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Capability Accumulation and the Growth Path of Lenovo

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1. Introduction

Lenovo Group is the leading IT companies in China. Since its acquisition of IBM's Personal Computing Division in 2005, Lenovo is the 2nd PC provider in the world. Founded in 1984 by eleven computer scientists in Beijing, China, as the New Technology Developer Inc., it was soon renamed as Legend and started a new era of consumer PCs in China. In 2004, aspiring to expand its business globally with a more global-like brand, the company changed the brand name "Legend" to the "Lenovo", taking "Le" from Legend, and adding "novo" the Latin word for "new", to reflect the spirit of innovation as the core of the company. The current CEO, Yang Yuanqing joined Lenovo in 1989 as a salesman, and rose rapidly through its ranks to CEO in 2005. In less than three decades, with his predecessor, Liu Chuanzhi, Yang Yuanquing has spearheaded Lenovo's ascend to its current position (Kirkland and Orr, 2013). We try to answer the question that how does Lenovo achieve such a prominent success in less than three decades. In this chapter we drew the concepts of entrepreneurship and capability accumulation to explain the competitive strategies adopted in the growth path of Lenovo.

Entrepreneurship has been perceived as an important factor for the creation and growth of firms (Kirzner, 1979; Shane and Venkataraman, 2000; Eckhardt and Shane, 2003; Langlois, 2007). In order to compete in a dynamic and ever-changing market, an entrepreneurial firm has to accumulate capabilities, which is usually defined as the capacity to recognise, conceive, create and exploit opportunities in order to generate competitive advantages (Mitchelmore and Jennifer, 2010; Jyotsna and Ananda, 2011; Zahra and Wright, 2011). The path of entrepreneurial capabilities accumulation includes creation, integration and renewal. These three segments can operate separately, but also integrated as one unit. The creative capabilities include the ability of exploration and ultilisation (Levinthal and March, 1993; March, 1991), such as developing new

market, innovating new technology, building organisational culture, constructing management mode and establishing international operation ability. Integration capability means the integrating internal resources and external resources, accessing external resources require valuable complementary resources (Harrison et al., 2001). Renewal capability defines as releasing inappropriate assets, building new thinking and bringing new resources from external sources to build new core competitive advantages (Danneels, 2002), such as creating market for the new products, innovating new products and technology, building new culture, constructing leadership capability and adjusting international operation. It is noticed that the three capabilities influence each other, reflecting the coincidence of timing and display pattern. Additionally, the three accumulation paths are dynamic, the core competences are improved, integrated, and reconstructed continuously.

Any entrepreneurial action needs to have competitive strategies to cultivate its capabilities, and thereby to create competitive advantages. Unlike most high-tech companies, which begin with core proprietary technology and gradually developing downstream capabilities in manufacturing, marketing, sales and distribution, Lenovo followed a reverse development process from downstream to upstream (Xie and White, 2004). As a result, Lenovo first adopted market extension as the competitive strategy. Marketing capabilities have direct and complementary effects on both revenue and profit margin growth rates (Rust etal., 2004; Morgan et al., 2009) and sustained competitive advantage (e.g., Krasnikov & Jayachandran, 2008; Slotegraaf & Dickson, 2004; Vorhies & Morgan, 2005). After generating a large amount of capital, Lenovo shifts its focus on developing technology. Economic theory suggests that the performance outcomes relate to innovation. New technology may change the routine or utilise new system. New technology can be an enabler of product or service innovations to offer a new service or to deliver products to customers in a way that is new to the enterprise (Koellinge, 2007). It is worth noting that a firm's competitive strategies can shift the focus and intensity of business activities while strategies are influenced by a firm's existing set of resources and capabilities. Dynamic capabilities stipulated by Teece et al (1997) are further emphasised in view of a world that is complex, changing, and uncertain. Therefore, to sustain competitive advantages, firms need to alter strategies to adapt to this ever-changing environment.

This chapter explores the entrepreneurial activities and the growth path of capabilities accumulation in Lenovo Group Limited. Lenovo began as a spin-off of a leading R&D institute in computer science. Lenovo followed a reverse development process from downstream (sales and distribution) to upstream (innovation). In order to accumulate dynamic capabilities, we therefore emphasise two key competitive strategies: market expansion and technology development. These capabilities help generate competitive value, such as technology upgrading, market distribution, capital advantages and financial performance. We describes Lenovo's capabilities accumulation process in terms of three phases: distribution and sale phase (1984-1990), manufacturing and technology developing phase (1991-2004), and branding and global deployment phase (2005-present).

The rest of this chapter is structured as follow: section 2 is the introduction of Lenovo Group. Lenovo's development stages and capabilities accumulation paths are presented in section 3. The managerial implications are included in section 4. The final section offers conclusion.

2. Lenovo Group

Lenovo is a US$30 billion technology company and the world's second-largest PC vendor (Official website of Lenovo: http://www.lenovo.com/). They have more than 30,000 employees in more than 60 countries serving customers in more than 160 countries. Lenovo was founded in Beijing and incorporated in Hong Kong under its previous name, Legend. The company begins by distributing and installing PCs produced by foreign manufacturers before expanding into own production of PCs and launching its own PC brand. In 1988, Lenovo (named Legend before 2004) received the highest National Science-Technology Progress Award in China for its invention in Chinese-character. Lenovo now is the largest PC company in China. Table 1 documents the critical events on the growth pathway of Lenovo.

[Table 1 Near Here]

In 1994, Lenovo became a public company, listed on the Hong Kong Stock Exchange. In 1997, it overtook both IBM and Compaq as the leading PC supplier in China, and since then has remained

in the first place and expanded its share to over 1/3 of the Chinese market since 2012 (see the market shares of top four PC manufacturers in China in Table 2).

[Table 2 Near Here]

Legend Holdings changed its name to Lenovo in 2004 and, in 2005, acquired the former Personal Computer Division of IBM. For 8 years from 2005 to 2012, Lenovo enjoys faster growth in PC sales than its competitors. Its PC market share rose to 14.8% from 6.9% globally (see Figure 1). In 2012, Lenovo became the world's second-largest personal computer vendor by unit sales in 2012.

[Figure 1 Near Here]

3. Development Stages and Capability Accumulation

Rather than beginning with core proprietary technology and gradually developing downstream capabilities in manufacturing, marketing, sales and distribution, Lenovo followed a reverse development process from downstream (sales and distribution) to upstream (innovation) (Xie and White, 2004). This section describes this process in terms of three phases that include the initial stage of distribution and sale (1984-1990), the ensuing manufacturing and technology developing stage (1991-2004), and the third stage of branding and global deployment (2005-present). We link changes in the market and technology activities to Lenovo's resources and capabilities accumulation as competitive strategies.

3.1 Distribution and Sale Phase (1984-1990)

3.2.1 Competitive Strategies

During the 1980s, second-tier foreign producers, such as California-based AST Research, occupied the leading market shares, because PC sales in China were negligible. From 1987 Legend expanded its activities to trade and distribution and became the first distributor for AST (the leading foreign brand in China at that time). These activities soon became its primary source

of revenues, and also generated capital that Lenovo invested in a joint venture in Hong Kong to trade and then manufacturer motherboards and add-on cards.

Legend gained technology capability and market knowledge by trial-and-error before 1990. For instance, Lenovo tried to sell televisions with a failure. However, Legend successfully developed Chinese-language computer input devices (Legend Hanka-Chinese character card) in 1987 and established its key technology. In 1990, the first Legend PC was launched in Chinese market. Legend has completed its transition from an agent for imported computer products to a producer and seller of its own branded computer products. These events mark the start of manufacturing and technology development phase of Lenovo (see Table 3).

[Table 3 Near Here]

3.1.2 Learning and Capability Development

Lenovo starts as a distributor for AST (the leading foreign brand in China at that time), and then other foreign brands like Hewlett-Packard. By distributing foreign-made PCs, Lenovo accumulated considerable amount of financial resource and marketing and distribution capabilities. The former CEO, Liu Chuanzhi, said 'our earliest and best teacher was Hewlett-Packard' (Gold et al., 2001). Through these activities, Lenovo also began to build up its understanding of its Chinese customers and their PC purchasing habits. In the meantime, taking the opportunity as a distributor of Hewlett-Packard, Toshiba and IBM PCs at the early stage of production of its own Legend brand PC, enables Lenovo a closely scrutiny of foreign products designs and customers feedbacks. Lenovo made extensive efforts in creating its national distribution network, which was extremely valuable to a manufacturer (see Figure 2). In 1990s, only the state-owned distribution organizations have distribution networks. The central planning system is responsible for fulfilling the State Planning Commission and relevant industrial bureau's allocation directives for manufacturing inputs, intermediary products, and final goods. In contrast, Lenovo was geared towards its customers' needs, not the state's plan. Therefore, Lenovo could only survive by satisfying customers' needs.

[Figure 2 Near Here]

3.2 Manufacturing and Technology Developing Phase（1991-2004）

3.2.1 Competitive Strategies

Since 1990, Legend had contended for PC domestic market. Legend became a publicly traded company after listing at the Hong Kong Stock Exchange in 1994. Legend overtook both IBM and Compaq and became the leading PC supplier in China, and since then has remained in the leading position and expanded its Chinese market share to over 1/3 since 2012 (see Table 2). In 1998 Legend opened its first Legend exclusive store in Beijing, started its exclusive store system, and formed its domestic market strategy. In 1999, Legend became the top PC vendor in the Asia-Pacific region and heads the Chinese national Top 100 Electronic Enterprises ranking. At the end of this stage, Legend authorized 50 distributors in each of the seven regions, into which it divided the Chinese market, and each distributor had its own reseller network. Altogether, there were approximately 2,000 resellers in Lenovo's distribution system, in addition to Lenovo's 130 home-PC Franchised Store branded as 'Lenovo 1+1'. Lenovo identified the different market segments in terms of commercial use and personal use. Hence, the 'Lenovo 1+1' home PC range is designed to stratify the needs of individual consumer. The 'Lenovo 1+1' franchised store is set to offer services to personal customers. This system is known as the 'Lenovo 1+1' retail network.

Considering technology development, between 1990 and 2000, Lenovo had to develop a large-scale and low-cost manufacturing capability to ensure its cost-competitiveness in the face of the foreign and domestic fierce competition. In 1993, Legend enters the "Pentium Era", producing China's first "586" PC, Legend established '1+1' retail network, and five years later, the millionth Legend PC came off the production line. Legend entered the stage with the capacity of mass manufacturing. In 2002, Legend launched its first technological innovation convention, "Legend World 2002" which opens up its "Technology Era". In this year, Legend's R&D input reached CN¥800 million, more than double that of last year. These funds mainly invested in infrastructure construction, laboratory construction, wage of technician, R&D of materials input. What's more, Legend launched its Collaborating Applications project. Through the cooperation with a few large

companies and the Chinese Ministry of the Information Industry, Legend promotes the formation of the industrial standard in 2003. As a result, Legend innovated a serial of new products that year, including Legend's DeepComp 1800, Legend Sureye intelligent monitoring and controlling system, Legend Tianqi 9220 and Kaitian 680. It is worth mentioning that Legend's supercomputer, the DeepComp 1800 is China's first computer with 1,000 GFLOP (floating point operations per second) and China's fastest computer for civilian use, ranked 43rd in the Top 500 list of the world's fastest computers.

3.2.2 Learning and Capability Development

At this stage, Lenovo adopted several important strategic approaches to satisfy customers' needs and to accumulate market knowledge. First, it offered Chinese customers PCs with the latest processors at low price (Business Week, 1999). Lenovo offer leading technology specially tailored to Chinese customers (Gold et al., 2001) by designing products for different market segments, different customer groups, and different distribution channels based on its awareness of customer preferences and behaviours. The third element of Lenovo's strategy was to compete on the basis of price. For comparable products, Lenovo priced its products at about two-thirds of foreign-made PCs (Wall Street Journal, 1997). For example, in August 1996 Lenovo was selling its 75MHz Pentium-based PC for US$1,520, compared to similar models by AST and IBM selling for US$2,000 or more (Upside, 1996). During the period of expanding global markets, the acquisition of IBM PC division marked an important step. Through this acquisition, Lenovo immediately gained IBM's sale channel and market.

The internal R&D is an important path of capability accumulation that supported Lenovo's cost-based and customer-focused strategy. Successfully implementation of this strategy would require R&D activities that brought marketing, product design and engineering, and manufacturing together. Therefore, Lenovo has successively settled a two-tier research structure and three-point research centres in the manufacturing and technology developing phase. Lenovo's management has settled on a two-tier structure (see Figure 3) corresponding to what they term 'technology for today' and 'technology for tomorrow and the day after tomorrow'.

[Figure 3 Near Here]

The first tier, charged with developing 'today's' technology for PCs, is located with the IT Business Cluster, which includes the server, notebook, consumer IT, commercial desktop and several other business units. These are served by more specific labs, for example, the Desktop PC Development Center based on five supporting labs that are responsible for parts and components, consumer systems, commercial systems, architecture and standards, and application software. These labs are responsible for engineering systems and components based on needs identified in current operations, although in some cases they may subcontract research work to second-level R&D centres. Under any circumstance, these labs need cooperate with the production engineering departments within Lenovo's three manufacturing plants ensuring that their solutions are cost-effective to manufacture (An interview with Mr. Yuhai Ou of Lenovo on 27 March 2004).

Second tier R&D, under a deputy director, is corporate-level centre that includes four centres. The first one, Lenovo Research Institute, is at the heart of Lenovo's development of future key technologies. It focus on coordinating applications, to develop the technologies and protocols that will make it possible to exploit opportunities for coordinating different information devices, including home appliances, telecommunications and computers. The other three centres are charged with developing technology and platforms for all business units within Lenovo. The Software Design Center develops application software, the Industrial Design Center focuses on product appearance and attractiveness; and the Add-on Card Design Center develops motherboards and other parts and components to optimize the performance of Lenovo's products. These centres are designed to support the first-level R&D units, and relationships between the first- and second-tier centres are governed by internal contracting agreements. Because of the breadth of technologies and capabilities relevant for PCs, however, Lenovo recognises that it must supplement internal R&D activities, especially those targeting the future, with cooperative activities with other firms. To this end, it has formed alliances with China Telecom, IBM, National Semiconductor and D-Link, among others. In August 2003, for example, it co-founded with Intel the Lenovo-Intel Future Technology Advancement Center. This centre is charged with building reliable computation environments and key technologies for the next-generation Internet, and

designing leading-edge products that fuse computers and telecommunications.

3.3 Branding and Global Deployment Phase (2005-)

3.3.1 Competitive Strategies

In 2004, Legend announced the adoption of its new “Lenovo” logo in an effort for its global expansion. In 2005, Lenovo completed the acquisition of IBM's Personal Computing division. This acquisition marked as the official starting point for the company’s global expansion. Lenovo entered into overseas market, and integrated domestic and overseas market accordingly by accessing the external resources. Through this process, Lenovo built strong presence in the international market. At the same year, Lenovo became the world's largest provider of biometric-enabled PCs by selling its one-millionth PC with an integrated fingerprint reader. Lenovo renewed its overseas market and business strategy, such as the China areas covering Hong Kong and Taiwan areas from 2006, Russia and other 12 nearby countries were also included since 2007. Lenovo set up new production factory and distribution center at Legnica Special Economic Zone in Poland. With the integration of the business coverage, the international business layout was constructed. On January 27, 2011, in order to boost Lenovo's Japanese sales share, Lenovo formed a joint venture with Japanese electronics firm NEC to produce personal computers. At that time, NEC has 20% of Japanese PC market, while Lenovo barely had 5% market share. In 2007, Lenovo acquired Medion, a German electronics manufacturing company and got 14 percent of the German computer market. In 2012, Lenovo acquired the Brazil-based electronics company Digibras.

From 2005, Lenovo started focusing on innovation drawing internal and external resources to speed up the technology upgrade. Especially Lenovo pays attention to external sources, For example, after Lenovo acquired IBM's Personal Computing Division, Lenovo introduced a series of new technology, including the industry's thinnest, lightest and most secure Tablet PC, the ThinkPad X41 Tablet, the first widescreen ThinkPad with embedded wireless WAN, the ThinkPad Z60. Lenovo established Center of Excellence (COE) located in Singapore, to develop advanced technology for international expansion in 2006. At the next year, Microsoft China and Lenovo set

up a joint innovation center in China, initiating the new dimension for cooperation and innovation between enterprises. Lenovo maintained its lead position in technology innovation. Between 2008 and 2009, Lenovo sold and bought back the mobile business, promoted the speedy growth of its mobile technology and business. As of 2009, the mobile division ranked third in terms of unit sales in China's mobile handset market. Lenovo invested CN¥100 million providing seed funding for mobile application development for its LeGarden online app store. As of 2010, LeGarden had more than 1,000 programs available for the LePhone. In May 2012 Lenovo announced an investment of US$793 million to construct a mobile phone manufacturing and R&D facility in Wuhan, China (Lee, 2012).

3.3.2 Learning and Capability Development

The growth speed of Lenovo was accelerated by the acquisition of external distribution channels. In 2005, Lenovo smoothly entered into overseas market by acquiring IBM's Personal Computing division. This acquisition brought Lenovo with $10 billion potential sales per year (Before acquisition, IBM PC sales were $10 billion per year, see Figure 4). Lenovo acquired IBM's personal computer business in 2005 and improved both its branding and technology (Stephen, 2012). Another example is Lenovo EMC, a joint venture formed by Lenovo and EMC offering network storage solutions. It offers more robust range of products to serve small and medium business than Lenovo previously offered.

[Figure 4 Near Here]

In 2005, Lenovo acquired IBM's PC business for $1.25 billion. The takeover provided the company with American know-how to expand globally. The acquisition gave Lenovo's PC business a boost. Liu Chuanzhi, former board chairman of Lenovo, said, “We benefited in three ways from the IBM acquisition. We got the ThinkPad brand, IBM's more advanced PC manufacturing technology and the company's international resources, such as its global sales channels and operation teams. These three elements have shored up our sales revenue in the past several years” (Zhou, 2012). Lenovo built global collaborative, efficient innovation system after the purchase of IBM PC, three R&D centers in Japan, China and American, take full advantage of

different capabilities to improve technology and productions invention (see Figure 5). This innovation system has created a series of new productions, such as the world's thinnest full-featured notebook in 2008. Research centers of software and hardware in the United States have strong research capabilities. The global research and development management system in the US research centres are well equipped for global operation. The research centres of software and hardware in US have strong research capabilities. The Japan R&D centre is the good in compact notebook designing and manufacturing. The research centre in China responses quickly to customer needs, and there are many talents team members to be ultilised for future research projects.

[Figure 5 Near Here]

4 Managerial Implications

We focus on the market expansion and technology development as the main competitive strategies and in turns they enhance the organizational capabilities. In a dynamic and complex market, demand and supply constantly in flux, knowledge which used to be valuable could turn obsolete. As a result, in order to maintain competitive advantages, the firm needs to keep unlearning the outdated knowledge and learning new knowledge. Put differently, the firm needs to create, maintain and expand capabilities through relentless learning (Chandler, 1992). Lenovo's development history and the conceptual elements in the market and technology are worth learning for managers. In this section, we conclude some of the conceptual resources and capabilities accumulation paths in the process of Lenovo's development.

Reverse development process Lenovo represents the way in which a new entrant may challenge incumbents, especially foreign competitors, by developing resources and capabilities that are especially adapted to the local market. On the one hand, the payoffs of innovation activities are determined by market process that involves not only the activities of the innovator, but also the reactions of customers and competitors (Koellinge, 2007). Lenovo strives to maintain its market-focused products innovations that proved hard for domestic competitors to replicate. Lenovo keeps this strategy as it has extended its capabilities into manufacturing and R&D, namely,

a major objective of Lenovo's ongoing activities is to develop products that targeting specific customer segments. The case clearly illustrates how the nature and direction of business activities evolves in the firm's accumulation of relevant resources and capabilities.

Leverage internal and external resources to uplift capabilities The case also shows changes in the capabilities and domains in which a firm competes and also illustrates ways to acquire new resources and capabilities. Initially, Lenovo competes in a number of sales by selling other firms' products or technology. In recent years, even the largest innovative organization can't rely solely on internal resources, they also acquire knowledge and capability from external sources. Therefore, in the branding and global deployment phase, Lenovo gained external markets and technology capability through merges and acquisitions, collaboration and jointly R&D centres. After acquiring IBM's global PC and forming a strategic alliance with IBM, Lenovo integrated the skills from both sides and acquired a world-class distribution network with global reach, and R&D sources.

Relentless learning The customer is the first source of Lenovo's learning, with which it had direct contact through its extensive PC distribution network. Lenovo actively seeks customer input for product development activities. For instance, Lenovo incorporated six 'hot key' on the keyboard, so the users can get access to 6 of the frequently used functions by clicking the 'hot key'. This implementation of new design was based on customers' survey. This model proved to be a great success, and was sold 900,000 units within a year of its launch (Asia Week, 2001). The experiences as a distributor of leading foreign brand computers were also valuable to Lenovo. Lenovo accessed first hand information on customers' feedbacks and products repairing issues through this approach.

5 Conclusions and Future Researches

Lenovo began as a spin-off of a leading R&D institute in computer science. Rather than beginning with core proprietary technology and gradually developing downstream capabilities in manufacturing, marketing, sales and distribution, Lenovo starts business in distribution and sale by allocating its resources to the sales and customer services. The wealth accumulated through

those activities helped fund Lenovo's next step development as a manufacturer. Similarly, its experience in manufacturing not only generated revenues, but also provided insight for R&D opportunities. The transition of each development phase associated with business opportunities and enabled Lenovo to compete directly with leading firms in the industry.

In this chapter, we describe this process in terms of three development phases to investigate Lenovo's development. By focusing on two competitive strategies of market expansion and technology innovation in each phase, this chapter explores capabilities accumulation path of Lenovo Group Limited. As Lenovo becomes a global enterprise, its product lines have expanded from PC to tablet and mobile devices. In order to outstrip its competitors, to make three-pronged investments in manufacturing, marketing, and management is essential for exploiting cost advantages from the economies of scale and scope, as Chandler (1992) suggested. In this chapter, we only focus on demonstrating two of this three-pronged investment in Lenovo, namely marketing (distribution) and production (technology). As Lenovo grows to a giant corporation with a global brand, the previous production-centric business model needs to change. Lenovo needs to change the mindset, as rightly asserted by Yang Yuanqing, "we must consider the whole package: hardware, software, services, and content" (Kirkland and Orr, 2013). The internal structure of the organization has to change in sync with the growth of the corporation. How to manage the organizational reengineering on its pathway of growth is equality important. Organizational change is a double-edged tool. It can establish a more focused business, and as well it can unleash a backlash of unrest and rupture. How Lenovo manages its organizational change, such as dealing with cultural differences when merging with foreign companies, is a topic worth further studying.

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Table 1 Critical events of Lenovo

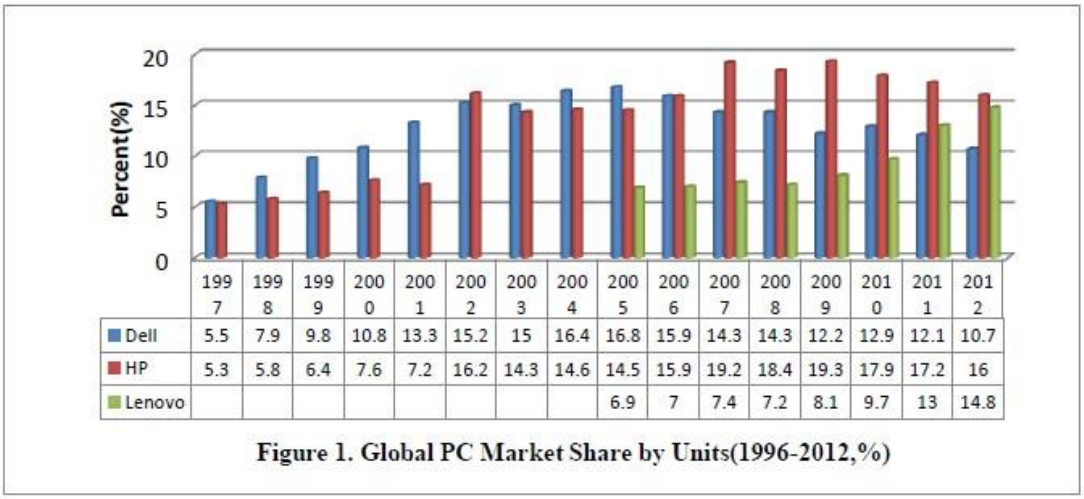
Year	Events
1984	Established in 1984 as ICT Co., a government-funded R&D institute under the Chinese Academy of Sciences.
1987	Became a distributor for AST, and later for HP and other foreign branded PCs.
1988	Established Hong Kong Computer Group, a joint venture with a Hong Kong partner to produce PC motherboards and add-on cards and operated a trading business.
1989	Renamed as Legend Group Co.
1990	Legend changed its role from that of an agent for imported computer products into that of a producer and seller of its own branded computer products.
1993	Became the largest local PC manufacturer in China, behind AST and Compaq.
1996	Legend became the market share leader in China for the first time and control over 30% of the country's market share.
1998	Legend establishes the first Legend Shop.
1999	Legend became the first Chinese PC manufacturer to be the top seller (by units) in the Asia-Pacific region (excluding Japan) and heads the Chinese national Top 100 Electronic Enterprises ranking.
2000	Legend becomes a constituent stock of the Hang Seng Index-HK. Legend ranked in top 10 of world's best managed PC venders.
2001	Legend successfully spun off Digital China Co. Ltd., which is separately listed on the Hong Kong Stock Exchange.
2002	Changed its English name from Legend Holdings Limited to Legend Group Limited.
2004	Changed its English name from 'Legend' to ''Lenovo'. Lenovo decided to develop the rural market.
2005	Lenovo completed the acquisition of IBM's Personal Computing Division and became the third-largest personal computer company in the world.
2006	The first Lenovo-branded products outside of China debut worldwide.
2007	Lenovo became the partner of the 2008 Olympic Games in Beijing.
2008	Lenovo entered the worldwide consumer PC market with new Idea brand.
2009	Lenovo led PC industry in using recycled material.
2010	Lenovo achieved its highest ever worldwide market share and became the world's fastest growing major PC manufacturer.
2011	Forbes names Lenovo one of the world's "100 Most Reputable Companies".
2012	Lenovo became the world second-biggest PC manufacturing firm.

Sources: Lenovo official website and Xie & White (2004).

Table 2 Market Shares of Top 4 PC Manufacturers in China (%)

Rank	1992	1996	1997	1998	2002	2006	2011	2012
1	AST (26.9)	COMPAQ (9.2)	Lenovo (10.7)	Lenovo (21.5)	Lenovo (27.3)	Lenovo (27.6)	Lenovo (29.5)	Lenovo (35.5)
2	COMPAQ (18.5)	IBM (6.9)	IBM (7.5)	IBM (6.2)	IBM (9)	Founder (13%)	acer (10.9)	acer (9.5)
3	Greatwall (11.2)	Lenovo (6.9)	COMPAQ (6.7)	Founder(5.9)	Founder (5)	HP (9)	Dell (10.4)	Dell (9.4)
4	IBM(5.2)	HP(6.7)	HP(6.5)	HP (5.6)	Dell(5)	Dell(9)	HP(8.5)	HP(5.3)

Sources: Xie & White (2004) and public information.



	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Dell	5.5	7.9	9.8	10.8	13.3	15.2	15	16.4	16.8	15.9	14.3	14.3	12.2	12.9	12.1	10.7
HP	5.3	5.8	6.4	7.6	7.2	16.2	14.3	14.6	14.5	15.9	19.2	18.4	19.3	17.9	17.2	16
Lenovo									6.9	7	7.4	7.2	8.1	9.7	13	14.8

Figure 1. Global PC Market Share by Units(1996-2012,%)

Sources: Lenovo's official website, Public information and Annual report

Table 3 Technology Development of Lenovo

Year	Events
1987	Innovate Chinese-language computer input devices (Legend Hanka-Chinese character card).
1993	Legend Chinese-western language graphic terminal on the market.
1990	The very first Legend PC is launched in the market. Legend PCs are ratified and accepted by the China Torch Program.
1993	Legend enters the Pentium era, producing China's first "586" PC. Legend establishes 1+1 retail network.
1995	Legend introduces the first Legend-brand server.
1997	Legend signs an Intellectual Property agreement with Microsoft, the most valuable deal ever made in China at the time.
1998	The millionth Legend PC comes off the production line. Intel Chairman Andy Grove attends the ceremony, and takes the PC for Intel's museum collection.
1999	Legend launches pioneering Internet PC, with its "one-touch-to-the-net" feature, which enables millions of Chinese PC users to easily access the Internet.
2001	Legend first introduces "digital home" concept and launches accessories-enabling PC.
2002	Legend Sureye intelligent monitoring and controlling system, Legend's DeepComp 1800, Legend Tianqi 9220 and Kaitian 680 on the market.
2003	Legend successfully develops DeepComp 6800 in November 2003. It ranks 14th in the Top 500 list of the world's supercomputer.
2004	Lenovo decides to develop the rural market by launching the "Yuanmeng" PC series designed for township home users.
2005	Lenovo introduces the industry's thinnest, lightest and most secure Tablet PC, the ThinkPad X41 Tablet. Lenovo introduces the first widescreen ThinkPad with embedded wireless WAN, the ThinkPad Z60, available for the first time with a titanium cover.
2006	Lenovo introduces the first dual-core ThinkPad notebook PCs, improving productivity and extending battery life for up to 11 hours. The first Lenovo-branded products outside of China debut worldwide. Establish Center of Excellence (COE) located in Singapore.
2007	Lenovo introduces first EPEAT Gold Monitor with new visuals portfolio. Microsoft China and Lenovo establish a joint innovation center in China.
2008	Lenovo becomes the first PC manufacturer to announce a client virtualization platform.
2009	Lenovo debuts Enhanced Experience for Windows 7, delivering significantly better performance for the new operating system.
2010	Lenovo introduces LePhone, its first smartphone.
2011	Lenovo forms Mobile Internet Digital Home (MIDH) business unit to attack growing opportunity in consumer devices such as smartphones, tablets and smart TV.
2012	Lenovo acquires Stoneware, a software firm focused on cloud computing.

Sources: Lenovo official website and public information.

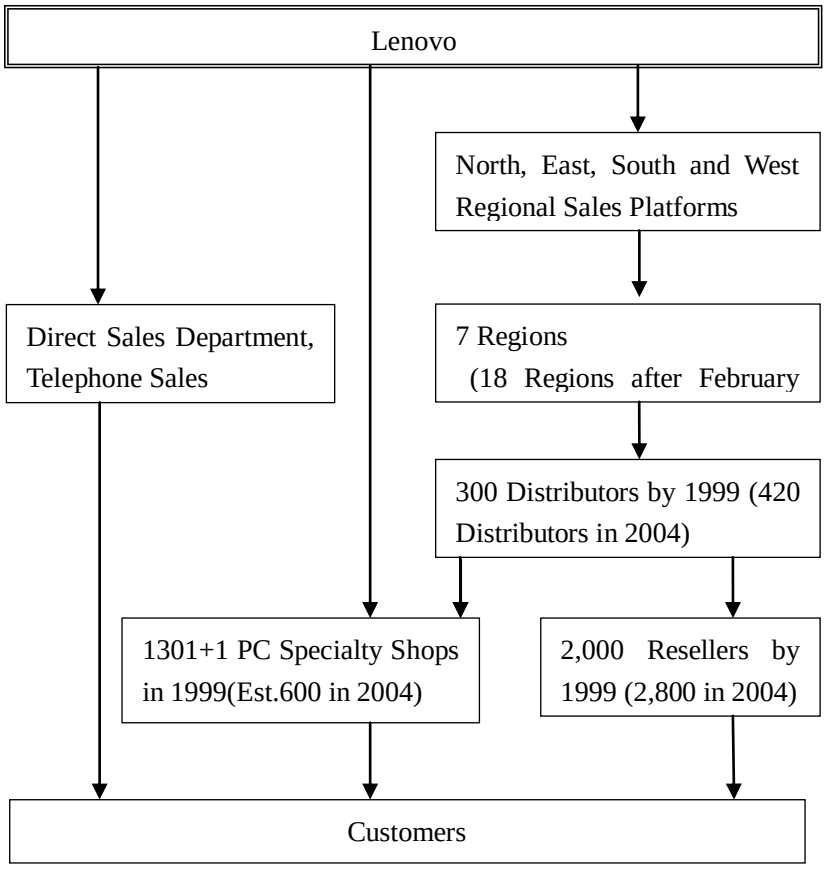


Figure 2 Lenovo's Distribution Network

Sources: Xie & White (2004) and the publicly available interviews of key decision makers of Lenovo from newspapers and business magazines.

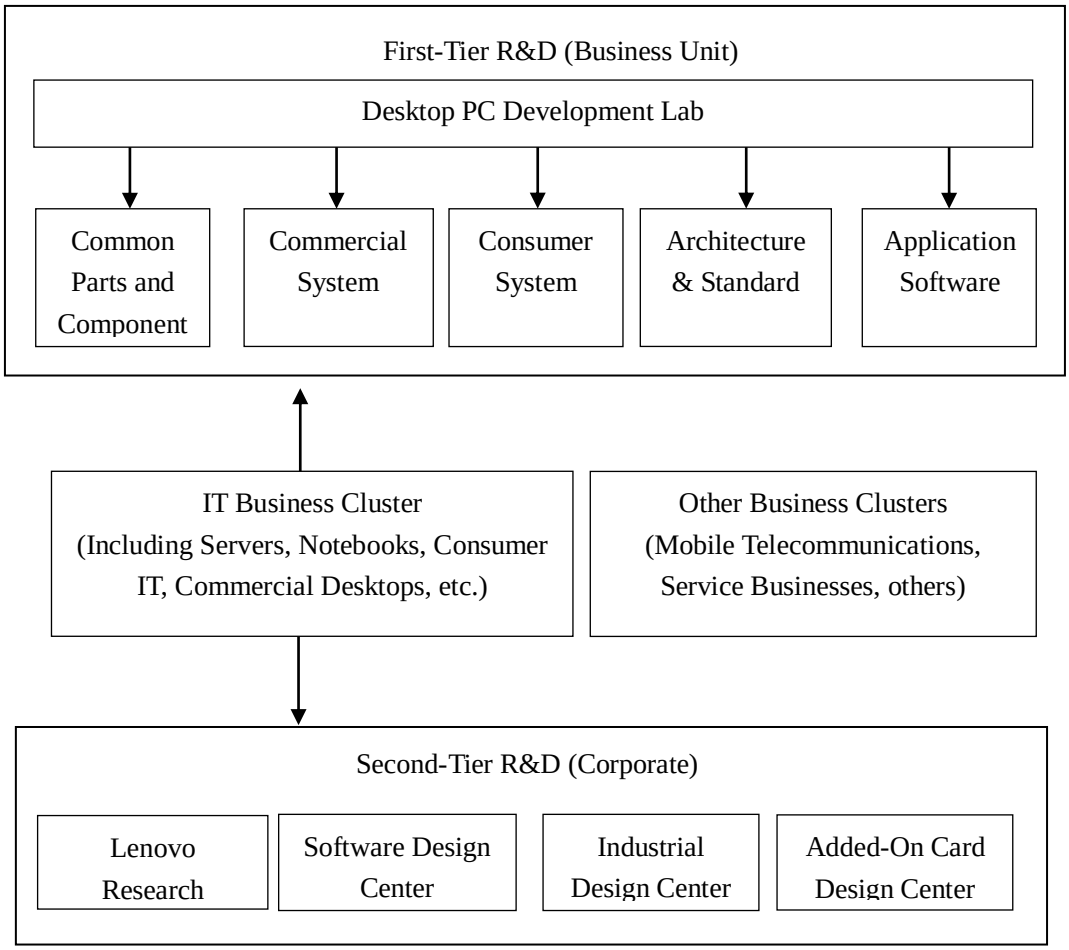


Figure 3 Lenovo's Two-Tier R&D Organization Structure

Sources: Xie & White (2004).

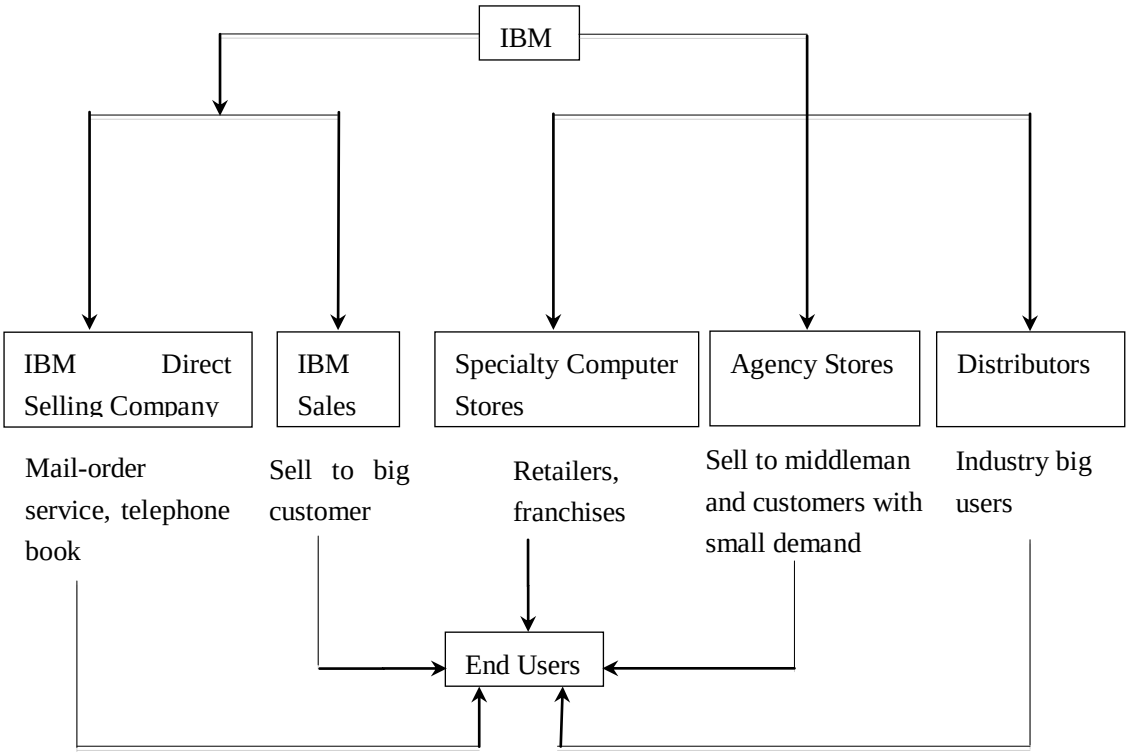


Figure 4 The IBM's Distribution Channel

Sources: Lenovo official website and interviews of Lenovo's key decision makers from newspapers and business magazines.

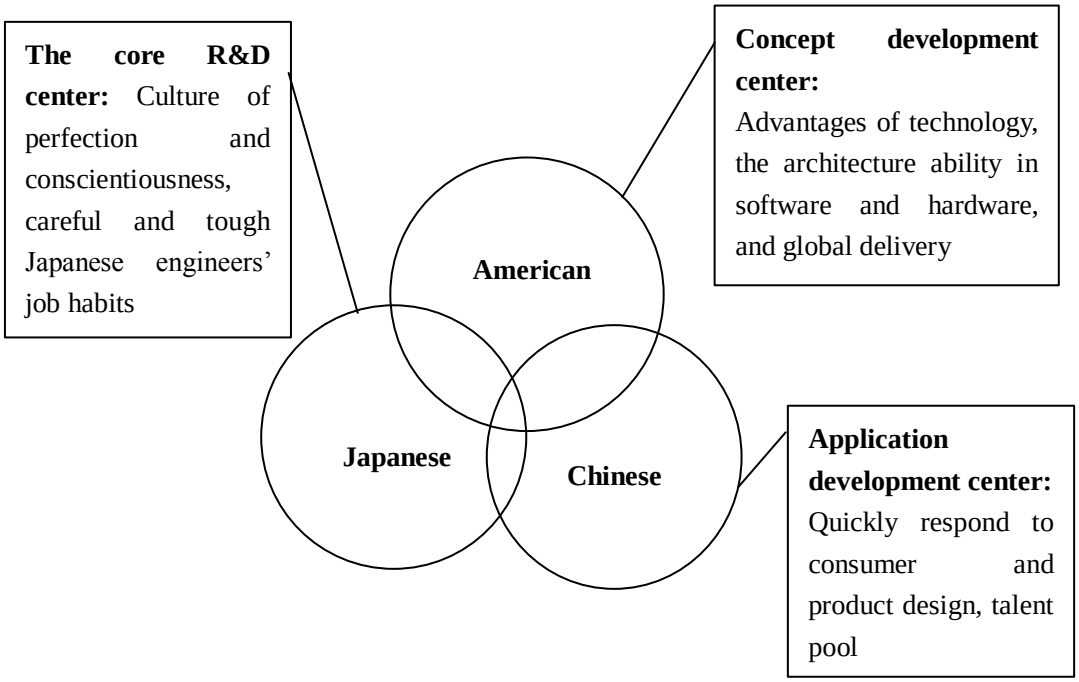


Figure 5 Global Collaborative, Efficient Innovation System

Sources: Lenovo official website and the publicly available information from interviews of key decision-makers of Lenovo from newspapers and business magazines.