This study examined the relationship between the capability of the enterprise to manage social networks and the resultant benefits of their investing in the social network. A fan page on Facebook is the selected target of study. By analyzing the efforts required to manage a fan page, we measure the fan page management capability by its reach, referrals, activities, and interactions. By analyzing literature and practical cases, we hypothesize six types of business benefit impacts can be experienced by enterprises investing in a fan page.

The study applied four-stages of data collection and testing. The first stage is to build a general understanding of the relationship between the number of fans and business revenue. Based on findings of the first stage, the study tested the fan page benefit hypotheses on selected global firms and sought patterns of benefits generated from the fan page. In the third and fourth stage, the study tested the fan page effect on product sold of selected firms in Taiwan and further examined other hypotheses by industries. This study builds deep understanding from various aspects about fan page effects on enterprises, and proposes that firms provide products and services with characteristics of low-product price, short-product durability and low-customer involvement are more influenced by the management of their fan pages. Retail industries such as: banking and airline with high capability of managing Facebook fan page are more likely to increase customer growth and intensify customer loyalty.

Key words: Social network, Facebook, Fan page, Business performance

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Chapter 1: Introduction

1.1 Compendium of social networks

The number of users of social networks is growing exponentially. The population of the social network grew from 100 million in August 2008 (Zuckerberg 2008) to more than 800 million at the end of 2011 (Ostrow 2011). Worldwide social media revenue is gradually reaching a total $10.3 billion in 2011 and expected grow to $14.9 billion in 2012 (Gartner 2011). Facebook, the most popular social network, has an estimated 770 billion page views each month (pingdom.com 2011). This powerful social networking medium appears to be a great opportunity for enterprises to extend their reach to customers. Social networks provide web-based services (Betonio 2010) that allows users to construct public or semi-public profiles, communicate lists of users with whom they share a connection, and view and traverse both their and others' lists of connections (Danah and Nicole 2007). People use social networks like Facebook, twitter, Plurk, and Linkedin to make friends, share photos, express opinions, play games, and exchange a network of information in real time. Meanwhile, enterprises use these social platforms to spread information, promote new products, and interact with customers. For example, T-Mobile's (unrulymedia.com, 2009) shared with customers on YouTube and Facebook a video of commuters dancing at Liverpool Street Station in London: The video spread through social networks and generated over 21 million views on YouTube in three days (viralblog 2009). They then held dancing activities in Trafalgar Square to involve everyone in the square. This activity attracted more than 18 million video plays, 20,649 comments, and an increase in sales by 22%.

With the maturing of cloud computing, networking, and communication, users have developed different behaviors and are now spending substantially more time on online networking (InsightXplorer 2011). According to a Nielsen report (Nielsen 2011), Americans spent 53.5 billion minutes a year on Facebook. In Taiwan, a high-internet-usage country, the reach rate of social networks is over 94% (12.3 million). In other words, people in Taiwan spend 508 minutes (31.5% of Internet usage) using social networks (InsightXplorer 2011). The social networks have a strong influence on consumers (Los Angeles Times 2011) and play such an important role in people's lives that it can reach more people than any other channel. More enterprises have invested resources in social networking operations (inside.com 2010); the operating methods include operating a fan page, building photo or flash plug-in fan pages, developing applications, and placing attractive advertisements on Facebook. For this reason, many companies own a professional group in charge of

managing their social network. The budget for social network advertising accounted for a higher percentage than in the previous year (Business Next 2011). In the United States, the U.K., France, and Germany, the price per click of a Facebook advertisement increased by 74% in 2011 (TBG Digital 2011). Regardless of the positive or negative effects, user experiences circulate quickly, and brand value could change in only a few minutes. For example, users posted, "*Dell posts wrong price, and they don't perform it!*" on a personal blog or social network, and the information caused a negative brand word-of-mouth (WOM) rise from 100 to more than 1,000 records (iBuzz 2009). Because of the fast and immense network effect, the "Brand Community" on social networks is one of the more influential groups that could have an impact on the minds of users (Huang & Chang 2007).

Major enterprises on Facebook use the platform as part of a joint marketing strategy (WaveMetrix 2010). Top brands use Facebook for different purposes; Coca-Cola uses it to reach the youth market, Disney sells film tickets, and McDonald's uses it to introduce products nationally (Yi Chung et al 2010).

Although we see such influence by social networks, businesses remain uncertain on the value of investing in social networking. On the one hand, people believe that social networking can be beneficial for communication, product selling, image building, and customer services. On the other hand, reports (http://blog.shanger.net/ 2009, Manpower 2010, eMarketer 2010, http://techorange.com/ 2011) have detailed enterprises losing interest in maintaining communication with customers through social networks; some enterprises (TEEMA 2010, Chen 2011) believe that social networks generate limited benefits. These businesses (Hiscox 2011) do not believe it necessary to maintain a social network presence and invest too much effort into it. One explanation for the hesitation to invest in social networking is that firms may not manage well the interactions with customers on social networks. In fact, certain firms that have invested in social networking have concerns on what to invest and how to measure the capability of managing the social network. With the uncertainty of both the capability of managing social networks and the possibility of the social networks' effects, building a clear understanding of the management and impact of this type of platform is necessary.

1.2 Research motivation and research question

The research objective is to determine the relationship between the capability of managing social networks and the impact of social networks on business performance. To understand clearly the effect of social networking, we chose enterprises' fan pages on Facebook as the study field. Facebook is currently the most popular and functional social network (Nielsen 2010), and Facebook created pages for enterprises to invite

users to become members of their fan page, and member users can show friends their product/service preferences and recommend them by adding Pages to their personal profiles (Facebook 2011). The information is posted on the user's wall and broadcasted to all friends. In addition, users can view friends' joined fan pages and be aware of their interactions on these fan pages. For enterprises, a fan page can send updates to an unlimited number of people, and help enterprises keep up with customers (Direct Creative 2011).

To verify the effectiveness of fan pages on Facebook, this research uses four-stages of empirical study. The first stage is to build general findings by selecting 16 global cases and collecting their fan page information through publicly available data sources, including fan page performance from Facebook insights and annual revenue reports and examining the relationship between these two items. The second stage is to verify the fan page effect by total revenue of 58 global enterprises; the third stage is to verify the fan page effect by total revenue of 11 firms in Taiwan, and base on the finding, some interesting differences in the various industries have lead us to test the benefit hypotheses in greater depth in telecommunications, airline, banking credit cards and convenience store in forth stage, to seek patterns of benefit generation in the different dimensions.

Chapter 2: Literature Review

2.1 The capability to manage a fan page

The social media phenomenon has introduced new channels and methodologies that drive and enhance enterprise marketing and customer services. Because social networking has spread among consumers and organizations, the capability to manage and use social media is critically required by enterprises (Briones et al. 2010). When firms fail to engage their customers in a social network, they also fail to fully exploit the capacities of social media platforms (Culnan et al. 2010). Although barriers to adopting social networks are substantially lower than for most other communication and branding channels, the resources invested by enterprises to manage social networks by enterprises have a price (Solis 2010).

The resources required by enterprises to manage social networks are for establishing the platform, maintaining operations, developing content and activities, promoting the platform, interacting with customers, storing and analyzing customer knowledge, and most importantly, leveraging customer knowledge for business decisions. When more time and resources are invested in managing fan pages, interaction increases (Torsten et al. 2011). Because the objectives of the fan page are not only for retaining a relationship (Lin & Lu 2011) with current customers but also for creating selling opportunities (Shih 2009) and interacting with prospective customers (Parent et al. 2011), measurements of the effectiveness of the fan page management capability should consider the engagement and attention of customers. Factors including the reach, referrals, activities and interactions of the fan page are key indicators for reflecting the management capability because customer-attracting content, interaction, and service design is crucial to increasing the patronage of the fan page.

2.2 Impacts of a fan page on business performance

The establishment of fan page impacts internal and external business practices. The published information and interactive communication can prompt purchases of the firm's products and/or services. The interactive activities can also increase brand awareness among both current and prospective customers. Additionally, the personalized service and interaction enhance customer satisfaction, and customer feedback can provide important inputs for the product development process.

Revenue from products/services

Creating a Facebook fan page is the quickest and easiest method for establishing a web presence for a new product (Guy 2011). Consumers create, modify, share, and

discuss product content on the social network platforms (Kietzmann et al. 2011). Product recommendations on social networks can influence people's purchase intentions (Hsiao et al. 2010). Increasing numbers of enterprises are creating, operating, and managing their own Facebook fan pages. In 2010, Milk-Bone used a service dog named Noble; by creating activities to promote products to fans on the Milk-Bone's service-dog star fan page, they increased revenue by 16% in North America (mediapost 2010).

Word-of-mouth (WOM) also has a considerable impact on customers' churn and purchase decisions. Users' interest and attitudes regarding products directly predict their purchase intentions and indirectly determine the product's persuasiveness (Prendergast et al. 2010). Thus, social networks can have a positive influence on a company's possibilities for increasing revenue through product sales (Vale and Guimaraes 2010). Therefore, we propose the following hypothesis:

H1: The better the fan page managing capability, the higher the product sold.

Customer satisfaction

Enterprises invest in product and service quality to increase customer satisfaction. On social networks, customers evaluate and comment on products and services. This feedback can assist firms in identifying weaknesses and strengths, and generate ideas for improvements (Wirtz et al. 2010). Social networks can be used to enhance user interaction, motivate customers to discuss their experience, and enable workers and managers to receive customer feedback (Gorry et al. 2011).

The content and responses on a Facebook fan page can influence customers' impression of product and service reliability. For example, 7-Eleven responded to product complaints on its fan page by rapidly resolving the issues, which satisfied their customers satisfied, resulting in growing loyalty (Vision 2011). Therefore, based on this perspective, we propose the following hypothesis:

H2: The better the fan page management capability, the higher the customer satisfaction.

Customer growth

An enterprise must understand consumer needs and motivations, promote member participation, and motivate members to cooperate by ensuring they feel included and empowered (Porter et al. 2011).

When users receive appealing content, they tend to share or forward it, and may even invite it. The emergence of Internet-based social media has enabled one person to communicate with hundreds or thousands of people regarding products, designers, and manufacturers. The impact of consumer-to-consumer communications in the

marketplace has greatly increased (Mangold and Faulds 2009). Through WOM, potential members can be linked through existing members and may subsequently join the site (Trusovet et al. 2009).

Enterprises can increase their fans and engage more potential customers of varying levels by initiating activities on a social network fan page. Thus, we propose the following hypothesis:

H3: The better the fan page management capability, the greater the customer growth.

Brand awareness

The attitudes, strategies, and behaviors of market brands are affected by their relationship with the fan page site (Ho Chia-Hui 2010). Social media provides an unparalleled platform for consumers to publicize their personal evaluations of purchased products, thereby facilitating WOM communication. It has a crucial influence on brands. Profit-seeking organizations have used these platforms to launch products and strengthen existing brands (Waters et al. 2009, Mangold and Faulds 2009).

Enterprises may use numerous tools to spread ideas and increase brand awareness. Nowadays, brands resource social media by joining online communities, sharing videos, and interacting with customers, which has gradually reduced traditional brand-building routes (Fournier and Avery 2011). Social networking tools are employed to enhance consumer-to-consumer communications and create virtual and viral marketing. Viral marketing, analogous to the spread of pathological and computer viruses, use social networks to increase brand awareness by self-replicating the viral diffusion of messages (Kiss and Bichler 2008). For example, UNIQLO used the tools on fan pages to create a game and several interesting activities to attract people. Through WOM, the number of users participating in the games reached 630,000 in two weeks in Taiwan (Today Weekly 2010, Digital Times 2010). Therefore, we propose the following hypothesis:

H4: The better the fan page management capability, the higher the brand awareness.

Customer loyalty

A firm's ability to obtain profitable customer relationships relies on its capability to take advantage of information obtained through successive customer interactions (Ramani and Kumar 2008). Social networking sites provide firms with opportunities to strengthen customer relationships through the site content and services (Pagani et al. 2011) and by co-learning, co-production, and collaboration activities (Marianna 2011).

The new breed of customer requires corporate transparency, authenticity, and

interaction (Paul 2010). To reach this intelligent and aggressive social consumer, a greater insight than that of the past is necessary. Social tools, such as Facebook insights, Google trends, and social media statistics, provide the tools for creating social media channels (Paul 2010). A fan page enables more companies to build virtual customer environments, resulting in broader and more profound implications for customers (Nambisan and Nambisan 2008). Virtual customer environments provide services ranging, enabling firms to involve their customers in innovation and value creation.

Best Buy's employee communities increased to 2,200 members within 3 months; they interacted with over 13,000 customers on its fan page, responding to questions, concerns, and opinions from the public (Rob Petersen 2011). Increasing employee-customer interactions can enhance the connection between firms and customers, building strong relationships with customers. Thus, we propose the following hypothesis:

H5: The better the fan page management capability, the better the customer loyalty.

Product development

Successful product development depends on satisfying the needs of diverse customers. The ability of firms to interact successfully with their customers distinguishes them from their competitors (Ramani and Kumar 2008). Firms can benefit from involving customers in developing new products (Svendsen et al. 2011, Sioukas 1995). Collecting user feedback and monitoring user interaction on fan pages (Nambisan and Baron 2010) is a method to explore customers' needs. Analysis and inference from communication records are effective methods to transfer customer insight to the development of new products and services. Furthermore, encouraging customers to adopt a more active role in new product development (Ernst et al. 2010) is a useful strategy to obtain ideas from fan page activities. Social networking allows companies to build strong online communities for feasible customer empowerment where they can listen to and integrate thousands of customers from all over the world (Fuchs and Schreier 2011).

Customer participation is contingent on the customer contribution context (Fang et al. 2008, Nambisan & Baron 2010), whether the contributions are to the customer community (through product support) or to the company (through product ideation). The sales of Toyota's new Yaris model in 2008 were the highest in the market, which can be attributed to information collected from initiating activities on Facebook fan pages (NOWnews 2008). The cost-efficient and multimedia-rich interaction opportunities offered by social networks and the existence of online communities have made virtual co-creation a suitable means of creating value and improving the

success of new products (Fuller et al. 2009). Based on literature regarding customer contribution to product development, we propose the following hypothesis:

H6: The better the fan page management capability, the more successful the product development.

Chapter 3: Methodology

3.1 Research model

The research objective is to understand the impacts of fan-page management on business performance. By examining business goals and required resources of fan pages, we formulated several indicators of their management capability. Based on literature and practical cases, we formed hypotheses on the relationship between fan-page management capability and various business benefits (shown in Fig. 1).

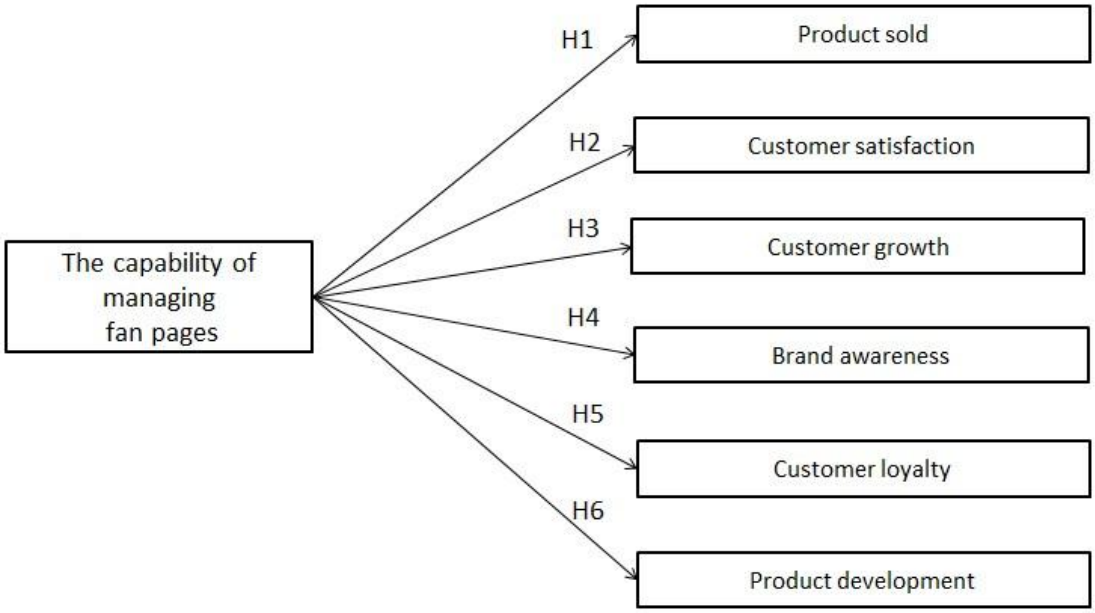

Figure 1. Research model.

To verify our hypotheses in an industry-specific environment, this research was conducted in four-stages. To clarify the overall research, we summarized a research-purpose table (see Table 3.1-1) that includes the scope of data collection of each stage, and the verifications and statistical methods used in each stage.

The first stage was to collect data of global enterprises from different industries and develop characteristically classified findings on the relationship between fan-page management and business revenue. Based on these findings, in the second stage, we then selected enterprises from different global industries to make a longitudinal analysis and test the hypotheses within and across the industry to create a deeper understanding of fan-page effects. In the third stage, this study putted focus on firms in Taiwan and tested the fan-page effect by total revenue. Finally, this study performed other hypotheses verification by industry in Taiwan, finding a suitable

operational model on fan pages within different kind industries.

Table 3.1-1. Descriptions of research stages

Stage	Purpose	Scope of Data Collection	Hypotheses Verified	Statistical Method
I	To build a general understanding of the fan-page effect on global enterprises	• Collected annual data from 16 global cases from 2008 to 2011	• Fan page & product sold	• Spearman's rank correlation coefficient
I I	To understand the fan-page effect by industries of global firms	• Collected annual data from 58 global cases in 5 industries - Food & beverage, Clothing & Accessories, Retail, Technology, Automobile from 2008 to 2011	• Fan page & product sold • Fan page & brand value	• Linear regression
I I I	To understand the fan-page effects in detail	• Collected monthly data from 11 cases in Taiwan from April 2010 to January 2012	• Fan page & product sold	• Linear regression
IV	To test other hypotheses by industry	• Collected monthly data from 11 cases in Taiwan from April 2010 to January 2012	• Fan page & customer satisfaction • Fan page & customer growth • Fan page & customer loyalty	• Linear regression

3.2 Research variables

The research variables are listed in Table 1 with a few operational indicators reflecting the value of the variables. Sources for collecting the indicators include http://www.socialbakers.com and http://monitor.wildfireapp.com,established in 2010 that track the number of fans, total reach, daily page activity and daily fan-page interaction. These sources also provide an annual report with information on products,

revenue, customers, and published reports such as A.C. Nielsen's, a third-party evaluation of the firm's brand value.

Table 3.2-1. Research variables

Research Variables	Operational Definition	Indicators	Sources
The management capability of fan pages	How enterprises build fan pages, share content , engage with customers and maintain customer engagement	• The number of fans • Total reach • Total page activity • Total interaction	http://www.socialbakers.com http://monitor.wildfireapp.com/
Customer growth	Acquired more customers	Customer number	Annual report
Product sold	The product's sells	Total sales	Annual report
Customer satisfaction	To satisfy customers by providing customers with quality services.	Customer satisfaction The attrition rate	The enterprise
Customer Loyalty	To retain customers and increase customer contribution.	Average Revenue Per User (ARPU)	Annual report
Product development	To make products that fit customer needs.	Product achievement rate	The enterprise
Brand awareness	To improve the brand value of enterprises.	Brand value	Published report

This research uses the four independent variables—number of fans, total reach, daily page activities, and total interaction—for measuring fan pages. Initially, enterprises like to establish platforms and channels on social networks, such as fan pages on Facebook, to engage and provide customers with an easy-access platform. Customers can use the platform to easily communicate with people and access

information. To establish the fan page's effectiveness, this research uses the number of fans and total reach to measure them. The number of fans means the number of people who become fans of this brand or enterprise; total reach means the total number of people who mention this brand on Facebook.

After establishing the platform, the contents of the page are required. More important, enterprises should initiate activities and provide content that enable them to retain fans, promote frequent visits and long stays, encourage fans to read, respond, and provide frequent suggestions, and collect customer information for the long-term run of the page. To measure content provision, this study used total reach and total-page activities—total page activities is the daily post (news, videos, and photos) on Facebook provided by enterprises.

Enterprises must also provide customer service through fan pages to solve fans' problems and ensure that customers are satisfied. To measure customer service on Facebook, we used total interaction, which includes the number of likes and fan comments for the content provided.

Enterprises should also ensure the continued running of the fan page and use platform promotion to encourage more customers to join. Customers would then recommend the page to others. To measure platform promotion, we used the number of fans and total reach.

3.3 Data collection

The general findings on the effectiveness of fan-page management in different industries are useful. We used the number of fan pages as an indicator of the management capability of the fan page and business revenue as a simple indicator of the business performance. The number of fans is derived from http://monitor.wildfireapp.com, a website that analyzes social networks, and the business performance is retrieved from the firms' annual reports.

Data collected in our researches are mainly publicly available data of enterprise fan pages. We chose 16 cases for non-parametric statistics (see Table 3.2-1) in stage one, by analyzing the pattern of business revenue and number of fans, we formed general findings on the relationship between fan-page management and business performance. Using findings on product types and product durability, we selected 58 global enterprises for linear regression (see Table 3.2-2) in stage 2. We also collected brand value form 38 global cases for statistical test (see Table 3.2-3) in stage 2. These enterprises were chose because they are all in the Fortune 500 global enterprises (all enterprises are listed in the Appendix), with different product durability and variant product types. We classified the information according to the following criteria.

1. The degree of their operation on the Facebook official fan page. We selected

enterprises with their own fan pages that had more than a half-million fans in 2011. We needed to ensure that the number of fans was enough to reflect on revenues. The more fans the company owns, the more accurate the customer opinion represents.

2. Observations on annual finance reports. This condition was based on whether or not the enterprises released a public financial report from 2008 to 2011. The annual reports give us the total-revenue information and are used as a dependent variable in our research.
3. Does the enterprise have independent brand in the market? We chose enterprises with their own market brands. We used these three conditions to select the following enterprises and took them as our objects.

Table 3.3-1. 16 global cases for non-parametric statistics

Enterprises	Industry	Data	2008	2009	2010	2011
Coca-Cola	Food & Beverage	# of Fans	1 *(1)*	6.7 *(2)*	23.4 *(3)*	35 *(4)*
		TR	66.6 *(1)*	68.7 *(2)*	70.4 *(3)*	71.8 *(4)*
Starbucks	Food & Beverage	# of Fans		10(million) *(1)*	15(million) *(2)*	26(million) *(3)*
		TR		9.7(million) *(1)*	10.7(million) *(2)*	11.7(million) *(3)*
McDonald's	Food & Beverage	# of Fans	0.6*(1)*	2*(2)*	6.8*(3)*	12.1*(4)*
		TR	23.5*(1)*	22.7*(4)*	24*(2)*	27*(3)*
Walmart	Retailer	# of Fans	0.1*(1)*	0.6*(2)*	2*(3)*	11*(4)*
		TR	238*(1)*	255*(2)*	258*(3)*	260*(4)*
7-11	Retailer	# of Fans		3(#)*10 *(1)*	10(#)*10 *(2)*	15(#)*10 *(3)*
		TR		101.7 *(1)*	114.6 *(2)*	120.3 *(3)*
H&M	Apparel	# of Fans		1*(1)*	8.31*(2)*	8.78*(3)*
		TR		17.58*(1)*	18.81*(2)*	18.87*(3)*
Nike	Apparel	# of Fans	0.3*(1)*	1.2*(2)*	4.3*(3)*	9.1*(4)*
		TR	18.627 *(1)*	19.176 *(3)*	19.014 *(2)*	21.77 *(4)*
ZARA	Apparel	# of Fans	0.7*(1)*	2.35*(2)*	7.77*(3)*	10.8*(4)*
		TR	9.4(EUR) *(1)*	10.4(EUR) *(2)*	12.53(EUR) *(3)*	14.7(EUR) *(4)*

L'Oreal	FMCG	# of Fans	0.02*(1)*	0.1*(2)*	0.3*(3)*	1.1*(4)*
		TR	17.54(EUR) *(2)*	17.43(EUR) *(1)*	19.5(EUR) *(3)*	20.1(EUR) *(4)*
Hewlett-Packard	Electronics	# of Fans	1(#)*10 *(1)*	3.3(#)*10 *(2)*	6.3(#)*10 *(3)*	8.3(#)*10 *(4)*
		TR	118.364 *(1)*	118.369 *(2)*	126 *(3)*	127.2 *(4)*
Samsung	Electronics	# of Fans	0.007 *(1)*	0.01 *(2)*	0.35 *(3)*	5.72 *(4)*
		TR	121 *(2)*	119 *(1)*	135 *(3)*	159 *(4)*
Nokia	Electronics	# of Fans	0.32*(1)*	1.2*(2)*	2.6*(3)*	4.8*(4)*
		TR	50.7(EUR) *(3)*	40.9(EUR) *(1)*	42.4(EUR) *(2)*	51(EUR) *(4)*
SONY	Electronics	# of Fans	0.1(#)*10 *(1)*	1.3(#)*10 *(2)*	3.6(#)*10 *(3)*	15(#)*10 *(4)*
		TR	115.1 *(4)*	100.3 *(3)*	93.6 *(2)*	93.2 *(1)*
Audi	Automobile	# of Fans	0.1*(1)*	0.386*(2)*	1.75*(3)*	4*(4)*
		TR	34.1(EUR)	29.8(EUR)	35.4(EUR)	32.4(EUR)
Toyota	Automobile	# of Fans	0.2*(1)*	1.3*(2)*	3.2*(3)*	6.5*(4)*
		TR	80.4(JPY) *(4)*	32.7(JPY) *(2)*	26.2(JPY) *(1)*	47.2(JPY) *(3)*
Ford	Automobile	# of Fans	0.1*(1)*	4*(2)*	11.3*(3)*	23.9*(4)*
		TR	146.3 *(4)*	118.3 *(1)*	128.9 *(2)*	136.3 *(3)*

*The unit of # of fans: (million)*1000; *The unit of total revenue: (billion) in US$

*TR=Total revenue

Table 3.3-2. 58 global cases for linear regression

Enterprises	Industry	Data	2008	2009	2010	2011
Coca-Cola	Food & Beverages	# of Fans	30,000	5,329,093	21,535,556	36,575,792
		Total Revenue	66,600	68,700	70,400	71,800
Starbucks	Food & Beverages	# of Fans	0	6,536,632	19,016,575	26,557,049
		Total Revenue	10,400	9,700	10,700	11,700

McDonald's	Food & Beverages	# of Fans	50,998	2,050,623	6,711,501	12,213,017
		Total Revenue	23,500	22,700	24,000	27,000
Burger king	Food & Beverages	# of Fans	10,055	96,245	757,874	2,378,115
		Total Revenue	2,455	2,537	2,502	2,455
Heineken	Food & Beverages	# of Fans	96,612	823,042	874,933	5,009,675
		Total Revenue	18,772.4	19,273.2	21,150.5	22,448.4
Pepsi	Food & Beverages	# of Fans	32,255	250,000	2,962,454	6,889,396
		Total Revenue	43,251	43,232	57,838	66,504
KFC(Kentucky Fried Chicken)	Food & Beverages	# of Fans	6,533	880,311	2,722,307	3,503,016
		Total Revenue	2,179	2,297	2,522	2,798
HERSHEY'S	Food & Beverages	# of Fans	50,177	843,701	1,692,431	2,970,877
		Total Revenue	5,132.8	5,298.7	5,671.0	6,080.8
America Eagle Outfitters	Clothing & Accessories	# of Fans	32,096	684,000	3,493,325	5,750,911
		Total Revenue	3,159.8	2,967.6	2,940.3	2,948.7
HUGO BOSS	Clothing & Accessories	# of Fans	47,122	253,668	511,138	886,419
		Total Revenue	2,251.9	2,083.6	2,307.0	2,746.4
GAP	Clothing & Accessories	# of Fans	90,113	552,673	1,239,002	1,828,814
		Total Revenue	14,526	14,197	14,664	14,549
Old Navy	Clothing & Accessories	# of Fans	19,160	512,543	1,546,195	2,755,611
		Total Revenue	5,707	5,808	5,905	5,674
Puma	Clothing & Accessories	# of Fans	371,602	1,489,334	3,592,034	6,015,235
		Total Revenue	2,607.6	2,807.6	2,862.1	3,009
Adidas	Clothing & Accessories	# of Fans	20,776	321,748	1,641,699	2,947,883
		Total Revenue	20,776	321,748	1,641,699	2,947,883
Hollister Co.	Clothing &	# of Fans	10,799	10,381	11,990	13,344

	Accessories	Total Revenue	630,121	1,034,997	3,999,136	6,411,366
Converse	Clothing & Accessories	# of Fans	3,484.1	2,928.6	3,468.8	4,158.1
		Total Revenue	10,299	10,799	10,381	11,990
Burberry	Clothing & Accessories	# of Fans	18,000	679,103	10,336,621	20,805,109
		Total Revenue	10,299	10,799	10,381	11,990
Abercrombie & Fitch	Clothing & Accessories	# of Fans	870,622	2,403,987	3,673,357	10,103,213
		Total Revenue	1,577.0	1,903.6	2,027.8	2,378.5
Levi's	Clothing & Accessories	# of Fans	599,023	1,760,229	3,475,846	5,795,506
		Total Revenue	3,540.3	2,928.6	3,468.7	4,158.1
Ralph Lauren	Clothing & Accessories	# of Fans	90,000	1,077,895	2,654,349	9,561,097
		Total Revenue	4,400	4,100	4,400	4,760
Coach	Clothing & Accessories	# of Fans	70,000	1,329,018	2,189,537	4,189,029
		Total Revenue	4,880.1	5,018.9	4,978.9	5,660.3
ASOS	Clothing & Accessories	# of Fans	4000	69000	381110	1496702
		Total Revenue	66,000	7,010,039	1,486,318	2,612,183
American Express	Finance Service	# of Fans	3,180	3,230	3,607	4,158
		Total Revenue	4,000	69,000	381,110	1,496,702
Tiffany & Co.	luxury	# of Fans	128	262	353	538
		Total Revenue	3,089	92,029	310,165	2,349,923
Dior	Cosmetics	# of Fans	15,025	13,389	27,582	29,962
		Total Revenue	67,000.0	334,000.0	716,968.0	1,637,690.0
Six Flags	Travel & Leisure	# of Fans	2,860	2,709.7	3,085.3	3,642.9
		Total Revenue	1013.17	975.89	898.93	1005.79
AirAsia	Travel &	# of Fans	71,303	483,921	502,294	5,669,829

	Leisure	Total Revenue	23,917.2	32,846.4	28,171.7	23,666.5
LEGO	Toy Retail	# of Fans	23,000	530,122	946,750	1,385,719
		Total Revenue	71,165	475,219	1,041,198	2,330,892
Walmart	Retail	# of Fans	1,013.2	975.9	898.9	1,005.8
		Total Revenue	27,120	214,698	803,531	1,327,941
7-11	Retail	# of Fans	931.9	1,022.7	1,288.7	1,460.1
		Total Revenue	23,000	530,122	946,750	1,385,719
Target	Retail	# of Fans	9,526	11,661	16,014	18,731
		Total Revenue	61,471	62,884	63,435	65,786
Lowe's Home Improvement	Retail	# of Fans	12,008	803,706	2,889,394	11,145,395
		Total Revenue	23,800	25,500	25,800	26,000
The Home Depot	Retail	# of Fans	0	326,544	1,022,856	1,595,314
		Total Revenue	102	101	114.6	120.3
Tesco	Retail	# of Fans	76,182	1,006,159	3,561,513	7,928,640
		Total Revenue	61,471	62,884	63,435	65,786
Amazon.com	Retail	# of Fans	6,091	97,940	494,901	786,009
		Total Revenue	48,230	47,220	48,815	50,208
Walgreens	Drug retail	# of Fans	10,348	33,339	206,313	505,401
		Total Revenue	2,260	2,661	3,338	3,883
Best Buy	Retail	# of Fans	54,312	109,026	260,072	480,460
		Total Revenue	75,513.6	86,050.9	90,859.7	97,279.4
eBay	Internet Service	# of Fans	4,300	25,232	484,365	2,203,557
		Total Revenue	19,166	24,509	34,204	48,077
Google	Technology	# of Fans	40,124	473,213	799,005	1,384,748
		Total	59,034	63,335	67,420	72,184

		Revenue				
Verizon Wireless	Technology	# of Fans	306,170	1,118,567	2,080,895	5,548,506
		Total Revenue	40,023	45,015	49,694	50,272
Microsoft	Technology	# of Fans	12,000	87,000	392,786	1,550,793
		Total Revenue	8,541	8,727	28,680	17,711
Dell	Technology	# of Fans	20,146	631,608	2,400,964	4,603,600
		Total Revenue	21,796	23,651	29,321	37,905
Nikon	Technology	# of Fans	19,033	870,450	1,101,091	2,017,541
		Total Revenue	97,354	107,808	106,565	110,875
SEGA	Technology	# of Fans	20,037	109,913	253,716	1,033,749
		Total Revenue	60,420	58,437	62,484	69,943
Intel	Technology	# of Fans	6,219	107,329	400,492	917,466
		Total Revenue	61,133	61,000	52,900	61,500
Research In Motion(RIM)	Technology	# of Fans	32,623	172,773	455,575	948,536
		Total Revenue	11,534	10,616	9,479.4	10,711
HTC	Technology	# of Fans	17,122	99,730	256,599	619,431
		Total Revenue	552.7	517.7	463.4	500.8
Motorola	Technology	# of Fans	24,409	73,186	286,592	4,437,063
		Total Revenue	37,600.0	35,127	43,623	53,999
Audi	Automobiles	# of Fans	10,144	536,246	2,784,750	4,041,397
		Total Revenue	37,995	490,887	4,421,950	8,929,765
Toyota	Automobiles	# of Fans	6,009	11,065	14,953	19,907
		Total Revenue	10,679	97,002	386,162	1,051,647
Ford	Automobiles	# of Fans	5,116.1	4,798.4	9,361	15,641.7
		Total Revenue	20,976	217,208	291,514	860,011

Honda	Automobiles	# of Fans	17,099	11,050	11,460	13,064
		Total Revenue	10,144	536,246	2,784,750	4,041,397
Mercedes Benz	Automobiles	# of Fans	45,161.4	39,466.5	46,883.1	42,909.9
		Total Revenue	21,069	90,826	323,858	670,012
NISSAN	Automobiles	# of Fans	10,057.8	4,090.7	3,277.6	5,904.6
		Total Revenue	24,115	442,895	1,137,247	2,359,697
KIA	Automobiles	# of Fans	14,630	11,830	12,890	13,630
		Total Revenue	69,103	281,122	815,654	1,420,936
Peugeot	Automobiles	# of Fans	14,824	12,317	10,555	10,995
		Total Revenue	22,770	300,564	2,103,473	4,517,720
BMW	Automobiles	# of Fans	63,713.5	55,105.8	71,254.3	76,567.7
		Total Revenue	70,965	67,608	80,636	88,674
AT & T	Telecommunications	# of Fans	16,012	39,208	151,928	456,883
		Total Revenue	10,204.4	90,920.6	10,610.9	107,470
Vodafone	Telecommunications	# of Fans	3,600	427,455	1,209,885	2,591,611
		Total Revenue	62,188	101,027	192,238	1,262,076

*The unit of # of fans: (thousand); *The unit of total revenue: (million) in US$

Table 3.3-3. Brand value of 38 cases for linear regression

Enterprises	Industry	2008	2009	2010	2011
Coca-Cola	Food & Beverages	32,728	34,844	25,807	31,082
Starbucks	Food & Beverages	4,144	5,187	5,462	6,750
McDonald's	Food & Beverages	20,003	20,193	21,842	22,230
Pepsi	Food & Beverages	15,035	15,991	14,363	17,096
HERSHEY'S	Food & Beverages	1,718	1013	2,715	3,053
GAP	Clothing & Accessories	2,665	2,246	2,161	2,589
Puma	Clothing & Accessories	2,112	1,493	1,990	2,291

Adidas	Clothing & Accessories	4,700	5,702	6,754	7,150
Ralph Lauren	Clothing & Accessories	2,274	2,952	3,162	3,367
American Express	Finance Service	9,944	12,737	15,530	18,231
Dior	Cosmetics	1,438	13,343	2,114	2,540
Walmart	Retail	40,616	41,365	36,220	38,320
7-11	Retail	6,743	2,302	3,905	4,549
Target	Retail	12,253	15,224	15,989	15,267
Lowe's Home Improvement	Retail	8,173	9,784	9,751	8,882
The Home Depot	Retail	14,310	19,013	20,423	20,902
Tesco	Retail	16,408	20,654	21,129	20,051
Amazon.com	Retail	7,466	13,340	17,780	94,398
Walgreens	Drug Retail	9,219	9,983	11,707	11,564
Best buy	Retail	4,107	6,000	6,534	4,936
eBay	Internet Service	4,026	5,148	8,002	8,959
Google	Technology	29,261	36,191	44,294	47,463
Verizon wireless	Technology	18,854	23,029	27,293	27,616
Microsoft	Technology	30,882	33,605	42,805	45,812
Dell	Technology	8,200	9,750	10,983	11,605
Intel	Technology	13,976	16,642	19,078	21,908
Motorola	Technology	3,928	6,254	5,585	2,940
Audi	Automobiles	6,323	3,398	3,739	4,561
Toyota	Automobiles	21,995	27,319	26,152	24,461
Ford	Automobiles	9,822	12,652	16,662	17,559
Honda	Automobiles	11,461	13,083	16,356	14,963
Mercedes Benz	Automobiles	9,844	13,883	20,798	19,762
NISSAN	Automobiles	7,742	10,412	13,705	14,167
KIA	Automobiles	1,414	2,264	2,788	5,089
Peugeot	Automobiles	3,780	4,485	6,625	7,976
BMW	Automobiles	13,659	16,616	20,157	21,262
AT & T	Telecommunications	19,850	26,585	28,884	28,379
Vodafone	Telecommunications	24,647	28,995	30,674	30,044

For the third stage, we selected fan pages from 11 firms in Taiwan for hypothesis testing based on the findings of industries that with different abilities of fan-page management, the selected industries were convenience stores, banking credit-card services, telecommunication companies, and airline companies. These industries are all in full competition in a mature market where customers experience innovative services and have a high demand for tailored products. The detail data are listed in Table 3.2-4, 3.2-5, 3.2-6, 3.2-7, and 3.2-8. Data from fan-page management are collected from Facebook insights, and the six-dimensional benefit factors are collected from published business data, publicly accessible databases, and surveys.

After analyzing data in the third stage research, we will use the 11 cases to test other hypotheses by product types, product durability and industry in the fourth stage research. However, we could not verify all of our hypotheses. In some industries, we could only verify a limited amount of data. The reasons are interpreted below.

Data collection

The measurements of some hypotheses could not be collected from public data such as the product-achievement rate for hypothesis 6, the attrition rate for hypothesis 2, and the customer number for hypothesis 3. These three indicators are confidential in many enterprises. Due to these reasons, we could not obtain the information from public data or through school-to-work programs, thus we could hardly verify hypotheses 2, 3, and 6 for all the cases. Independent variables such as total reach, daily page activity and daily interaction could be collected from special websites, but we did not have enough in our budget to pay for their charges. Because of these difficulties, the three indicators could not be provided in our research to verify some of our hypotheses.

Data characteristics

Some indicators only existed in specific industries like Average Revenue Per User (ARPU) for hypothesis 5. ARPU is usually used by telecommunications companies, but this information is not easily found in other industries, therefore, we could hardly measure customer loyalty in all industries and verify hypothesis 5. For the same reason, the churn rate is usually used in telecommunications, and some indicators are only used in the banking industry. Due to these reasons, we could only verify the hypotheses by the particular data we could obtain in each industry.

Divergences between different industries

We collected total revenue from 58 enterprises across five industries and there is a significant difference in revenue in different industries. For example, the number of revenue is related huge in automobile rather than food and beverage industry, and it

will lead to tremendous standard error of our records which will cause higher opportunity to reject our hypothesis. In the other way, some events in different industries may bring about influence to them. For example the credit squeeze in 2009 made a huge impact on the automobile industry, and some companies in our study went into bankruptcy, which led to some changes in their yearly revenue. However, the credit squeeze did not cause this result in other industries, hence the records in our research are not in the same comparison conditions, which impacts our statistic results.

Table 3.3-4. Public data of convenience store industry

Month	7 ELEVEN		Family Mart	
	Total Revenue (thousnd)	Fans Number	Total Revenue (thousnd)	Fans Number
Apr-10	8895036	355010	3268256	47298
May-10	9686463	356135	3717275	47878
Jun-10	9495227	356890	3632261	50269
Jul-10	10289154	421623	4003762	63138
Aug-10	10189963	673938	3960021	84140
Sep-10	10040908	730190	3704590	88157
Oct-10	10105227	819167	3783590	94089
Nov-10	9341217	932522	3547716	204520
Dec-10	9730864	1020811	3566106	210448
Jan-11	9336890	1059456	3495592	215676
Feb-11	9540881	1096903	3308275	222653
Mar-11	9406303	1158673	3507977	237736
Apr-11	9534967	1196281	3796799	270521
May-11	10243258	1278436	3927056	294338
Jun-11	10393956	1319610	3892256	314343
Jul-11	10806588	1399987	4186706	343323
Aug-11	10657507	1441589	4203710	360841
Sep-11	10811993	1510567	4444292	364510
Oct-11	10941694	1547623	4411963	376895
Nov-11	10379518	1573318	4145609	385498
Dec-11	10659172	1595314	4107737	394428
Jan-12	11675088	1643919	4523114	443549

Table 3.3-5. Public data of banking industry

Month	Union Bank of Taiwan					Taishin Bank				
	Transaction Amt.Cred	Credit Cd. in Circu.	CreditCard No.in For.	Credit Card_Stop	Fans Number	Transaction Amt.Cred	Credit Cd. in Circu.	CreditCard No.in For.	Credit Card_Stop	Fans Number
Apr-10	3728278	1658699	947544	13405	0	10716047	3049535	1823169	15444	0
May-10	4157867	1793987	1023095	25321	0	10657275	2946559	1791487	24796	0
Jun-10	4192505	1764740	1014313	34781	0	12861768	2933887	1788785	32807	0
Jul-10	4250040	1745592	1004432	25571	0	11375149	2934194	1787564	20674	0
Aug-10	4651426	1727309	994288	25340	0	12016057	2939856	1794309	19501	0
Sep-10	3916390	1711157	991710	21990	0	11150546	2956256	1788142	19525	0
Oct-10	4030712	1695790	982082	21289	0	12649512	2958576	1790305	43025	0
Nov-10	4133349	1688362	980342	13771	0	12505223	2982212	1802093	20083	23931
Dec-10	4305792	1680984	974536	13571	0	12976078	3002853	1819643	21367	24116
Jan-11	5054595	1681400	967992	15395	0	12935956	3011266	1827332	19383	24364
Feb-11	3553430	1673495	963241	12346	0	10435393	3017134	1819827	14237	24659
Mar-11	3906580	1666268	952618	13402	145	11732559	3032236	1826240	19046	25114
Apr-11	3728278	1658699	947544	13405	1019	10716047	3049535	1823169	15444	25519
May-11	3934908	1652384	941153	14297	1210	11518094	3068803	1824788	18645	26979
Jun-11	3924818	1645817	938489	15356	3234	14424295	3086640	1820452	18593	27521
Jul-11	4179181	1638565	935809	15332	7781	11500978	3091098	1822640	30586	27760
Aug-11	4465628	1634642	933646	14998	8323	13543713	3087958	1848331	39794	28554
Sep-11	3906106	1627906	934633	14827	9192	11994081	3060830	1858446	62988	29307
Oct-11	4084887	2079998	928993	33767	10002	13398894	3035621	1877943	60204	29840
Nov-11	4061492	2035262	952886	85312	10433	12589469	2984368	1891435	88092	30030
Dec-11	4152054	2068118	981561	73721	10964	12814187	2960949	1904510	64190	36035
Jan-12	4267099	2022063	1017016	57379	11402	13191548	2924545	1914425	59106	35,974
Month	Chinatrust					Bank of Taiwan				
	Transaction Amt.Cred	Credit Cd. in Circu.	CreditCard No.in For.	Credit Card_Stop	Fans Number	Transaction Amt.Cred	Credit Cd. in Circu.	CreditCard No.in For.	Credit Card_Stop	Fans Number
Apr-10	20945072	4993676	3465524	21724	0	731720	266284	119735	901	0
May-10	21726633	5012321	3468784	19977	0	747592	266253	119195	834	0
Jun-10	26835921	5033476	3474042	19147	0	866416	266512	119222	719	0
Jul-10	22812378	5053523	3472005	20372	0	744423	266637	123439	809	0
Aug-10	24705751	5071851	3479941	23989	0	799360	266768	123269	770	0
Sep-10	22255870	5095720	3490490	22730	3452	721458	266617	122119	907	0
Oct-10	22060956	5117363	3500046	22560	4498	684372	266355	122144	1043	0
Nov-10	24057822	5138919	3512022	22944	6445	764275	266181	121635	930	1224
Dec-10	26439278	5166407	3525062	27206	9435	780557	265441	121385	1520	1881
Jan-11	25838701	5182961	3545504	25630	10032	778571	262767	116099	3588	2429
Feb-11	20043594	5189076	3555272	22537	19323	655754	262323	115620	803	4225
Mar-11	24442395	5205124	3552625	26204	30132	735896	262181	115045	1186	5027
Apr-11	20967831	5227197	3562580	22132	44034	650815	262198	114542	746	7996
May-11	23888528	5258456	3567969	26977	68324	740723	233650	113638	29750	8551
Jun-11	28531708	5281748	3580379	30557	93253	812335	234014	113894	969	10244
Jul-11	23876901	5393994	3584564	32812	110342	691574	234364	114025	1038	13125
Aug-11	26383430	5331238	3532529	136151	120350	815589	234702	114090	847	18669
Sep-11	23456880	5370637	3583471	39012	130000	741812	235000	114102	828	20554
Oct-11	24171582	5485663	3610246	42135	137605	702895	235344	114570	808	24340
Nov-11	24790012	5371730	3651711	52649	143560	736797	235661	114700	797	25005
Dec-11	26751572	5382359	3679229	33518	150002	760386	235839	111748	883	26158
Jan-12	26361906	5382452	3696908	30200	170344	756945	235587	114166	961	27000

Table 3.3-6. Fan numbers of telecommunications industry

Fans Number			
Month	CHT	Taiwan Mobile	Far EasTone Telecommunication
Apr-10	0	0	0
May-10	0	0	0
Jun-10	0	0	0
Jul-10	0	0	0
Aug-10	0	0	0
Sep-10	0	0	0
Oct-10	0	0	0
Nov-10	4737	7063	3511
Dec-10	7608	7378	5408
Jan-11	15061	7745	7460
Feb-11	17580	9322	9016
Mar-11	19531	10218	10736
Apr-11	21191	10594	11314
May-11	22323	10937	13385
Jun-11	24706	11146	16033
Jul-11	27531	11269	17560
Aug-11	28622	11358	18130
Sep-11	31975	11454	21326
Oct-11	37614	14463	25537
Nov-11	48451	15792	29030
Dec-11	62007	15890	32815
Jan-12	69737	16050	34724

Table 3.3-7. Public data of telecommunications industry

Month	CHT				Taiwan Mobile				Far EasTone Telecommunication			
	Mobile Communications Business	Total mobile subs (thousand)	APRU	churn rate	Total Revenue (million)	Total Mobile subs (thousand)	APRU	churn rate	total revenue (million)	Total Mobile subs (thousand)	APRU	churn rate
Apr-10	6553998	9383	664	0.008662771	5778	6383	702	1.7%	4841	6236	692	2.0%
May-10	6342288	9417	635	0.007650371	5919	6378	719	1.8%	5089	6247	712	1.9%
Jun-10	6311896	9446	645	0.008434121	5752	6380	712	1.7%	4927	6263	708	1.8%
Jul-10	6282842	9487	641	0.008760388	5906	6379	736	1.8%	5111	6276	727	1.8%
Aug-10	6350378	9534	659	0.009310207	5873	6386	728	1.8%	5463	6299	720	2.0%
Sep-10	6416082	9577	647	0.008674096	5933	6390	730	1.8%	5816	6320	716	1.9%
Oct-10	6540479	9611	643	0.008306726	5907	6392	724	1.8%	6759	6325	719	2.0%
Nov-10	6369142	9645	637	0.008727952	5938	6395	714	1.8%	5621	6339	700	1.8%
Dec-10	6275218	9679	625	0.00950101	6056	6399	741	1.8%	6094	6360	726	1.9%
Jan-11	6763001	9719	661	0.008442819	6107	6405	715	1.7%	6094	6377	698	1.7%
Feb-11	6072271	9753	599	0.007882911	5822	6407	677	1.7%	5485	6399	662	1.6%
Mar-11	5743232	9784	557	0.008869388	6293	6417	729	1.8%	6096	6412	718	2.0%
Apr-11	5824151	9810	600	0.009190889	5896	6432	707	1.6%	5948	6433	693	1.8%
May-11	5824151	9836	578	0.009584093	6058	6447	721	1.8%	6208	6463	715	1.9%
Jun-11	6403640	9862	594	0.009852	6021	6474	719	1.8%	6297	6,501	712	1.7%
Jul-11	6178420	9896	612	0.01104146	6896	6508	739	1.8%	6587	6524	732	1.8%
Aug-11	6214513	9923	615	0.011666866	7495	6544	739	1.9%	6585	6549	736	1.9%
Sep-11	6056661	9956	602	0.010165204	7338	6574	722	1.8%	6438	6574	723	1.8%
Oct-11	6004934	9971	597	0.009741639	7550	6601	718	1.8%	6430	6587	723	1.8%
Nov-11	5922117	10006	591	0.009157721	7507	6634	713	1.9%	6599	6601	718	1.9%
Dec-11	6463240	10072	582	0.009577897	8386	6663	723	2.0%	6983	6618	740	2.0%
Jan-12	6603504	10081	588	0.011023611	8330	6690	724	1.8%	7381	6640	737	1.8%

Table 3.3-8. Public data of airline industry

Month	China Airlines				TransAsia Airways			
	Revenue (thousand)	Customer Number	Customer Capacity	Fans Number	Revenue (thousand)	Customer Number	Customer Capacity	Fans Number
Apr-10	11269298	927870	0.8031	1218	672780	233353	0.8242	0
May-10	12135505	931245	0.8011	1296	704446	235515	0.7912	0
Jun-10	12096329	953997	0.8331	1366	715587	229654	0.8185	0
Jul-10	13238515	1058405	0.8456	5432	835839	271312	0.8479	0
Aug-10	12375476	1019012	0.8408	6560	837653	262731	0.8422	0
Sep-10	11262462	911231	0.8084	8447	697900	212171	0.7450	0
Oct-10	11916162	921705	0.8172	9954	698639	213475	0.7773	0
Nov-10	11207638	916942	0.7867	10271	720770	222009	0.7991	0
Dec-10	11422063	952021	0.7594	12223	688515	203278	0.7516	0
Jan-11	11041154	320213	0.7930	14518	681585	193177	0.6742	0
Feb-11	9223656	875586	0.7660	16219	670427	201896	0.7166	0
Mar-11	11285172	903943	0.7804	17484	582040	189562	0.7231	0
Apr-11	10797250	930075	0.7930	18584	699430	227659	0.8204	1214
May-11	10639653	873732	0.8018	19768	698998	221822	0.7605	1315
Jun-11	11036888	946666	0.8267	22089	737354	238321	0.7980	3245
Jul-11	12267225	1030858	0.8418	23156	863857	279792	0.8133	4457
Aug-11	11787562	1010347	0.8222	24725	850682	255255	0.7555	4501
Sep-11	10701446	878108	0.7458	25587	746144	224656	0.6626	5240
Oct-11	11454536	902618	0.7506	29518	746302	214843	0.7355	6877
Nov-11	10563232	839497	0.7317	19776	739302	224363	0.8031	7021
Dec-11	11498427	897664	0.7210	29003	724971	194065	0.6961	7542
Jan-12	11364000	968523	0.7718	30008	809601	218799	0.6573	8740

3.4 Methods of data analysis

3.4.1 Statistical method for 16 case analyses

The statistical analysis for 16 cases was performed with SPSS software. Spearman's rank correlation coefficient, a non-parametric measure, was used to assess the statistical dependence between two variables. The Spearman correlation coefficient is defined as the Pearson correlation coefficient between the ranked variables. For a sample of size n, the n raw scores Xi,Yi are converted to ranks xi,yi, and ρ is computed from these:

$$\rho = \frac{\sum_i (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum_i (x_i - \bar{x})^2 \sum_i (y_i - \bar{y})^2}}.$$

In this analysis, xi means the number of fans during the period of data collection, yi means the total revenue during 2008 to 2011, and n means the three or four observation years. The correlation, as listed in Table 3.3-1, is the classification reference of different types of enterprises used in this research.

Table 3.4-1. Interpretation of correlation coefficient

Correlation	Negative	Positive
None	-0.09 to 0.0	0.0 to 0.09
Small	-0.3 to -0.1	0.1 to 0.3
Medium	-0.5 to -0.3	0.3 to 0.5
Strong	-1.0 to -0.5	0.5 to 1.0

By analyzing the pattern of these variables, we formed general findings on the relationship between fan-page management and business performance. Chapter five reports the findings.

3.4.2 Statistical method for the following research

For the following research, we used SPSS software and linear regression as our statistic tool and method to test our data. Linear regression is an approach to modeling the relationship between a scalar dependent-variable Y and one or more explanatory variables denoted X. In our research, the method is also called simple regression as we used only one explanatory variable.

We observe two indicators via linear regression to determine whether the relationships are positive and the results significant. The two indicators are the Pearson correlation coefficient and adjusted R^2. The Pearson correlation coefficient is a measure of the correlation (linear dependence) between two variables X and Y, giving a value between +1 and −1 inclusive. We determine that a correlation greater than 0.8 is generally described as strong, whereas a correlation less than 0.5 is generally described as weak.

Adjusted R^2 is a modification due to Theil of R^2 that adjusts for the number of explanatory terms in a model. It increases only if the new term improves the model more than would be expected by chance. The adjusted R^2 can be negative and will always be less than or equal to R^2.

Chapter 4: Research Results

4.1 Research results of each stage

Here we make a summary table of the research results. The items with three characteristics mean the industry with short-product durability, low-product prices, and low-customer involvement.

Table 4.1-1. Research results of hypotheses verification in each stage

<table>
<tr><th colspan="6">STAGE ONE</th></tr>
<tr><td colspan="6">The characteristics found from 16 global firms</td></tr>
<tr><td colspan="6">• There is a significant relationship of 11 cases, and non-significant of 5 cases
• Short-product durability; Low-product prices; Low-customer involvement.</td></tr>
<tr><th colspan="6">STAGE TWO</th></tr>
<tr><td colspan="6">The fan-page effect by total revenue of 58 global firms</td></tr>
<tr><td>Records to Be Analyzed</td><td>Person Correlation</td><td>R Square</td><td>Adjusted R Square</td><td colspan="2">Relationship</td></tr>
<tr><td>232</td><td>0.039</td><td>0.002</td><td>-0.003</td><td colspan="2">N</td></tr>
<tr><td colspan="6">The fan-page effect by brand value of 58 global firms</td></tr>
<tr><td>Records to be analyzed</td><td>Person Correlation</td><td>R Square</td><td>Adjusted R Square</td><td colspan="2">Relationship</td></tr>
<tr><td>152</td><td>0.112</td><td>0.013</td><td>0.006</td><td colspan="2">N</td></tr>
<tr><td colspan="6">The fan-page effect by total revenue of 58 global firms by industry</td></tr>
<tr><td>Industry</td><td>With three Characteristics</td><td>Person Correlation</td><td>Adjusted R Square</td><td colspan="2">Relation-ship</td></tr>
<tr><td>Food and Beverage (Global)</td><td>Y</td><td>0.385</td><td>0.12</td><td colspan="2">N</td></tr>
<tr><td>Clothing and Accessories (Global)</td><td>Y</td><td>0.123</td><td>-0.005</td><td colspan="2">N</td></tr>
<tr><td>Retail (Global)</td><td>Y</td><td>0.058</td><td>-0.0026</td><td colspan="2">N</td></tr>
<tr><td>Technology (Global)</td><td>N</td><td>0.046</td><td>-0.024</td><td colspan="2">N</td></tr>
<tr><td>Automobiles (Global)</td><td>N</td><td>0.355</td><td>0.1</td><td colspan="2">N</td></tr>
<tr><th colspan="6">STAGE THREE</th></tr>
</table>

The fan-page effect by total revenue of 11 firms in Taiwan by industry				
Telecommunications (Taiwan)	N	0.325	0.091	N
Airline (Taiwan)	Y	0.678	0.447	Y
Banking (Taiwan)	Y	0.567	0.314	Y
CVS (Taiwan)	Y	0.863	0.739	Y
STAGE FOUR				
The fan-page effect by customer satisfaction of 11 firms in Taiwan by industry				
Telecommunications (Taiwan)	N	0.248	0.047	N
Banking (Taiwan)	Y	0.407	0.156	N
The fan-page effect by customer growth of 11 firms in Taiwan by industry				
Telecommunication (Taiwan)	N	0.412	0.157	N
Airline (Taiwan)	Y	0.667	0.432	Y
Banking (Taiwan)	Y	0.528	0.270	Y
Fan-page effect by customer loyalty of 11 firms in Taiwan by industry				
Telecommunication (Taiwan)	N	0.454	0.194	N
Airline (Taiwan)	Y	0.046	-0.022	N
Banking (Taiwan)	Y	0.534	0.277	Y

4.2 Analyzed results of stage one: fan-page effects of global enterprises

Based on the analysis of 16 fan pages of global enterprises, 11 show a positive, strong correlation between the growth of fan numbers and business revenue. The other five fan pages show weak or negative related between them. Investigating in greater depth, the positive, strong correlation cases yield a finding that shows that the enterprises share generally similar characteristics in their products, with relatively short-product durability, low product prices and low customer involvement. In addition, they can reach more customers with a higher repurchase rate. This shows why Coca-Cola enhances their brand image and Starbucks makes good customer loyalty with their customers through holding activities, communicating with users, handling complaints, and other operations on Facebook. Conversely, the other five cases generally have a high-product price with relatively long-product durability.

Table 4.2-1. The correlation of 16 global firms

Enterprise	**P (Spearman correlation coefficient)**	**Correlation**

Coca-Cola	1	Positive Strong
Starbucks	1	Positive Strong
McDonald's	0.8	Positive Strong
Walmart	1	Positive Strong
7-11	1	Positive Strong
H&M	1	Positive Strong
Nike	0.8	Positive Strong
ZARA	1	Positive Strong
L'Oreal	0.8	Positive Strong
Hewlett-Packard	1	Positive Strong
Samsung	0.8	Positive Strong
Nokia	0.4	Positive Medium
SONY	-1	Negative Strong
Audi	0	None
Toyota	-0.4	Negative Medium
Ford	-0.2	Negative Small

4.3 Analyzed results of stage two: Fan-page effects of global enterprises by industry

To verify the relationship between fan numbers and total revenue, we use ordinary least squares multiple-linear regression as our statistic method. There are 232 records to be analyzed, the independent variable is the number of fans, and the dependent variable is total revenue. The results are showed in below Table 4.3-1.

Table 4.3-1. Analysis description of the fan-page effect by total revenue of 58 firms

	Mean	**Standard error**	**Numbers**
Total revenue	27869075172.4138	30538204814.34167	232
Fan numbers	2000956.4138	4173327.58481	232

The Pearson correlation for 232 records is 0.39 (see Table 4.3-2). It is smaller than 0.5, which means there is no relationship between the two variables and is not significant.

Table 4.3-2. Correlation coefficients between fan numbers and total revenue from 58 firms

		Total revenue	**Fan numbers**

Pearson correlation	Total revenue	1.000	.039
	Fan numbers	.039	1.000
Significance (single tail)	Total revenue	.	.276
	Fan numbers	.276	.
Numbers	Total revenue	232	232
	Fan numbers	232	232

Adjusted R square is -0.003 (see Table 4.3-3), which means the fan numbers is not the major fact that leads to total revenue. We can make the conclusion that there is no significant relationship between the fan numbers and total revenue of these 232 records.

Table 4.3-3. Linear regression results between fan numbers and total revenue of 58 firms

R	.039(a)
R square	.002
Adjusted R square	-.003
Standard error	30580952872.47862
R square change	.002
F change	.355
Degree of freedom of numerator	1
Degree of freedom of denominator	230
Significance of F change	.552
Durbin-Watson	.440

In addition, we test the fan numbers and brand value of these two variables and recorded the results in Table 4.3-4.

Table 4.3-4. Analysis description of the fan-page effect by brand value of 58 firms

	Mean	**Standard Error**	**Numbers**
Brand value	14994.01	12757.382	152
Fan numbers	2015322.8487	4593730.92151	152

The Pearson correlation between two variables is 0.112 (see Table 4.2-5), smaller than 0.5. This means there is no relationship between the fan numbers and brand value.

Table 4.3-5. Correlation coefficients between fan numbers and brand value of 58

firms

		Brand Value	Fan Numbers
Pearson correlation	Brand value	1.000	.112*
	Fan numbers	.112*	1.000
Significance (single tail)	Brand value	.	.084
	Fan numbers	.084	.
Numbers	Brand value	152	152
	Fan numbers	152	152

*p < 0.1

We can see that the adjusted R square is 0.006 (see Table 4.2-6), which means that only 0.6% of the fan numbers led to brand value. We also studied within specific industries and the results are showed below.

Table 4.3-6. Linear regression results between fan numbers and brand value of 58 firms

R	.112(a)
R square	.013
Adjusted R square	.006
Standard error	12718.617
R square change	.013
F change	1.922
Degree of freedom of numerator	1
Degree of freedom of denominator	150
Significance of F change	.168
Durbin-Watson	.904

4.3.1 The fan-page effect by total revenue of the food and beverage industry

We collected 32 public records from the food and beverage industries. The mean value and standard error are listed in Table 4.3-7.

Table 4.3-7. Analysis description of the fan-page effect by total revenue of the food and beverage industry

	Mean	Standard Error	Numbers
Total revenue	23487450000.0000	23958983779.74459	32
Fan numbers	5295807.6563	8729929.37430	32

The Pearson correlation between two variables in this industry is 0.385 (see Table 4.3-8), smaller than 0.5, meaning the relationship is not high in this industry.

Table 4.3-8. Correlation coefficients between fan numbers and total revenue of the food and beverage industry

		Total Revenue	**Fan Numbers**
Pearson correlation	Total revenue	1.000	.385
	Fan numbers	.385	1.000
Significance (single tail)	Total revenue	.	.015*
	Fan numbers	.015*	.
Numbers	Total revenue	32	32
	Fan numbers	32	32

*p < 0.1

We can see that adjusted R square is 0.12, which means that only 12% of the fan numbers led to total revenue. In this industry, there is no significant relationship between the fan numbers and total revenue.

Table 4.3-9. Linear regression results between fan numbers and total revenue of the food and beverage industry

R	.385(a)
R square	.148
Adjusted R^2	.120
Standard error	22478613019.05380
R square change	.148
F change	5.218
Degree of freedom of numerator	1
Degree of freedom of denominator	30
Significance of F change	.030
Durbin-Watson	.494

4.3.2 The fan-page effect by total revenue of the clothing and accessories industry

In this industry there are 52 records to be analyzed, and the mean value and standard error are listed below in Table 4.3-10.

Table 4.3-10. Analysis description of the fan-page effect by total revenue of the of clothing and accessories industry

	Mean	Standard Error	Numbers
Total revenue	5197824230.7692	4193438632.46388	52
Fan numbers	2666386.6346	3703610.07619	52

We can see the result is not significant and the Pearson correlation in this industry is 0.123 (see Table 4.3-11), smaller than 0.5, which showed an irrelevance between the fan numbers and total revenue.

Table 4.3-11. Correlation coefficients between fan numbers and total revenue in the clothing and accessories industry

		Total Revenue	Fan Numbers
Pearson correlation	Total revenue	1.000	.123
	Fan numbers	.123	1.000
Significance (single tail)	Total revenue	.	.192
	Fan numbers	.192	.
Numbers	Total revenue	52	52
	Fan numbers	52	52

The adjusted R square is -0.05 here, the meaning of this number is that the fan numbers is hard to give an explanation to the total revenue in this industry.

Table 4.3-12. Linear regression results between fan numbers and total revenue of the clothing and accessories industry

R	.123(a)
R square	.015
Adjusted R^2	-.005
Standard error	4202941303.2911
R square change	.015
F change	.770
Degree of freedom of numerator	1
Degree of freedom of denominator	50

Significance of F change	.385
Durbin-Watson	.670

4.3.3 The fan-page effect by total revenue of the retail industry

There are 36 records to be analyzed in this industry, the mean value and standard error of which are list in below in Table 4.3-13.

Table 4.3-13. Analysis description of the fan-page effect by total revenue of the retail industry

	Mean	Standard Error	Numbers
Total revenue	41232375000.0000	28329593288.09339	36
Fan numbers	1330016.8056	2364103.81728	36

The result is not significant, the Person correlation is 0.058 smaller than 0.5, which means the relationship between the fan numbers and total revenue is related low.

Table 4.3-14. Correlation coefficients between fan numbers and total revenue in the retail industry

		Total Revenue	Fan Numbers
Pearson correlation	Total revenue	1.000	.058
	Fan numbers	.058	1.000
Significance (single tail)	Total revenue	.	.368
	Fan numbers	.368	.
Numbers	Total revenue	36	36
	Fan numbers	36	36

The adjusted R square is -0.026, which means that the percentage of total revenue that could be explained by the fan numbers in this industry is very low.

Table 4.3-15. Linear regression results between fan numbers and total revenue of the retail industry

R	.058(a)
R square	.003
Adjusted R^2	-.026
Standard error	28694648323.87486
R square change	.003

F change	.115
Degree of freedom of numerator	1
Degree of freedom of denominator	34
Significance of F change	.736
Durbin-Watson	.699

4.3.4 The fan-page effect by total revenue of the technology industry

In the technology industry the number of records is 40, and the mean and standard error are listed below in Table 4.3-16.

Table 4.3-16. Analysis description of the fan-page effect by total revenue of the technology industry

	Mean	Standard Error	Numbers
Total revenue	34192510500.0000	32382686227.18343	40
Fan numbers	968819.7250	1761845.57795	40

With our focus on the Pearson correlation, the value is 0.046, which means the degree of correlation is very low between the two variables and the result is not significant.

Table 4.3-17. Correlation coefficients between fan numbers and total revenue in the technology industry

		Total Revenue	Fan Numbers
Pearson correlation	Total revenue	1.000	.046
	Fan numbers	.046	1.000
Significance (single tail)	Total revenue	.	.388
	Fan numbers	.388	.
Numbers	Total revenue	40	40
	Fan numbers	1.000	.046

The adjusted R square is -.024, which means the percentage that the total revenue that could be explained by fan numbers in this industry is very low.

Table 4.3-18. Linear regression results between fan numbers and total revenue of the technology industry

R	.046(a)
R square	.002

Adjusted R^2	-.024
Standard error	32770591258.45140
R square change	.002
F change	.082
Degree of freedom of numerator	1
Degree of freedom of denominator	38
Significance of F change	.776
Durbin-Watson	.318

4.3.5 The fan-page effect by total revenue of the automobile industry

In the automobile industry, we collected 36 records for statistical analyses, and the mean value and standard error are listed in Table 4.3-19 below.

Table 4.3-19. Analysis description of the fan-page effect by total revenue of the automobile industry

	Mean	Standard Error	Numbers
Total revenue	40757922222.2222	31140188958.01108	36
Fan numbers	1076888.3056	1641743.76364	36

The Pearson correlation in this industry is 0.355 smaller than 0.5, thus the relationship between fan numbers and total revenue in the automobile industry is related low.

Table 4.3-20. Correlation coefficients between fan numbers and total revenue in the automobile industry

		Total Revenue	Fan Numbers
Pearson correlation	Total revenue	1.000	.355*
	Fan numbers	.355*	1.000
Significance (single tail)	Total revenue	.	.017
	Fan numbers	.017	.
Numbers	Total revenue	36	36
	Fan numbers	36	36

*p < 0.1

The adjusted R square is 0.126, which means that only 12.6% of the fan numbers led to total revenue.

Table 4.3-21. Linear regression results between fan numbers and total revenue of the automobile industry

R	.355(a)
R square	.126
Adjusted R^2	.100
Standard error	29541464644.42721
R square change	.126
F change	4.891
Degree of freedom of numerator	1
Degree of freedom of denominator	34
Significance of F change	.034
Durbin-Watson	1.319

4.4 Analyzed results of stage three: longitudinal analysis of enterprises fan pages in Taiwan

Except for the 58 global cases mentioned above, we also made a study of four industries in Taiwan, and we collected monthly public data of four industries (airlines, telecommunications, banking and convenience store) from April 2010 to December 2012. These data were issued by government supervisors or official websites, the Civil Aeronautics Administration for the airlines, the National Communication Commission for telecommunications industry and Financial Supervisory Commission for banking credit-card services. We use Pearson correlation coefficient and coefficient of determination as our key judgment on verifying our hypotheses. For the airline industry, we selected China Airlines and TransAsia Airways as our study objects; for telecommunications, we selected Chunghwa Telecom, Taiwan Mobile and Far EasTone Telecommunication; for banking credit-card services, we chose Union Bank of Taiwan, Taishin Bank, Chinatrust, and the Bank of Taiwan.

4.4.1 The fan-page effect by total revenue of the telecommunication industry in Taiwan

We analyze the relationship between fan numbers and revenue, and the mean value and standard error are listed in the Table 4.4-1 below.

Table 4.4-1. Analysis description of the fan-page effect by total revenue of the telecommunication industry in Taiwan

	Mean	Standard Error	Numbers
Total revenue	2087754.1061	2970277.73431	66

Fan numbers	13111.1818	14715.08121	66

The Pearson correlation here is 0.325 smaller than 0.5, thus the relationship between fan numbers and total revenue in the telecommunication industry is related low.

Table 4.4-2. Correlation coefficients between fan numbers and total revenue in the telecommunication industry in Taiwan

		Total Revenue	**Fan Numbers**
Pearson correlation	Total revenue	1.000	.325**
	Fan numbers	.325**	1.000
Significance (single tail)	Total revenue	.	.004
	Fan numbers	.004	.
Numbers	Total revenue	66	66
	Fan numbers	66	66

**p < 0.01

The adjusted R square is 0.091, which means the percentage of fan numbers leading to total revenue is 9.1%. This very low number shows that there is no significant relationship between the two variables in these industries.

Table 4.4-3. Linear regression results between fan numbers and total revenue of the telecommunications industry in Taiwan

R	.325(a)
R square	.105
Adjusted R^2	.091
Standard error	2831267.80665
R square change	.105
F change	7.539
Degree of freedom of numerator	1
Degree of freedom of denominator	64
Significance of F change	.008

4.4.2 The fan-page effect by total revenue of the airline industry in Taiwan

We have China Airlines and TransAsia Airways as our cases in the airline industry. We made an analysis on fan numbers, total revenue, and total customers, and the results are introduced in this section.

There are 44 records to be analyzed, and the mean value and standard error are listed below.

Table 4.4-4. Analysis description of the fan-page effect by total revenue of the airline industry in Taiwan

	Mean	Standard Error	Numbers
Total revenue	6061510.7045	5420057.67905	44
Fan numbers	9030.7727	9687.57851	44

The Pearson correlation is 0.678, which means there is a strong, positive relationship between fan numbers and total revenue in the airline industry.

Table 4.4-5. Correlation coefficients between fan numbers and total revenue in the airline industry in Taiwan

		Total Revenue	Fan Numbers
Pearson correlation	Total revenue	1.000	.678***
	Fan numbers	.678***	1.000
Significance (single tail)	Total revenue	.	.000
	Fan numbers	.000	.
Numbers	Total revenue	44	44
	Fan numbers	44	44

***p<0.001

The adjusted R square is 0.447, which means 44.7% of the fan numbers led to total revenue.

Table 4.4-6. Linear regression results between fan numbers and total revenue of the airline industry in Taiwan

R	.678(a)
R square	.459
Adjusted R^2	.447
Standard error	4032086.23849
R square change	.459
F change	35.699
Degree of freedom of numerator	1
Degree of freedom of denominator	42
Significance of F change	.000

4.4.3 The fan-page effect by total revenue of the banking industry in Taiwan

In the banking industry, we collected a different type of indicators from the Union Bank of Taiwan, Taishin Bank, Chinatrust, and the Bank of Taiwan to perform the statistical analysis, and the results help us to verify hypothesis one.

“Transaction Amt.Cred" is the amount of the credit-card transaction issued by the banking institution and it is a important indicator for total revenue. The mean value and standard error are listed below in Table 4.4-7.

Table 4.4-7. Analysis description of the fan- page effect by total revenue of the banking industry in Taiwan

	Mean	**Standard error**	**Numbers**
Transaction Amt.Cred	10296059.8864	9147089.17442	88
Fan numbers	22056.4432	37930.42592	88

The Pearson correlation is 0.567, which means the relationship between the fan numbers and transaction amt. cred is related strong and positive.

Table 4.4-8. Correlation coefficients between fan numbers and total revenue in banking industry in Taiwan

		Transaction Amt.Cred	**Fan Numbers**
Pearson correlation	Transaction Amt.Cred	1.000	.567***
	Fan numbers	.567***	1.000
Significance (single tail)	Transaction Amt.Cred	.	.000
	Fan numbers	.000	.
Numbers	Transaction Amt.Cred	88	88
	Fan numbers	88	88

***p<0.001

The adjusted R square is 0.270, which means that 31.4% of the fan numbers led to transaction Amt.Cred.

Table 4.4-9. Linear regression results between fan numbers and total revenue of the banking industry in Taiwan

R	.567(a)
R square	.322
Adjusted R^2	.314
Standard error	7575936.78236
R square change	.322
F change	40.827
Degree of freedom of numerator	1
Degree of freedom of denominator	86
Significance of F change	.000

4.4.4 The fan-page effect by total revenue of the convenience-store industry in Taiwan

In the convenience-store industry (CVS), we took 7 ELEVEN and Family Mart as our research targets, analyzed the relationship between the fan numbers and total revenue, and the results are showed below.

Table 4.4-10. Analysis description of the fan-page effect by total revenue of the CVS industry in Taiwan

	Mean	**Standard Error**	**Numbers**
Total revenue	7026982.0238	3205703.45216	42
Fan numbers	671426.2381	530406.84959	42

The Pearson correlation in the CVS industry is 0.863 bigger than 0.5, which means there is a significant positive relationship between fan numbers and total revenue in this industry.

Table 4.4-11. Correlation coefficients between fan numbers and total revenue in the CVS industry in Taiwan

		Total revenue	**Fan Numbers**
Pearson correlation	Total revenue	1.000	.863***
	Fan numbers	.863***	1.000
Significance (single tail)	Total revenue	.	.000
	Fan numbers	.000	.
Numbers	Total revenue	42	42
	Fan numbers	42	42

***p<0.001

The adjusted R square is 0.739, which means that 73.9% of the fan numbers led to total revenue.

Table 4.4-12. Linear regression results between fan numbers and total revenue of the CVS industry in Taiwan

R	.863(a)
R square	.746
Adjusted R^2	.739
Standard error	1636984.18879
R square change	.746
F change	117.232
Degree of freedom of numerator	1
Degree of freedom of denominator	40
Significance of F change	.000

4.5 The testing of other hypotheses

Here we use passenger number and passenger capacity as the indicators for measuring customer growth and customer loyalty in the airline industry. In the telecommunications industry, we use total mobile subscriber, average revenue per user (ARPU) and churn rate as the indicators for measuring customer growth, customer loyalty, and customer satisfaction. In the banking credit-card service industry, we use "Credit Cd. in Circu.", "CreditCard No.in For" and "Credit Card_Stop" as indicators for customer growth, customer loyalty, and customer satisfaction. Table 4.5-1 below gives an explanation of the above indicators and their meanings.

Table 4.5-1. Meanings of indicators used in the testing of other hypotheses

Industries	**Indicator**	**Description**	**Measuring**
Airline	Passenger Number	Total number of passengers	Customer growth
Airline	Passenger Capacity	The number of people who can be seated in a specific space	Customer loyalty
Telecommunications	Total Mobile Subscriber	The number associated with all GSM and UMTS network mobile phone users	Customer growth

Telecommunications	ARPU	The total revenue divided by the number of subscribers	Customer loyalty
Telecommunications	Churn Rate	The number of individuals or items moving into or out of a collective over a specific period of time	Customer satisfaction
Banking Credit Card	Credit Cd. in Circu.	The number of credit card issue minus stop	Customer growth
Banking Credit Card	CreditCard No.in For	The number of credit card with record of consumption during six months	Customer loyalty
Banking Credit Card	Credit Card_Stop	The number of credit card stopped per month	Customer satisfaction

4.5.1 The fan-page effect by customer satisfaction of the telecommunications industry in Taiwan

Churn rate is a measurement of the number of individuals or items moving out of a collective over a specific period of time. This indicator helps us understandard the shift in customers in the telecommunications industry. We analyzed the relationship between fan numbers and churn rate, and the mean value and standard error are listed in the Table 4.5-2 below.

Table 4.5-2. Analysis description of the fan-page effect by customer satisfaction of the telecommunications industry in Taiwan

	Mean	Standard Error	Numbers
Churn rate	1.5244	.43695	66
Fan numbers	13111.1818	14715.08121	66

The Pearson correlation is -0.248, which means there is a weak relationship: the higher the fan numbers, the less churn rate in the telecommunications industry.

Table 4.5-3. Correlation coefficients between fan numbers and churn rate in the telecommunications industry in Taiwan

		Churn Rate	Fan Numbers
Pearson correlation	Churn rate	1.000	-.248*
	Fan numbers	-.248*	1.000
Significance (single tail)	Churn rate	.	.022
	Fan numbers	.022	.
Numbers	Churn rate	66	66
	Fan numbers	66	66

*p<0.1

The adjusted R square is 0.047, which means that only 4.7% of the fan numbers led to the churn rate.

Table 4.5-4. Linear regression results between fan numbers and churn rate of the telecommunications industry in Taiwan

R	.248(a)
R square	.062
Adjusted R^2	.047
Standard error	.42654

R square change	.062
F change	4.212
Degree of freedom of numerator	1
Degree of freedom of denominator	64
Significance of F change	.044

4.5.2 The fan-page effect by customer growth of the telecommunications industry in Taiwan

We also analyzed the effect on subscribers caused by fan numbers in the telecommunications industry, and the mean value and standard error are listed below.

Table 4.5-5. Analysis description of the fan-page effect by customer growth of the telecommunications industry in Taiwan

	Mean	Standard Error	Numbers
Subscriber	7546.5000	1576.05470	66
Fan numbers	13111.1818	14715.08121	66

The Pearson correlation is 0.412 smaller than 0.5, thus there is a weak and positive relationship between the fan numbers and subscribers.

Table 4.5-6. Correlation coefficients between fan numbers and total subscribers in the telecommunications industry in Taiwan

		Subscriber	Fan Numbers
Pearson correlation	Subscriber	1.000	.412***
	Fan numbers	.412***	1.000
Significance (single tail)	Subscriber	.	.000
	Fan numbers	.000	.
Numbers	Subscriber	66	66
	Fan numbers	66	66

***p<0.001

The adjusted R square is 0.157, which means there that 15.7% of the fan numbers led to subscribers.

Table 4.5-7. Linear regression results between fan numbers and total subscribers of the telecommunications industry in Taiwan

R	.412(a)
R square	.170
Adjusted R^2	.157
Standard error	1447.20297
R square change	.170
F change	4.21213.090
Degree of freedom of numerator	1
Degree of freedom of denominator	64
Significance of F change	.001

4.5.3 The fan-page effect by customer loyalty of the telecommunications industry in Taiwan

Average Revenue Per User (ARPU) is a very important indicator for customer loyalty in the telecommunications industry, and is defined as the total revenue divided by the number of subscribers. Here we study the relationship between fan numbers and ARPU, and the mean value and standard error are listed below.

Table 4.5-8. Analysis description of the fan page-effect by customer loyalty of the telecommunications industry in Taiwan

	Mean	**Standard Error**	**Numbers**
ARPU	684.1061	52.56150	66
Fan numbers	13111.1818	14715.08121	66

The Pearson correlation is -0.454, which means the relationship is negative and not very strong between fan numbers and ARPU.

Table 4.5-9. Correlation coefficients between fan numbers and ARPU in the telecommunications industry in Taiwan

		ARPU	**Fan Numbers**
Pearson correlation	ARPU	1.000	-.454***
	Fan numbers	-.454***	1.000
Significance (single tail)	ARPU	.	.000
	Fan numbers	.000	.
Numbers	ARPU	66	66
	Fan numbers	66	66

***P<0.001

The adjusted R square here is 0.194, which means that only 19.4% of the fan numbers led to ARPU.

Table 4.5-10. Linear regression results between fan numbers and ARPU of the telecommunications industry in Taiwan

R	.454(a)
R square	.206
Adjusted R^2	.194
Standard error	47.19060
R square change	.206
F change	16.638
Degree of freedom of numerator	1
Degree of freedom of denominator	64
Significance of F change	.000

4.5.4 The fan-page effect by customer growth of the airline industry in Taiwan

The number of customer is a useful indicator in the airline industry in our study. We collected the number about internal line, made s analysis on it, and the mean value and standard error are listed below.

Table 4.5-11. Analysis description of the fan-page effect by customer growth of the airline industry in Taiwan

	Mean	**Standard Error**	**Numbers**
Customer numbers	566771.9545	359353.59524	44
Fan numbers	9030.7727	9687.57851	44

The Pearson correlation is 0.667, which means there is a high and positive-related relationship between the customer number and fan numbers in the airline industries.

Table 4.5-12. Correlation coefficients between fan numbers and customer number in the airline industry in Taiwan

		Customer Numbers	**Fan Numbers**
Pearson correlation	Customer numbers	1.000	.667***
	Fan numbers	.667***	1.000

Significance (single tail)	Customer numbers	.	.000
	Fan numbers	.000	.
Numbers	Customer numbers	44	44
	Fan numbers	44	44

***p<0.001

The adjusted R square is 0.432, which means that 44.6% of the fan numbers led to total revenue.

Table 4.5-13. Linear regression results between fan numbers and customer number of the airline industry in Taiwan

R	.667(a)
R square	.446
Adjusted R square	.432
Standard error	270747.75561
R square change	.446
F change	33.750
Degree of freedom of numerator	1
Degree of freedom of denominator	42
Significance of F change	.000

4.5.5 The fan-page effect by customer loyalty of the airline industry in Taiwan

Passenger capacity is the number of people who can be seated in a specific space. It is an indicator to measure customer loyalty in the airline industry, and we listed the analysis results below.

Table 4.5-14. Analysis description of the fan-The page effect by customer loyalty of the airline industry in Taiwan

	Mean	**Standard Error**	**Numbers**
Passenger capacity	.778509	.0497429	44
Fan numbers	9030.7727	9687.57851	44

The result is not significant. The Pearson correlation is 0.046 smaller than 0.5, which means there is no significant relationship between fan numbers and passenger capacity.

Table 4.5-15. Correlation coefficients between fan numbers and passenger capacity in

the airline industry in Taiwan

		Passenger Capacity	Fan Numbers
Pearson correlation	Passenger capacity	1.000	-.046
	Fan numbers	-.046	1.000
Significance (single tail)	Passenger Capacity	.	.384
	Fan numbers	.384	.
Numbers	Passenger capacity	44	44
	Fan numbers	44	44

The adjusted R square is -0.022, which means the capacity that fan numbers led to passenger capacity is weakly related.

Table 4.5-16. Linear regression results between fan numbers and passenger capacity of the airline industry in Taiwan

R	.046(a)
R square	.002
Adjusted R^2	-.022
Standard error	.0502788
R square change	.002
F change	.088
Degree of freedom of numerator	1
Degree of freedom of denominator	42
Significance of F change	.768

4.5.6 The fan-page effect by customer growth of the banking industry in Taiwan

The indicator “Credit Cd. in Circu” is the number of credit cards issued minus stop. It is an important indicator to measure customer growth in the banking industry. We listed the statistical results below.

Table 4.5-17. Analysis description of the fan-page effect by customer growth of the banking industry in Taiwan

	Mean	Standard Error	Numbers
Credit Cd. in Circu	2556508.1477	1831927.52587	88
Fan numbers	22056.4432	37930.42592	88

The Pearson correlation is 0.528, which means there is a positive and strong relationship between fan numbers and Credit Cd. in Circu.

Table 4.5-18. Correlation coefficients between fan numbers and Credit Cd. in Circu in the banking industry in Taiwan

		Credit Cd. in Circu	**Fan Numbers**
Pearson correlation	Credit Cd. in Circu	1.000	.528***
	Fan numbers	.528***	1.000
Significance (single tail)	Credit Cd. in Circu	.	.000
	Fan numbers	.000	.
Numbers	Credit Cd. in Circu	88	88
	Fan numbers	88	88

***p<0.001

The adjusted R square is .270, which means that 27% of the fan numbers led to Transaction Credit Cd. in Circu.

Table 4.5-19. Linear regression results between fan numbers and Credit Cd. in Circu of the banking industry in Taiwan

R	.528(a)
R square	.279
Adjusted R^2	.270
Standard error	1564957.38397
R square change	.279
F change	33.215
Degree of freedom of numerator	1
Degree of freedom of denominator	86
Significance of F change	.000

4.5.7 The fan-page effect by customer loyalty of the banking industry in Taiwan

This variable is the number of credit cards with a record of consumption during the past six months, which is an indicator to measure the customer loyalty in the banking industry.

Table 4.5-20. Analysis description of the fan-page effect by customer loyalty of the banking industry in Taiwan

	Mean	Standard Error	Numbers
CreditCard No.in For	1616161.8523	1277756.49482	88
Fan numbers	22056.4432	37930.42592	88

The Pearson correlation is 0.534, which means there is a positive relationship between fan numbers and “CreditCard No.in For.”.

Table 4.5-21. Correlation coefficients between fan numbers and CreditCard No.in For. in the banking industry in Taiwan

		CreditCard No.in For	Fan Numbers
Pearson correlation	CreditCard No.in For	1.000	.534***
	Fan numbers	.534***	1.000
Significance (single tail)	CreditCard No.in For	.	.000
	Fan numbers	.000	.
Numbers	CreditCard No.in For	88	88
	Fan numbers	88	88

***p<0.001

The adjusted R square is 0.277, which means that 27.7% of the fan numbers led to CreditCard No.in For.

Table 4.5-22. Linear regression results between fan numbers and CreditCard No. of the banking industry in Taiwan

R	.534(a)
R square	.285
Adjusted R^2	.277
Standard error	1086700.86210
R square change	.285
F change	34.281
Degree of freedom of numerator	1
Degree of freedom of denominator	86
Significance of F change	.000

4.5.8 The fan-page effect by customer satisfaction of the banking industry in Taiwan

"Credit Card_Stop" is the number of credit card stopped per month. It is an important indicator to measure customer satisfaction in the banking industry. We show the statistical results below.

Table 4.5-23. Analysis description of the fan-page effect by customer satisfaction of the banking industry in Taiwan

	Mean	Standard Error	Numbers
Credit Card_Stop	23578.4773	22761.35539	88
Fan numbers	22056.4432	37930.42592	88

The Pearson correlation is 0.407, smaller than 0.5, which means there is not a significant relationship between fan numbers and Credit Card_Stop.

Table 4.5-24. Correlation coefficients between fan numbers and Credit Card_Stop in the banking industry in Taiwan

		Credit Card_Stop	Fan Numbers
Pearson correlation	Credit Card_Stop	1.000	.407***
	Fan numbers	.407***	1.000
Significance (single tail)	Credit Card_Stop	.	.000
	Fan numbers	.000	.
Numbers	Credit Card_Stop	88	88
	Fan numbers	88	88

***p<0.001

The adjusted R square is 0.156, which means that only 15.6% of the fan numbers led to a Credit Card_Stop.

Table 4.5-25. Linear regression results between fan numbers and Credit Card_Stop of the banking industry in Taiwan

R	.407(a)
R square	.166
Adjusted R^2	.156
Standard error	20910.76280
R square change	.166

F change	17.080
Degree of freedom of numerator	1
Degree of freedom of denominator	86
Significance of F change	.000

We will discuss the findings and provide explanations for these analyses in the next chapter. The findings will bring new field of vision to enterprises and give some direction to the enterprises' strategy for managing fan pages on Facebook.

Chapter 5: Discussion

5.1 Overview of research finding

This paper aims to understand whether social networks can bring benefits to enterprises. We developed six hypotheses in our research that are listed below in table 66. In the first stage of our research, we use Spearman's rank correlation coefficient as our statistical method, and find three characteristics to help us conduct the following research. In stage two, we used linear regression as our statistic method and took 232 records from 58 global firms as our data. Our results encouraged us to continue our research in depth. In stage three, we used 11 firms in Taiwan as our research targets and tested hypothesis one. The results provided us with information to suggest to enterprises. Moreover, we collected monthly data from those 11 firms in Taiwan to analyze others hypotheses we addressed. Through step-by-step research, we gained more understanding about the benefits of enterprises using fan page.

Table 5.1-1. Finding of six hypotheses in this study

Hypotheses	Contents	Finding
H1	The better the fan-page managing capability, the higher the product sales	Rejected in global firms test,
		Accepted in airline, banking, and CVS industry test in Taiwan
H2	The better the fan-page management capability, the higher the customer satisfaction	Rejected in telecommunications and banking industry test
H3	The better the fan-page management capability, the greater the customer growth	Rejected in telecommunications industry test
		Accepted in airline and banking industry test
H4	The better the fan-page management capability, the higher the brand awareness	Rejected in global firms test
H5	The better the fan-page management capability, the better the customer loyalty	Rejected in telecommunications and airline industry test
		Accepted in banking industry test
H6	The better the fan-page management capability, the more successful the product development	This study could not test it so far

5.2 Verification of the fan-page effect by total revenue

5.2.1 Verification of the fan-page effect by total revenue from 16 global cases

Based on the stage 1 analysis of the 16 global fan pages (see Table 5.2-1), more than half the enterprises (11 enterprises) show a strong relationship between fan numbers and business revenue. The rest show a low relationship between the number of fan pages and business revenue. Investigating in greater depth, the 11 strongly related cases yielded a finding that shows that the enterprises share similar characteristics in their products, with short-product durability, low-product prices and low-customer involvement. Conversely, the five cases with the low relationships generally have a high-product price with long-product durability or with high-customer involvement.

Table 5.2-1. Research results of 16 global firms

Positive Strong Relationship	No relationship
11	5

It seems that customers of relatively low-priced and short-life cycle products are more likely to be impacted by a fan page. Based on these general findings, we selected cases from industries with multiple-product prices, different kinds of product durability, and varied customer involvement, and tested whether there were different statistical results between industries with different kind of characteristics.

5.2.2 Verification of the fan-page effect by total revenue from global firms

The findings of our stage 2 studies showed that there is no significant between the fan numbers of Facebook fan pages and yearly total revenue. There are many factors that affect the total revenue of enterprises but in some situations the fan numbers increase due to activities or advertisements, yet yearly revenue decreases due to economic reasons or other negative events in the industry.

In addition, we also studied the following industries: food and beverage, clothing and accessories, retail, technology, and automobiles. The findings of these statistical analyses also showed an irrelevance between the fan numbers and total revenue. Based on these results, we have confidence that we can reject hypothesis 1: The better the fan-page managing capability, the higher the product sales

Although the public believes that managing fan pages can bring higher product sales and there are many enterprises that have invested many resources on running fan pages, the result is that investment does not really bring more sales and create more

revenue because there is a barrier between how to transfer the fans on Facebook to real consumers. Enterprises cannot find a solution to overcome this gap, so the fan numbers on Facebook do not reflect on the total revenue in each industry. Enterprises should not expect to earn much more revenue from managing fan pages. However, social networks have a great influence on attracting users, delivering messages, and interacting with users; thus enterprises can make a long-term plan of managing fan pages for other proposes and targets.

Table 5.2-2. Research results of 58 global firms

Industries	With Three Characteristics	Person Correlation	Adjusted R Square	Relationship
Food and Beverage (Global)	Y	0.385	0.12	N
Clothing and Accessories (Global)	Y	0.123	-0.005	N
Retail (Global)	Y	0.058	-0.0026	N
Technology (Global)	N	0.046	-0.024	N
Automobiles (Global)	N	0.355	0.1	N

5.2.3 Verification of fan-page effect by total revenue from firms in Taiwan

Although results showed that there is no significance between fan numbers and total revenue either from our worldwide observation of firms or in different industries, we can still find an interesting and useful finding from the analysis for four industries in Taiwan. From the research results, we can see that industries with one or more characteristics have a positive relationship between fan numbers and total revenue. Therefore, we do not reject hypothesis 1: The better the fan-page management capability, the higher the product sales.

We separated the industries to analyze. In the telecommunications industry, the products include Internet services, mobile solutions, and others. Fans on Facebook are more complex than in other industries: they may be mobile subscribers, coming to a fan page maybe for mobile issues, or perhaps for other reasons. Because of the uncertainty of fans group, it is not possible to bring the total revenue under fan numbers.

In this stage, we collected more detailed data and reduced the error caused by mixing the data from different industries and companies. In the airline industry, the product durability is short (a trip, 40 to 50 minutes) and it is almost the same in the size of the seat and quality of facilities in domestic flights. As customers only care

about the price of tickets, the customer involvement is relatively low; in the banking industry, it is free to apply for a credit card, and there are usually benefits to encourage customers paying by credit card; in the CVS industry, the product's price is low (20 to 100 NTD), the product durability is relatively short (5 to 120 minutes) and customers do not spend too much time choosing which convenience store to patronize, therefore, customer involvement is related low.

Based on the reasons above and the statistical results, this provides encouraging evidence to enterprises in Taiwan. If they have one or more of the characteristics we mentioned, they can consider in investing resources to managing fan pages to bring in more revenue.

Table 5.2-3. Research results of firms in Taiwan

Industries	With Three Characteristics	Person Correlation	Adjusted R Squire	Relationship
Telecommunication (Taiwan)	N	0.325	0.091	N
Airline (Taiwan)	Y	0.678	0.447	Y
Banking (Taiwan)	Y	0.567	0.314	Y
CVS (Taiwan)	Y	0.863	0.739	Y

5.3 Verification of the fan-page effect by customer satisfaction

We obtained public data from the telecommunications and banking industries to verify hypothesis 2, and the results showed a rejection of it: The better the fan page-management capability, the higher the customer satisfaction.

Base on the results, no matter which industry you work in, we suggest enterprises in Taiwan do not run fan pages for the purpose of enhancing customer satisfaction. As Facebook is just other venue that is different from the original venue through to collect complaints from customers and create better user experiences, it is not a tool to solve a problem caused by products or services. The problem post on a fan page sometimes cannot be solved or enterprises do not take those problems too seriously. Due to the abovementioned reason, it is not so easy to achieve higher customer satisfaction only by running a fan page, and more efforts on other aspects like yield rate and problem solving should be explored.

Table 5.3-1. Research results about customer satisfaction by industry in Taiwan

Industries	With Three Characteristics	Person Correlation	Adjusted R Squire	Relationship
Telecommunications	N	0.248	0.047	N

(Taiwan)				
Banking (Taiwan)	Y	0.407	0.156	N

5.4 Verification of the fan-page effect by customer growth

The results of our research showed that the airline and banking industries in Taiwan had a positive relationship between two customer-growth variables. In these two industries, we do not reject hypothesis 3: The better the fan-page management capability, the greater the customer growth.

In addition, it gives us support to advise enterprises in Taiwan with one or more characteristics that they could consider by investing resources in managing fan pages for the purposes of reaching and attracting more customers. People are usually attracted by advertisements, product news, and price information, and do not think too much when buying, hence, customer involvement is low. Based on their background, enterprises should provide more product formula, price information and preferences with customers via Facebook. After receiving this information, customers could make a quick purchase decision without pondering too much over the details.

Table 5.4-1. Research results about customer growth by industry in Taiwan

Industries	With Three Characteristics	Person Correlation	Adjusted R Squire	Relationship
Telecommunication (Taiwan)	N	0.412	0.157	N
Airline (Taiwan)	Y	0.667	0.432	Y
Banking (Taiwan)	Y	0.528	0.270	Y

5.5 Verification of the fan-page effect by brand value

Our statistical results showed that there is no positive relationship between fan numbers and brand value. Hence, we can reject hypothesis 4: The better the fan-page management capability, the higher the brand awareness.

For the same reasons as described previously, many factors influence brand value. In some situation, the fan numbers increase but the brand value lessens because of negative news, financial affairs, or public affairs. Those positive or negative variations could bring fans and determine the brand value, but may not in the same aspect.

5.6 Verification of the fan-page effect by customer loyalty

The results in our research showed that there is a positive relationship between fan numbers and the variables about customer loyalty in the airline and banking industries. In these two industries in Taiwan, we do not reject hypotheses 5: The better

the fan-page management capability, the better the customer-relationship management.

Because the producer-to-consumer flow is relatively short in these two industries, and their products or services also have one or more characteristics we mentioned. It is very important to fulfill customer needs immediately and consolidate the customer relationship by contacting the customer via any channel. The Facebook fan page is a powerful channel in what enterprises in these two industries need. Enterprises could handle the problem about consumers promptly, provide the information with customer needs, and most important, focus their attention on what customer really worries about by building long-term relationships with customers by daily interactions and negotiations on the fan page. We encourage enterprises with one or more characteristics that we have mentioned in this research to invest the resources and time on managing fan pagess for building long-term relationships with customers and strengthening customer loyalty.

Table 5.6-1. Research results about customer loyalty by industry in Taiwan

Industries	**With Three Characteristics**	**Person Correlation**	**Adjusted R Squire**	**Relationship**
Telecommunications (Taiwan)	N	0.454	0.194	N
Airline (Taiwan)	Y	0.046	-0.022	N
Banking (Taiwan)	Y	0.534	0.277	Y

For all the above explanations, products or services with low-priced, short-product durability or low-customer involvement are easily affected by the events, news, or activities on Facebook. But the effects do not apply to all enterprises. We can see the effects of managing fan pages in some specific regions in selected industries in Taiwan. There is also a positive relationship between fan numbers and customer-loyalty related indicators. In addition, there is a positive relationship between fan numbers and customer growth-related indicators. We encourage enterprises with one or more characteristics that we have mentioned to manage their Facebook fan pages for enhancing customer growth and intensifying customer loyalty. However, we suggest enterprises to estimate more factors and do more research if they run Facebook fan pages for other purposes.

Chapter 6: Conclusion

Social networks are very popular for this generation and no one can escape their effects. People and enterprises are all involved in social networks for different reasons, and this study wants to understand that social networks can bring benefits to enterprises. We studied abundant literature and built hypotheses of six dimensions that may be affected by managing fan pages.

To verify the hypotheses, we used a four-stage research to complete our tests. Stage one used a Spearman correlation coefficient to test 16 global firms and found 3 characteristics of low-product price, short-product durability or low-customer involvement that may let enterprises be more influenced by fan-page management; stage two research used linear regression to test 58 global firms and analyzed them by industry. The results rejected hypothesis one about the fan-page effect by total revenue. The rejection aroused our curiosity to understand the result of testing the hypotheses in firms in Taiwan. So we took 11 firms from four industries in Taiwan, using linear regression to go deep into them, and found that there is a positive relationship between fan numbers and total revenue in enterprises with low-product price, short-product durability or low-customer involvement. In the stage-four research, we tested other hypotheses we addressed about the 11 firms by industry by using linear regression and found that managing fan pages could bring positive effects on customer growth and customer loyalty.

The findings help us understand that social networks can bring benefits to enterprises, but not in all dimensions. Enterprises in Taiwan have products or services with low-product price, short-product durability or low-customer involvement and for the purposes of improving customer growth and intensifying customer loyalty are much more affected from managing Facebook fan pages.

6.1 Research Limitations

Observation time

In our research, we set the dependent and independent variables, and basically, if the dependent variables are supposed to affect the independent variables, the dependent variables should occur before the independent variables. However, it has been just four to five years since the Facebook fan page was launched (2007 to the present), and we have not had enough observation time to collect detailed data to test and make our research. This suggests that researchers will collect data in much longer periods of time in the future that will be more accurate and valuable in related studies.

Data Collection

Some indicators in our study are about information, which is very important and confidential to enterprises and related to the competitive ability within the industry. It is hard to get such information from public data or via school-to-work program and without this information we can hardly build dependent variables. Moreover, we cannot verify some of our hypotheses. As a suggestion, researchers could obtain such information from corporations with high-level managers and do related researches via case studies or interviews.

Distinguishing between pure dependent variables from other factors is very important to ensure the efficiency of statistical analysis. There are dozens of other factors that will affect the research-dependent variables. We could not distinguish the independent variable from other factors in our research. We assumed that there is a pure relationship between fan numbers and other dependent variables and ignored other factors that may affect dependent variables, but this method may reduce the accuracy of the statistical results of our research. We suggest researchers who may be interested in this field to distinguish the variables by scientific method before statistical analysis.

6.2 Research Contributions

Although we cannot verify all the hypotheses we explored in this paper, we still built four-stage researches and brought contributions in two aspects. First, the academic contribution of this research is that we put much time and effort into studying large amount of literatures, and analyzed, and compared the points at issue and built a complete, exact research model. In addition, we studied the indexes in the market and filtered the financial items in consolidate annual report of enterprises and found suitable indicators to measure our research. Although we do not verify all of the hypotheses in our research, we provide a clear viewpoint and contribute to an integral research model in the social-network field, which helps researchers who may be interested in this topic.

Second, this study has provided new insights for fan-page management. We clarify the doubts of running Facebook fan pages and the finding of this research gives enterprises the following suggestions on managing fan pages: It is feasible that enterprises provide products or services with low-product prices, short-product durability, or low-customer involvement to manage their Facebook fan pages for enhancing customer growth and intensifying customer loyalty.

6.3 Further Study

Our study has collected all the factors of the benefits and tested them, and proposed suggestions on managing Facebook fan pages. For enterprises, the

executives see their rivals that use information for competitive advantage. These executives recognize the need to become directly involved in the management of new technology (Porter & Millar, 1985). Enterprises have understood how important social networking is and have used it as a channel or tool to help themselves. Therefore, social networks are compatible needs for enterprises but not compatible advantages for them.

Although we verified some hypotheses in our study and found some trends for enterprises to manage fan pages, there are some hypotheses we could not verify. In the future, researchers who are interested in the social-networks field could refer to our suggestions to overcome limitations and base a research model that would complete our research. Moreover, the Facebook time line is a new function that has only been launched recently. For every event or activity, time is an important factor that lets us know the history of enterprises and it is much easier to connect the events with the market, society, and circumstances. With a time line, researchers could obtain more information in order to do more research.

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Appendix - 2011 Fortune 500 Enterprises

Fortune 500 enterprises	Facebook fan page operation (High, Low)	Financial figures (Yes / No)	Brands (Yes / No)
Wal-Mart Stores	High	Yes	Yes
Exxon Mobil	Low	Yes	Yes
Chevron	Low	Yes	Yes
ConocoPhillips	Low	Yes	Yes
Fannie Mae	Low	Yes	Yes
General Electric	Low	Yes	Yes
Berkshire Hathaway	Low	Yes	Yes
General Motors	Low	Yes	Yes
Bank of America Corp.	Low	Yes	Yes
Ford Motor	High	Yes	Yes
Hewlett-Packard	Low	Yes	Yes
AT&T	High	Yes	Yes
J.P. Morgan Chase & Co.	Low	Yes	Yes
Citigroup	Low	Yes	Yes
McKesson	Low	Yes	Yes
Verizon Communications	Low	Yes	Yes
American International Group	Low	Yes	Yes
International Business Machines	Low	Yes	Yes
Cardinal Health	Low	Yes	Yes
Freddie Mac	Low	Yes	Yes
CVS Caremark	Low	Yes	Yes
UnitedHealth Group	Low	Yes	Yes
Wells Fargo	Low	Yes	Yes
Valero Energy	Low	Yes	Yes
Kroger	Low	Yes	Yes
Procter & Gamble	Low	Yes	Yes
AmerisourceBerge	Low	Yes	Yes

n			
Costco Wholesale	Low	Yes	Yes
Marathon Oil	Low	Yes	Yes
Home Depot	Low	Yes	Yes
Pfizer	Low	Yes	Yes
Walgreen	Low	Yes	Yes
Target	High	Yes	Yes
Medco Health Solutions	Low	Yes	Yes
Apple	Low	Yes	Yes
Boeing	Low	Yes	Yes
State Farm Insurance Cos.	Low	Yes	Yes
Microsoft	High	Yes	Yes
Archer Daniels Midland	Low	Yes	Yes
Johnson & Johnson	Low	Yes	Yes
Dell	High	Yes	Yes
WellPoint		Yes	Yes
PepsiCo	High	Yes	Yes
United Technologies	Low	Yes	Yes
Dow Chemical	Low	Yes	Yes
MetLife	Low	Yes	Yes
Best Buy	High	Yes	Yes
United Parcel Service	Low	Yes	Yes
Kraft Foods	Low	Yes	Yes
Lowe's	Low	Yes	Yes
INTL FCStone	Low	Yes	Yes
Lockheed Martin	Low	Yes	Yes
Merck	Low	Yes	Yes
Goldman Sachs Group	Low	Yes	Yes
Express Scripts	Low	Yes	Yes
Intel	High	Yes	Yes
Sears Holdings	Low	Yes	Yes

Caterpillar	Low	Yes	Yes
Chrysler Group	Low	Yes	Yes
Safeway	Low	Yes	Yes
Supervalu	Low	Yes	Yes
Cisco Systems	Low	Yes	Yes
Morgan Stanley	Low	Yes	Yes
Prudential Financial	Low	Yes	Yes
Walt Disney	Low	Yes	Yes
Comcast	Low	Yes	Yes
Sysco	Low	Yes	Yes
Sunoco	Low	Yes	Yes
Abbott Laboratories	Low	Yes	Yes
Coca-Cola	High	Yes	Yes
New York Life Insurance	Low	Yes	Yes
Northrop Grumman	Low	Yes	Yes
FedEx	Low	Yes	Yes
Hess	Low	Yes	Yes
Ingram Micro	Low	Yes	Yes
Johnson Controls	Low	Yes	Yes
Aetna	Low	Yes	Yes
Amazon.com	High	Yes	Yes
Humana	Low	Yes	Yes
Enterprise Products Partners	Low	Yes	Yes
Honeywell International	Low	Yes	Yes
Liberty Mutual Insurance Group	Low	Yes	Yes
News Corp.	Low	Yes	Yes
DuPont	Low	Yes	Yes
Sprint Nextel	Low	Yes	Yes
General Dynamics	Low	Yes	Yes
TIAA-CREF	Low	Yes	Yes

Delta Air Lines	Low	Yes	Yes
Allstate	Low	Yes	Yes
HCA Holdings	Low	Yes	Yes
American Express	High	Yes	Yes
Google	High	Yes	Yes
Tyson Foods	Low	Yes	Yes
Philip Morris International	Low	Yes	Yes
Time Warner	Low	Yes	Yes
Oracle	Low	Yes	Yes
3M	Low	Yes	Yes
Deere	Low	Yes	Yes
Plains All American Pipeline	Low	Yes	Yes
Rite Aid	Low	Yes	Yes
Massachusetts Mutual Life Insurance	Low	Yes	Yes
Publix Super Markets	Low	Yes	Yes
CHS	Low	Yes	Yes
Raytheon	Low	Yes	Yes
International Paper	Low	Yes	Yes
Travelers Cos.	Low	Yes	Yes
Macy's	Low	Yes	Yes
Staples	Low	Yes	Yes
Tech Data	Low	Yes	Yes
DirecTV	Low	Yes	Yes
McDonald's	High	Yes	Yes
Northwestern Mutual	Low	Yes	Yes
Murphy Oil	Low	Yes	Yes
United Continental Holdings	Low	Yes	Yes
Eli Lilly	Low	Yes	Yes
Motorola Solutions	High	Yes	Yes
Hartford Financial	Low	Yes	Yes

Services			
AMR	Low	Yes	Yes
TJX	Low	Yes	Yes
Emerson Electric	Low	Yes	Yes
Xerox	Low	Yes	Yes
Cigna	Low	Yes	Yes
Alcoa	Low	Yes	Yes
Fluor	Low	Yes	Yes
Aflac	Low	Yes	Yes
U.S. Bancorp	Low	Yes	Yes
Nationwide	Low	Yes	Yes
Tesoro	Low	Yes	Yes
Occidental Petroleum	Low	Yes	Yes
Kimberly-Clark	Low	Yes	Yes
Bristol-Myers Squibb	Low	Yes	Yes
Avnet	Low	Yes	Yes
World Fuel Services	Low	Yes	Yes
Capital One Financial	Low	Yes	Yes
Nike	Low	Yes	Yes
Freeport-McMoRan Copper & Gold	Low	Yes	Yes
Time Warner Cable	Low	Yes	Yes
Manpower	Low	Yes	Yes
Goodyear Tire & Rubber	Low	Yes	Yes
Arrow Electronics	Low	Yes	Yes
Exelon	Low	Yes	Yes
Kohl's	Low	Yes	Yes
Whirlpool	Low	Yes	Yes
Halliburton	Low	Yes	Yes
United Services Automobile Assn.	Low	Yes	Yes
J.C. Penney	Low	Yes	Yes

Southern	Low	Yes	Yes
United States Steel	Low	Yes	Yes
Ally Financial	Low	Yes	Yes
AES	Low	Yes	Yes
PNC Financial Services Group	Low	Yes	Yes
EMC	Low	Yes	Yes
Union Pacific	Low	Yes	Yes
Altria Group	Low	Yes	Yes
Computer Sciences	Low	Yes	Yes
Illinois Tool Works	Low	Yes	Yes
Nucor	Low	Yes	Yes
Medtronic	Low	Yes	Yes
L-3 Communications	Low	Yes	Yes
Colgate-Palmolive	Low	Yes	Yes
Next Era Energy	Low	Yes	Yes
Dominion Resources	Low	Yes	Yes
Amgen	Low	Yes	Yes
Progressive	Low	Yes	Yes
Bank of New York Mellon Corp.	Low	Yes	Yes
General Mills	Low	Yes	Yes
Gap	High	Yes	Yes
Loews	Low	Yes	Yes
American Electric Power	Low	Yes	Yes
Baker Hughes	Low	Yes	Yes
TRW Automotive Holdings	Low	Yes	Yes
Constellation Energy	Low	Yes	Yes
Duke Energy	Low	Yes	Yes
CBS	Low	Yes	Yes
Texas Instruments	Low	Yes	Yes
Toys "R" Us	Low	Yes	Yes

PG&E Corp.	Low	Yes	Yes
Eaton	Low	Yes	Yes
Health Net	Low	Yes	Yes
Viacom	Low	Yes	Yes
PPG Industries	Low	Yes	Yes
Jabil Circuit	Low	Yes	Yes
FirstEnergy	Low	Yes	Yes
Consolidated Edison	Low	Yes	Yes
Chubb	Low	Yes	Yes
Cummins	Low	Yes	Yes
Danaher	Low	Yes	Yes
Dollar General	Low	Yes	Yes
Oneok	Low	Yes	Yes
Community Health Systems	Low	Yes	Yes
Sara Lee	Low	Yes	Yes
Baxter International	Low	Yes	Yes
DISH Network	Low	Yes	Yes
Aramark	Low	Yes	Yes
Omnicom Group	Low	Yes	Yes
Waste Management	Low	Yes	Yes
AutoNation	Low	Yes	Yes
Edison International	Low	Yes	Yes
Kellogg	Low	Yes	Yes
ConAgra Foods	Low	Yes	Yes
Public Service Enterprise Group	Low	Yes	Yes
National Oilwell Varco	Low	Yes	Yes
Dean Foods	Low	Yes	Yes
Navistar International	Low	Yes	Yes
Southwest Airlines	Low	Yes	Yes
Apache	Low	Yes	Yes

Lear	Low	Yes	Yes
US Airways Group	Low	Yes	Yes
Qwest Communications	Low	Yes	Yes
Marriott International	Low	Yes	Yes
Office Depot	Low	Yes	Yes
Coventry Health Care	Low	Yes	Yes
Entergy	Low	Yes	Yes
Yum Brands	Low	Yes	Yes
Genuine Parts	Low	Yes	Yes
Smithfield Foods	Low	Yes	Yes
ITT	Low	Yes	Yes
Land O'Lakes	Low	Yes	Yes
SAIC	Low	Yes	Yes
BB&T Corp.	Low	Yes	Yes
BJ's Wholesale Club	Low	Yes	Yes
Qualcomm	Low	Yes	Yes
Anadarko Petroleum	Low	Yes	Yes
Liberty Media	Low	Yes	Yes
Marsh & McLennan	Low	Yes	Yes
Avon Products	Low	Yes	Yes
Thermo Fisher Scientific	Low	Yes	Yes
Penske Automotive Group	Low	Yes	Yes
Starbucks	High	Yes	Yes
CSX	Low	Yes	Yes
Devon Energ	Low	Yes	Yes
H.J. Heinz	Low	Yes	Yes
Textron	Low	Yes	Yes
Monsanto	Low	Yes	Yes
Lincoln National	Low	Yes	Yes

First Data	Low	Yes	Yes
Xcel Energy	Low	Yes	Yes
Paccar	Low	Yes	Yes
Unum Group	Low	Yes	Yes
Progress Energy	Low	Yes	Yes
Praxair	Low	Yes	Yes
KBR	Low	Yes	Yes
Genworth Financial	Low	Yes	Yes
SunTrust Banks	Low	Yes	Yes
Guardian Life Ins. Co. of America	Low	Yes	Yes
Ameriprise Financial	Low	Yes	Yes
R.R. Donnelley & Sons	Low	Yes	Yes
Parker Hannifin	Low	Yes	Yes
Peter Kiewit Sons'	Low	Yes	Yes
Jacobs Engineering Group	Low	Yes	Yes
Western Digital	Low	Yes	Yes
Oshkosh	Low	Yes	Yes
State Street Corp.	Low	Yes	Yes
Nordstrom	Low	Yes	Yes
Liberty Global	Low	Yes	Yes
KKR	Low	Yes	Yes
Williams	Low	Yes	Yes
Limited Brands	Low	Yes	Yes
Applied Materials	Low	Yes	Yes
Newmont Mining	Low	Yes	Yes
Norfolk Southern	Low	Yes	Yes
GameStop	Low	Yes	Yes
Chesapeake Energy	Low	Yes	Yes
Huntsman	Low	Yes	Yes
C.H. Robinson Worldwide	Low	Yes	Yes
Tenet Healthcare	Low	Yes	Yes

URS	Low	Yes	Yes
Principal Financial	Low	Yes	Yes
eBay	High	Yes	Yes
Icahn Enterprises	Low	Yes	Yes
Air Products & Chemicals	Low	Yes	Yes
Ashland	Low	Yes	Yes
Whole Foods Market	Low	Yes	Yes
Sempra Energy	Low	Yes	Yes
Automatic Data Processing	Low	Yes	Yes
NRG Energy	Low	Yes	Yes
Caesars Entertainment	Low	Yes	Yes
Great Atlantic & Pacific Tea	Low	Yes	Yes
Center Point Energy	Low	Yes	Yes
PPL	Low	Yes	Yes
Synnex	Low	Yes	Yes
Black Rock	Low	Yes	Yes
DTE Energy	Low	Yes	Yes
Reynolds American	Low	Yes	Yes
Assurant	Low	Yes	Yes
Aon	Low	Yes	Yes
Micron Technology	Low	Yes	Yes
Stanley Black & Decker	Low	Yes	Yes
Holly	Low	Yes	Yes
Reinsurance Group of America	Low	Yes	Yes
Discover Financial Services	Low	Yes	Yes
Energy Future Holdings	Low	Yes	Yes

Regions Financial	Low	Yes	Yes
Kinder Morgan	Low	Yes	Yes
Owens & Minor	Low	Yes	Yes
Republic Service	Low	Yes	Yes
Visa	Low	Yes	Yes
Western Refining	Low	Yes	Yes
Gilead Sciences	Low	Yes	Yes
Ball	Low	Yes	Yes
Crown Holdings	Low	Yes	Yes
Family Dollar Stores	Low	Yes	Yes
Ross Stores	Low	Yes	Yes
Bed Bath & Beyond	Low	Yes	Yes
Boston Scientific	Low	Yes	Yes
Global Partners	Low	Yes	Yes
Estée Lauder	Low	Yes	Yes
Sherwin-William	Low	Yes	Yes
Enbridge Energy Partners	Low	Yes	Yes
VF	Low	Yes	Yes
CarMax	Low	Yes	Yes
Campbell Soup	Low	Yes	Yes
Ameren	Low	Yes	Yes
Masco	Low	Yes	Yes
Hertz Global Holdings	Low	Yes	Yes
Becton Dickinson	Low	Yes	Yes
Henry Schein	Low	Yes	Yes
Thrivent Financial for Lutherans	Low	Yes	Yes
Visteon	Low	Yes	Yes
Quest Diagnostics	Low	Yes	Yes
Cablevision Systems	Low	Yes	Yes
AutoZone	Low	Yes	Yes
Stryker	Low	Yes	Yes

Winn-Dixie Stores	Low	Yes	Yes
Hormel Foods	Low	Yes	Yes
Fifth Third Bancorp	Low	Yes	Yes
Eastman Kodak	Low	Yes	Yes
W.W. Grainger	Low	Yes	Yes
Autoliv	Low	Yes	Yes
OfficeMax	Low	Yes	Yes
Dover	Low	Yes	Yes
Darden Restaurants	Low	Yes	Yes
Charter Communications	Low	Yes	Yes
Century Link	Low	Yes	Yes
Pepco Holdings	Low	Yes	Yes
Shaw Group	Low	Yes	Yes
Goodrich	Low	Yes	Yes
Peabody Energy	Low	Yes	Yes
Sonic Automotive	Low	Yes	Yes
AGCO	Low	Yes	Yes
Dole Food	Low	Yes	Yes
Las Vegas Sands	Low	Yes	Yes
Broadcom	Low	Yes	Yes
SLM	Low	Yes	Yes
Owens-Illinois	Low	Yes	Yes
Mosaic	Low	Yes	Yes
Coca-Cola Enterprises	Low	Yes	Yes
Eastman Chemical	Low	Yes	Yes
Calpine	Low	Yes	Yes
Corning	Low	Yes	Yes
Energy Transfer Equity	Low	Yes	Yes
Fortune Brands	Low	Yes	Yes
AECOM Technology	Low	Yes	Yes
Weyerhaeuser	Low	Yes	Yes
Interpublic Group	Low	Yes	Yes

Avery Dennison	Low	Yes	Yes
Advanced Micro Devices	Low	Yes	Yes
American Family Insurance Group	Low	Yes	Yes
DaVita	Low	Yes	Yes
CMS Energy	Low	Yes	Yes
Commercial Metals	Low	Yes	Yes
NiSource	Low	Yes	Yes
Pantry	Low	Yes	Yes
CIT Group	Low	Yes	Yes
Yahoo	Low	Yes	Yes
Sanmina-SCI	Low	Yes	Yes
Reliance Steel & Aluminum	Low	Yes	Yes
Steel Dynamics	Low	Yes	Yes
Smurfit-Stone Container	Low	Yes	Yes
Dillard's	Low	Yes	Yes
Omnicare	Low	Yes	Yes
McGraw-Hill	Low	Yes	Yes
MeadWestvaco	Low	Yes	Yes
Virgin Media	Low	Yes	Yes
Cameron International	Low	Yes	Yes
Dana Holding	Low	Yes	Yes
EOG Resources	Low	Yes	Yes
Ecolab	Low	Yes	Yes
Jarden	Low	Yes	Yes
MGM Resorts International	Low	Yes	Yes
Spectrum Group International	Low	Yes	Yes
Symantec	Low	Yes	Yes
AK Steel Holding	Low	Yes	Yes
Expeditors International of	Low	Yes	Yes

Washington			
TravelCenters of America	Low	Yes	Yes
Tenneco	Low	Yes	Yes
Advance Auto Parts	Low	Yes	Yes
Celanese	Low	Yes	Yes
Frontier Oil	Low	Yes	Yes
Dollar Tree	Low	Yes	Yes
CC Media Holdings	Low	Yes	Yes
Mattel	Low	Yes	Yes
Franklin Resources	Low	Yes	Yes
Domtar	Low	Yes	Yes
Barnes & Noble	Low	Yes	Yes
Amerigroup	Low	Yes	Yes
Newell Rubbermaid	Low	Yes	Yes
Fidelity National Financial	Low	Yes	Yes
Mutual of Omaha Insurance	Low	Yes	Yes
PetSmart	Low	Yes	Yes
Universal American	Low	Yes	Yes
Hershey	Low	Yes	Yes
BorgWarner	Low	Yes	Yes
Dr Pepper Snapple Group	Low	Yes	Yes
Pacific Life	Low	Yes	Yes
NII Holdings	Low	Yes	Yes
UGI	Low	Yes	Yes
Universal Health Services	Low	Yes	Yes
Precision Castparts	Low	Yes	Yes
MasterCard	Low	Yes	Yes
Clorox	Low	Yes	Yes

Core-Mark Holding	Low	Yes	Yes
Group 1 Automotive	Low	Yes	Yes
Anixter International	Low	Yes	Yes
Gannett	Low	Yes	Yes
Targa Resources	Low	Yes	Yes
KeyCorp	Low	Yes	Yes
Mylan	Low	Yes	Yes
Agilent Technologies	Low	Yes	Yes
WellCare Health Plans	Low	Yes	Yes
Pitney Bowes	Low	Yes	Yes
CH2M Hill	Low	Yes	Yes
Lubrizol	Low	Yes	Yes
O'Reilly Automotive	Low	Yes	Yes
Auto-Owners Insurance	Low	Yes	Yes
Fidelity National Information Services	Low	Yes	Yes
Mohawk Industries	Low	Yes	Yes
Consol Energy	Low	Yes	Yes
Harris	Low	Yes	Yes
Integrys Energy Group	Low	Yes	Yes
Western Union	Low	Yes	Yes
Avis Budget Group	Low	Yes	Yes
Momentive Specialty Chemicals	Low	Yes	Yes
SunGard Data Systems	Low	Yes	Yes
Health	Low	Yes	Yes

Management Associates			
St. Jude Medical	Low	Yes	Yes
Ryder System	Low	Yes	Yes
Booz Allen Hamilton Holding	Low	Yes	Yes
Emcor Group	Low	Yes	Yes
CB Richard Ellis Group	Low	Yes	Yes
Starwood Hotels & Resorts	Low	Yes	Yes
Spectra Energy	Low	Yes	Yes
Wesco International	Low	Yes	Yes
Live Nation Entertainment	Low	Yes	Yes
Avaya	Low	Yes	Yes
Foot Locker	Low	Yes	Yes
Laboratory Corp. of America	Low	Yes	Yes
Owens Corning	Low	Yes	Yes
Nash-Finch	Low	Yes	Yes
Telephone & Data Systems	Low	Yes	Yes
Polo Ralph Lauren	High	Yes	Yes
Apollo Group	Low	Yes	Yes
Big Lots	Low	Yes	Yes
Con-way	Low	Yes	Yes
Kelly Services	Low	Yes	Yes
Western & Southern Financial Group	Low	Yes	Yes
Allergan	Low	Yes	Yes
Harley-Davidson	Low	Yes	Yes
Northeast Utilities	Low	Yes	Yes
SPX	Low	Yes	Yes
Erie Insurance	Low	Yes	Yes

Group			
Bemis	Low	Yes	Yes
Meritor	Low	Yes	Yes
Dick's Sporting Goods	Low	Yes	Yes
General Cable	Low	Yes	Yes
Rockwell Automation	Low	Yes	Yes
United Stationers	Low	Yes	Yes
SanDisk	Low	Yes	Yes
NCR	Low	Yes	Yes
Washington Post	Low	Yes	Yes
Insight Enterprises	Low	Yes	Yes
Alliant Techsystems	Low	Yes	Yes
Atmos Energy	Low	Yes	Yes
AbitibiBowater	Low	Yes	Yes
W.R. Berkley	Low	Yes	Yes
Biogen Idec	Low	Yes	Yes
Cliffs Natural Resources	Low	Yes	Yes
Rockwell Collins	Low	Yes	Yes
Phillips-Van Heusen	Low	Yes	Yes
Graybar Electric	Low	Yes	Yes
El Paso	Low	Yes	Yes
J.M. Smucker	Low	Yes	Yes
Scana	Low	Yes	Yes
Cognizant Technology Solutions	Low	Yes	Yes
Terex	Low	Yes	Yes
PulteGroup	Low	Yes	Yes
Genzyme	Low	Yes	Yes
YRC Worldwide	Low	Yes	Yes
American Financial Group	Low	Yes	Yes

Sealed Air	Low	Yes	Yes
Charles Schwab	Low	Yes	Yes
RadioShack	Low	Yes	Yes
Centene	Low	Yes	Yes
Host Hotels & Resorts	Low	Yes	Yes
NYSE Euronext	Low	Yes	Yes
Levi Strauss	Low	Yes	Yes
NuStar Energy	Low	Yes	Yes
Ruddick	Low	Yes	Yes
D.R. Horto	Low	Yes	Yes
Seaboard	Low	Yes	Yes