

ASEAN CASE STUDY

NDR CO., LTD.

INDUSTRY NOTE

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A. Software Industry Categorization

a) Software Classification

Software products in the IT industry world are mainly categorized into four types:

1) Application software, whose role is mainly to improve business processes and the level of automation within the organization.

This type of software is used directly by the end-users.

2) System software is the infrastructure software foundation which manages and links the hardware, the network and the software together.

3) Middleware and tools are intermediary software that stand between the system infrastructure and application software and allow different software to interact with each other.

4) Electronic games that form part and parcel of the software industry as they provide interactions with a user interface offering visual feedback on a video display. Both paid and ad-funded games

b) Types of software by customization

Software is either (1) written for general use and replicated in its original form across many users, or, (2) written for a specific user. The former is termed a software product or package. It may be shrink-wrapped and transported physically or over the Internet. The latter is termed custom software. The made-to-order custom software is more geographically constrained than products, i.e., proximity to the user is more important. Because of this, software products are more readily exportable than custom software.

System-level software is the most complex as it manages the interfaces with both hardware and higher level software; while applications software

is the least complex. Nowadays, all system level software are products. The more varied an end-user's needs are from another end-user, the more likely is the software to be customized. Since the variations in needs appear most at the stage of applications, most customized software is applications software.

B. Global Software Market

The world software market exceeded \$265 billion in 2010, according to Market Line. Market growth is expected to exceed 6% yearly between 2010 and 2015, bringing the market to almost \$357 billion. Home use and general business applications lead the market at almost \$64 billion, accounting for around a quarter of the overall market, which encompasses systems and application software. The former includes network and database management, operating systems and other systems software, while the latter involves application software for office and home, and vertical applications.

The software market is extremely globalized, with expansion proving the fastest in developing markets. Over the past twenty years there has been extensive consolidation within the software industry. Revenue recognition is a significant challenge for the industry.

At present, top software companies of the world are heavily competing with each other to grab the ever growing software market of the world. Backed with skilled software professionals, the **top software companies of the world** are offering software solution of any kind to their clients.

Table 1 shows some of the major software companies of the world:

Table 1. World Major Software Companies

Microsoft (USA)
Oracle Corporation (USA)
First Data (USA)
SAP (Germany)
Accenture (Bermuda)
Google (USA)

Yahoo (USA)
IBM (USA)
Soft Bank (Japan)
Syantec (USA)
CA (USA)
Infosys (India)
Adobe Systems (USA)
Capgemini (France)
ASML Holdings (Netherlands)
Advantest (Japan)
TCS (India)
Wipro (India)
Autodesk (USA)
Check Point Software (Israel)
The Sage Group (UK)
Sassault Sytems (France)
CSK (Japan)

Source: Finance Maps of the World, April 2012

Despite a recognized maturity due to product standardization and market concentration, new players and new technologies also contribute to the sustained growth of the world software market and continued innovation. With the introduction of cloud computing, the value proposition of software has improved dramatically and also the way to deliver and to sell the “product” has evolved consequently.

Software vendors have managed to take advantage of the recent evolution in the software model, reshaping the traditional business model focused on product sale and turning it into a service offer, which ensures a more recurrent and resilient cash flow.

The future of software is increasingly more focused on services rather than on products. The browser is becoming the common platform for software applications and the cloud system is replacing the PC. Rather than having to pay for a perpetual and static software program, users will pay for

services and on a subscription basis, which is pre-packaged and easily accessible

C. Global System Integration Market

The Global Industry Analysts (GIA) reports there is a growing awareness among business partners, and severe competition in the market are compelling companies to provide customers, employees and other business partners with on-demand services and information sourced from different data resources.

The GIA report further says this phenomenon is actually driving increased demand for integration solutions and services -- preferably in easily accessible and flexible ways.

Overall, the systems integration market -- which includes enterprise software and services -- is projected to grow at a clip of about 5.15% annually, for the period 2009 through 2017. A majority of activity will be in application development.

The global market for Systems Integration is projected to reach \$339.68 billion by 2017, primarily driven by the growing complexity of IT infrastructure, the need to integrate multiple application/system capabilities for integrated IT set-up, and increased corporate efforts directed at application consolidation, optimization and rationalization. Strong demand for Enterprise Application Software (EAS) systems also augurs well for the future of this market.

What also bodes well for the systems integration market is the strong demand for enterprise application software (EAS), including Enterprise Resource Planning (ERP), Supply Chain Management (SCM), product life cycle management (PLM), HR Applications, Data Management and Business Intelligence (BI), all of which help enhance profitability, operational efficiency and competitiveness of businesses. Increased focus of companies on data center optimization strategies will create demand for IT Infrastructure integration in addition to application integration services

and solutions. Virtualization as a means for consolidating IT resources will drive up opportunities for systems integration and consulting services.

The forecast for systems integration services is also foreseen to grow in the public sector, encouraged largely by government investments in upgrading IT infrastructure. Implementation of enterprise resource planning (ERP) systems in government agencies, introduction of public convenience and safety solutions, such as E-governance, and modernization programs, and those initiated by the US Department of Health and Human Services (DHHS). All these will especially boost demand for systems integration over the next few years. The Table 2 shows major players in the marketplace.

Table 2. World Major Systems Integrators

Accenture (Bermuda)
Atos SA (France)
BT Global Services Ltd.(UK)
CapgeminiS.A. (France)
Computer Sciences Corporation (USA)
Fujitsu Limited (Japan)
Hewlett-Packard (USA)
Hitachi Co., Ltd. (Japan)
IBM Corporation (USA)
IndraSistemas S.A. (Spain)
Infosys Ltd. (India)
Lockheed Martin Corporation (USA)
LogicaCMG Plc. (UK)
NEC Corporation (Japan)
Northrop Grumman Corporation (USA)
Oracle Corporation (USA)
SAP AG (Germany)
Science Applications International Corp. (USA)
Tata Consultancy Services Limited (India)
T-Systems Limited (Germany)
Wipro Limited (India)

Source: Global Industry Analysts Inc. "World Major Systems Integrators" 2012

D. Globalization of the Software Industry

One rather unexpected phenomenon of the 1990s has been the amazing growth of the software industry in some emerging countries.

The first element of surprise is that these countries are not where one would expect to see the growth of what is commonly thought as a high-tech industry.

The second element is that the 1990s have shown, not just growth of the industry, but remarkable growth. In India, for example, software production was almost non-existent in the early 1980s.

Today, the software industry employs more than 1,000,000 employees, sustaining annual growth rates of 30 to 40 percent in revenues and employment over more than ten years. Although less remarkable than India, countries like Ireland and Israel have also had double-digit growth.

In the global software industry, India, China, Ireland, Israel and Brazil are the 5 newcomer countries. The growth of India, Ireland and Israel was fueled by exporting a substantial portion of their output and services mainly to the United States, while China and Brazil have grown largely due to their domestic market.

In 2002, the Indian and Chinese software industries were of comparable size (\$12.5 and \$13.3 billion in revenue, respectively).

In 2012, India recorded \$88 billion in revenues and China \$311 billion, respectively.

The 2012 sales of Brazil and Israel were \$16.2 billion and \$3.6 billion, respectively. The Irish industry reached \$13.9 billion in total sales in 2002, of which \$12.3 billion is attributed to multinational companies (MNCs) and \$1.6 billion to the indigenous sector.

The employment differences among these five countries are more marked than those in sales. In March 2003, the Indian software industry employed about 250,000 people. The 2000 figures for China and Brazil are about 160,000 and 190,000, respectively.

As noted, 2002 employment in the Irish software industry was about 28,000, while 2001 employment in the Israeli industry was about 15,000.

To put these figures in perspective, employment in the U.S. software industry was slightly above 1 million, with sales of around \$200 billion; the comparable figures for Japan were 534,000 and \$85 billion. Germany, the third largest software producer, employed around 300,000 and had sales around \$40 billion.

The sales and employment figures produce notable differences in the sales per employee, with Israel having the highest sales per employee, followed by Ireland, whose figures are only slightly lower than the figures for Germany. The revenue per employee of the Indian industry in 2002 was about \$50,000, which is comparable to figures for China and Brazil.

The picture that emerges from these figures is consistent with stylized facts. The Israeli software industry is largely product and research and development oriented. The software industry in Brazil, China, and India has a lower value-added and heavily service oriented. Ireland is in between, with a handful of product-oriented firms, and several small consultancies and niche firms.

In Brazil and China, software sales are between 1 and 1.5 percent of gross domestic product (GDP), only slightly smaller than the corresponding figures for richer countries such as the United States, Japan, and Germany.

The GDP software share is higher in Israel (3.7 percent) and India (2.5 percent). The shares for India and China have also increased substantially in recent years, while they have remained more stable for the other countries.

In 2001, the GDP share of software was only 0.6 percent in China and 1.7 percent in India. Thus, in these two economies, software has continued to grow faster than GDP in 2001-2002, despite the general slowdown in the IT sector worldwide.

In all five countries, software ranks high when compared to their overall level of development, as measured by the ratio between the software share of GDP and the GDP per capita.

In all five emerging countries, these ratios are far higher than those in the United States, Germany, and Japan, suggesting a specialization in software. The level of the index is particularly impressive for India (about ten to twenty times higher than the levels in the United States, Japan, and Germany).

But the most impressive figures about the software industry in these emerging economies are their growth rates, which have ranged as high as 40 percent per year in the Indian case. The number of firms has also grown.

In India, membership in the National Association of Software and Service Companies (NASSCOM) increased from around 100 in 1990 to 797 in 2000. Similarly, the number of new Irish software firms increased from less than 300 in 1991 to 760 in 2000.

D. History and Perspective of Japan's Software Industry

1. Prologue

The software industry in Japan has never been competitive in the global market, having always been fragmented among incompatible platforms provided by large systems integrators (Hitachi, Fujitsu, NEC) and dominated by customized software.

Of course there are consumer software exceptions for firms that have reached global prominence like Rakuten, an online shopping mall, Trend Micro, a large security software firm, and DeNA, a developer of games for mobile devices. It should be stressed that a tremendous amount of software is

produced and used in Japan. The problem is that most software is produced by subsidiaries of large firms and customized for the needs of very few or oftentimes one, large customers.

2. Historical Background of the Japanese Software Industry

In the early 1960s, the Ministry of International Trade and Industries (MITI) orchestrated licensing agreements that paired each major Japanese computer system developer with a U.S. counterpart. Hitachi went with RCA then IBM, NEC with Honeywell, Oki with Sperry Rand, Toshiba with GE, Mitsubishi with TRW and Fujitsu went on its own before joining IBM. The idea was to make sure Japan embarked on the computer revolution and that it competed effectively with then-almighty IBM.

However, these initial pairings were one of the causes of the fragmented state of the Japanese computer software industry, leading to a Tower of Babel of incompatible systems, in which, as in the biblical story, all participants are forever condemned to speak different languages, as punishment for previous sins.

Since each of the major computer system suppliers had a different U.S. partner, each had a different antecedent for its operating system. In fact, even IBM-compatible producers only had the instruction set licensed from IBM in common; their operating systems were incompatible among themselves. Very rapidly, each company found it profitable to lock-in its customers by supplying highly customized software, often free of charge, which meant that clients had only one source of upgrades, support and application development. Over time, many of the former U.S. partners were forced to exit the industry due to intense global competition from IBM. However, their Japanese licensees remained, which perpetuated these incompatible systems.

In the United States, IBM was forced to unbundle its software and hardware in 1969. The IBM System/360 was the first true market platform in the computer industry in that it was the first to support third-party suppliers of software applications and hardware add-ons.

This also marked the beginning of the vertical disintegration and modularization of the computer industry: computer systems were no longer solely provided as fully vertically integrated products; rather users could mix and match a variety of complementary hardware and software products from independent suppliers. This led to the development of an immensely successful software industry.

The new industry became prominent with the work station and PC revolutions in the early 1980s, which brought computing power into the mainstream through smaller, cheaper, microprocessor-based machines. An important consequence was the great potential created for software/hardware platforms, which a handful of companies understood and used to dominate their respective segments: Sun Microsystems in the workstation market, Apple and Microsoft in the PC market.

By contrast, in Japan there was no catalyst for such sweeping modularization and standardization process. No one required the large systems makers to unbundle and there were no incentives to achieve compatibility.

During the next three decades, the customized strategies became entrenched. Each supplier found it profitable to lock its clients into proprietary hardware/software systems that it alone could provide, and clients set up their own software divisions to further customize the proprietary systems they received, thus increasing sunk costs and reducing the likelihood of switching to newer systems.

Japanese computer manufacturers tried to extend this strategy to the work station and PC market, but failed due to competitive pressure from foreign suppliers, particularly, American.

The best known example is NEC, which until around 1992 held a virtual monopoly on the Japanese PC market. In the end, however, NEC's monopoly was broken by Dell, Compaq and low-cost Taiwanese PC makers.

The prevalence of closed, proprietary strategies prevented the economies of scale necessary for the emergence of a successful independent Japanese

software industry. No single computing platform became popular enough with users to provide sufficient innovation incentives for packaged application software. This is the main reason why Japanese software companies are less competitive in the global market.

In comparing the top two American firms, Accenture and IBM with the top two Japanese firms, it is obvious that the bulk of sales of the two Japanese firms are domestic, while the revenue of the top two American firms is global.

3. Present and Future Direction

Japan's software market in FY2010 was worth Yen 18,844 billion, a 12.3% decline over the previous year (see Exhibit 1, Japan's software industry, revenue and number of employees). This is mainly attributable to the shrinkage of world economy triggered by Lehman Shock in September 2008.

However, from FY2011 to FY2013, it is expected that businesses are resuming IT investments and the software market is anticipated to return to the growth mode, but at a much slower pace.

The corporate market entered the replacement stage of client servers installed in early 2000s. The system replacement demand is also having a positive effect on software demand.

The recovery and growth in IT investment are evident not only among large corporations but also among SMEs. One factor encouraging IT investment among SMEs is the government tax incentive promoting investment in IT.

In addition, implementation of the legislation protecting personal information in 2005 has been increasing awareness of security needs thus security related software market is expected to grow.

According to the 2010 data from the METI Annual Survey of the Software Industry, 86% of the total industry sales are derived from customized software development and only 14% from prepackaged software sales.

This indicates a large of customization in the Japanese market and packaged software products playing a much less role.

There are, however, long term trends indicating the growth of packaged software with the introduction of open –sourced software movement. There were a few successful cases in recent years among producers and of packaged software for small and medium sized firms. As for the large firms, however, vertical markets and customized software are still dominant (see Exhibit 2, Top ten system integrators and their market shares).

F. Small and Medium Sized Software Companies in Japan

1. Definition of SME in Japan

According to the Small and Medium-sized Enterprise Basic Act and Japan's Ministry of Economy, Trade and Industry (METI), the definition of SME is as follows:

Industries	Capital size(¥m)	Number of Employees
Manufacturing and others*	300 or less	300 or fewer
Wholesale	100 or less	100 or fewer
Retail	50 or less	50 or fewer
Services*	50 or less	100 or fewer

*This sector includes Software and IT industry.

Source: Small and Medium Enterprise Agency, White Paper Year 2011

2. SMEs in Japan's economy

SMEs are prevalent across the Japanese economy, constituting share of enterprises in all sectors and most numerous in retail, services and restaurant/lodging industries (Table 1).

Among the most productive are those in the manufacturing sector, while many of those in the services sector are wholly reliant on domestic demand. A large proportion of SME manufacturers are essential suppliers to Japan's large exporters. The significance of SMEs in the export supply chain explains in part why the sector was hit so hard by the recession of 2008-09. A study commissioned by METI's SME Agency showed approximately ¥700bn (US\$8.3bn) in declines.

Table 3.Composition of SME sector in Japan (% of enterprises)

Real estate industry	7%
Manufacturing	11%
Retail	20%
Service industry	18%
Finance and insurance	1%
ICT industry	1%
Transportation	2%
Education, learning support	3%
Health, welfare	4%
Wholesale	6%
Real estate industry	7%
Manufacturing	11%
Restaurants & lodging industry	15%
Construction	12%

Source:Ministry of Internal Affairs and Communications (Japan),“Establishment and Enterprise Census”, 2011

3. SME in Japan’s Software Market

Table 3 above shows that the presence of SMEs in the ICT industry is rather insignificant as compared with other industry sectors.

Despite efforts by the Ministry of the Economy, Trade and Industry (METI, formerly MITI), there are relatively few small to medium-sized independent software companies in Japan, compared to the U.S. This is because the highly fragmented, vertically integrated and specialized industrial structure precludes modularity and the emergence of popular platforms, which in turn impedes the economies of scale needed to offer sufficient innovation incentives to independent developers.

It is mostly for this reason that the PC and packaged software markets are dominated by foreign, particularly U.S., software providers.

In 2010, SMEs’ market share improved slightly during the same period, but still slightly less than 1% of the total software industry. Total revenue of the

SME software sector increased from 1,456 billion yen in 2007 to 1,631 billion yen, a 12% hike over 4 years period, while the total number of firms increased from 6,847 to 7,508, a 9.7% hike during the same period (see Exhibit 3-1 and Exhibit 3-2).

The prolonged recession in Japan forced corporate clients to demand large system integrators to cut development costs. Large system integrators, in turn, asked SME subcontractors to squeeze their profit. Further, these big players shifted a portion of their orders to offshore software outsourcing destinations such as China and India. Under such circumstances, the profitability of SME in this sector deteriorated.

To improve profitability and sustainability, it seemed these are the 4 options for SMEs:

1. Strengthen relationship with large system integrators to secure enough deal flows;
2. Develop direct relationship with small and medium sized users to increase profit margin;
3. Enter into firm ware development venture to establish direct relationship with end-users; and
4. Establish offshore subsidiary to reduce cost and to secure good quality engineers.

However, this is easier said than done, because to change the course of business directions, the SMEs required government support and guidance.

4. Japanese Government Support and Guidance

4.a) INFORMATION-TECHNOLOGY PROMOTION AGENCY, JAPAN (IPA)

Originally, IPA was established as a Specially-Approved Corporation based on the Law on Promotion of Information Processing (enacted May 22, 1970, Law No.90). By amendments enacted on December 11, 2002 (Low No. 144).

IPA was reorganized to become an incorporated administrative agency on January 5, 2004. One of its missions is to strengthen the development

capability of SMEs and to improve sustainability. It helps SMEs to shift from simple subcontracting work to higher added value businesses.

The agency also provided human resource training and education for small and medium sized users on how to utilize computer systems.

4.b) Organization for Small & Medium Enterprises and Regional Innovation, JAPAN was founded in 2004, based on the Act on the Organization for Small & Medium Enterprises and Regional Innovation, JAPAN, Independent Administrative Agency with the following functions:

1) Support for Start-Ups

Provide various support measures including consultation at advice counters and dispatching experts, in order to resolve problems related to start-ups and new business development.

2) Support for SME Growth and Development

Provide support towards business enhancement, such as responding to the advanced management issues of SMEs, in collaboration with local SME support organizations

3) Support for Safety Net

Provide “security” through a small-scale enterprise mutual aid system and business safety mutual relief system to those who wish to be prepared for future what-ifs.

4) Support for Infrastructure

Offer support in terms of infrastructure to those who wish to improve facilities, or who are looking for new sites/ space for business.

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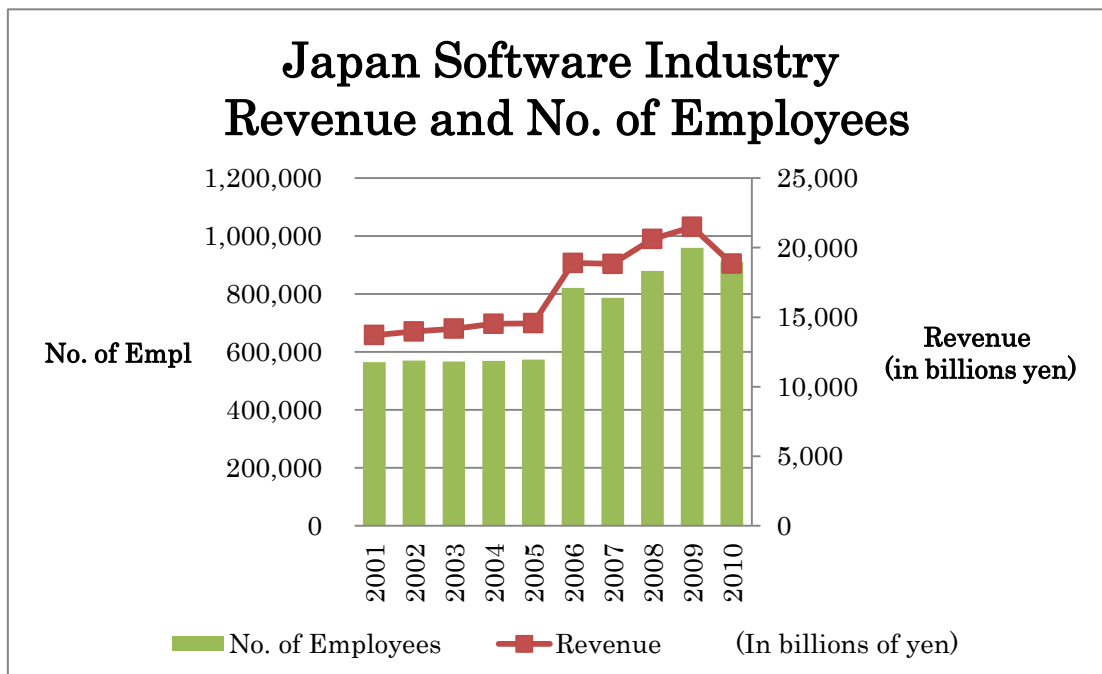
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Exhibit 1.

Japan's Software Industry

Market Size and No. of Employees

Year	Revenue (In billions of yen)	Change over a year ago	No. of Employees	Change over a year ago
2001	13,704	21.8%	565,115	8.8%
2002	13,973	1.9%	569,823	0.8%
2003	14,171	1.4%	567,467	-0.4%
2004	14,527	2.5%	569,542	0.4%
2005	14,556	0.2%	573,778	0.7%
2006	18,895	23.0%	820,723	30.1%
2007	18,826	-0.4%	786,677	-4.3%
2008	20,631	8.7%	879,461	10.6%
2009	21,495	4.0%	959,193	8.3%
2010	18,844	-14.1%	912,284	-5.1%



Source: METI Selected Service Industry Survey 2007 to 2010

Exhibit 2.

Japan: Top 10 System Integrators' Revenue and Market Share 2006-2007

(in millions of dollars)

Rank	Vendor	Revenues 2006	Revenues 2007	Growth (%) 2006--2007	Market Share (%) 2007
1	Fujitsu	4,849	4,938	1.8	15.8
2	NEC	4,146	4,311	4.0	13.8
3	Hitachi	3,668	3,913	6.7	12.5
4	IBM	3,466	3,555	2.6	11.4
5	Nomura Research Institute	1,067	1,220	14.3	3.9
6	NTT Data	1,021	1,052	3.0	3.4
7	Toshiba	987	1,047	6.1	3.3
8	Fuijsoft	986	965	-2.2	3.1
9	Mitsubishi Electric	866	882	1.9	2.8
10	Nihon Unisys	657	858	30.7	2.7
	Other Service Vendors	8,007	8,547	6.8	27.3
	Total Market	29,720	31,289	5.3	100.0

Source: Karlsson, 2008

Exhibit3-1.Average Annual Revenue of SME Software Firms

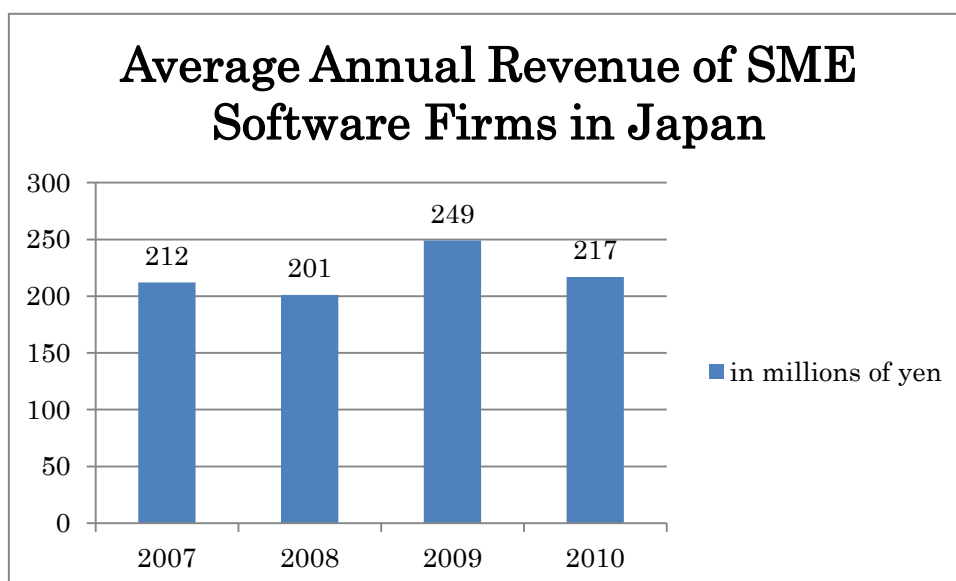
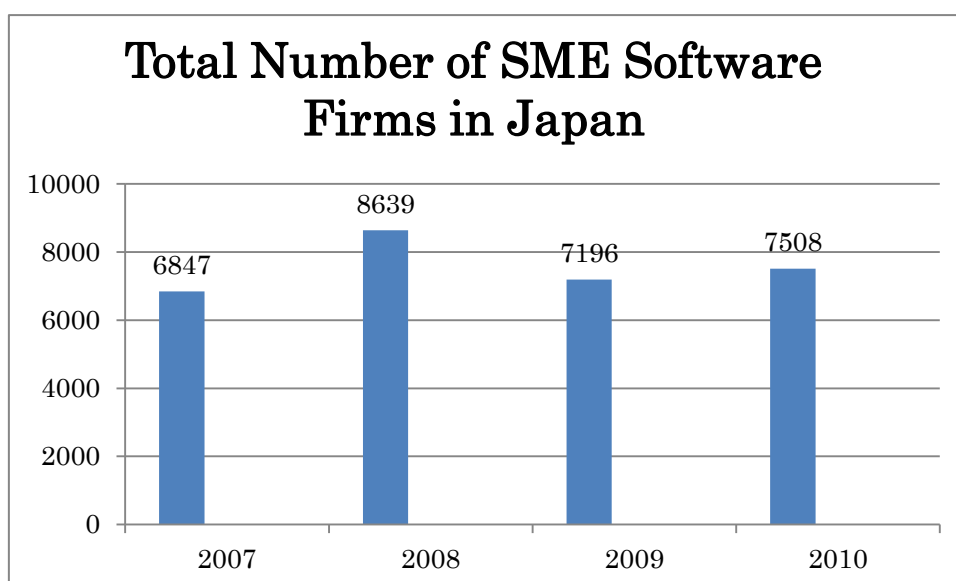


Exhibit 3-2. Total Number of SME Software Firms



Source: METI Selected Service Industry Survey 2007 to 2010