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## Comparative analysis for Japanese Private Sector IT investment and Productivity The roles of IT investments for corporate growth and profit

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# **Comparative analysis for Japanese Private Sector IT investment and Productivity**

## **The roles of IT investments for corporate growth and profit**

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### **Abstract**

Japanese IT investment has stagnated. Though some Japanese companies are investing in IT, this does not represent offensive IT investment. I analyzed what kind of IT investment would lead company profit, growth, and what kind of IT investment made reluctance for companies. I found out empirical relations between IT investment and corporate productivity. Analyses of productivity revealed low productivity among some business types and fields, where significantly fewer benefits were being produced by IT investment. Based on these results, I showed how productivity improvement supported by IT investment encourages company profit and growth. These results indicated further discussion for government policy implications.

**Keywords:** Innovation, Productivity, IT governance, ROE, Growth, Management

### **1. Introduction**

Since last 20years, Japanese Government, media and various economic organizations, promote Japanese company to invest IT for their profit as well as total Japanese economic growth. However, Japanese companies either reluctant to invested to IT or would not receive favorable results from IT investment. In this study I would like to analyze what kind of IT investment would lead company profit, growth, and what kind of IT investment made reluctance for companies.

At the same time, the majority of Japanese industry productivity is still low compare to other countries, such as United States. This is obviously discourage company profit, wage and growth. I would like to find out empirical relations between IT investment and corporate

productivity. As result, I may show how productivity improvement supported by IT investment encourage company profit and growth.

Then back to another question, which is “Why some sector of Japanese companies would not invest IT even IT may lead productivity improvement as well as company growth?” This question may imply the main driver for IT investment and the barrier to make decision to IT investment. The result might be good feeding for Japanese Government IT policy directions.

## **2. Some remarks on methodology and Expected results**

The initial phase of the study will consist in and gathering exhaustive information concerning the current normative institutions devoted to IT investment in various industries. Japan User Association for Information System (JUAS) has been done annual user companies survey as well as trend analysis. Research Institution of METI (RIETI) made some comparison study between US company investment and Japanese company investment in IT. Government itself like METI, periodically publicize their IT policy related research and effective policy target report, which may facilitate to this research object.

Once information and data have collected, I will build a taxonomic scheme reflecting how each industry handling IT investment. The classification will include items such as their motivation or obligation for IT investment such as adopting existing regulation, institutions their functions, cost reduction, supply chain management, etc.

I will assess each those reasons and company ROE, which, perhaps the most remarkable way to show productivity growth. At the same time, I will conduct comparative analysis between US and Japanese companies, how different in relations between two countries in terms of IT investment and ROE indicators.

I expect this study demonstrates relationship on IT investment and company's profitability. Moreover, it may imply the gap that company which has certain IT strategy and management recognition or which has not yet clear perspective on IT. In the same vein, the study may show the correlation of productivity change and company profitability, which comes from IT inclusion. On the other hand, the study may find out the reasons that certain companies which reluctant to invest to IT or invest IT inefficiently. These reasons would indicate further discussion for government policy implications.

### 3. Research Results

#### 3-1. IT Investment and Economic Growth

##### 3-1-1. IT investment and its contribution to Japan's economy

Although Japanese IT investment is significant, there is a suspicion that it is failing to contribute to company performance or economic growth. The ratios of IT investment to gross domestic product (GDP) in 2008 are shown in Figure 1 (Japan Users Association of Information Systems, 2014). Japan's was 4.7%, higher than the global average. The difference between the percentages in Japan and the US was only around 1.2%, indicating that Japan is investing in the IT industry actively, given the robust IT investment in the US.

Meanwhile, Japanese labor productivity ranks 21st among the 34 OECD countries, with its value lower than the average, and lowest among G7 nations (see Figure 2) (The Japan Productivity Center, 2015). The US ranks 4th, achieving approximately 1.6 times the value in Japan, demonstrating a great difference between the two countries. We will later take a closer look at the relationship between IT investment and labor productivity. The difference in labor productivity between Japan and the US is obviously greater than is the difference in IT investment.

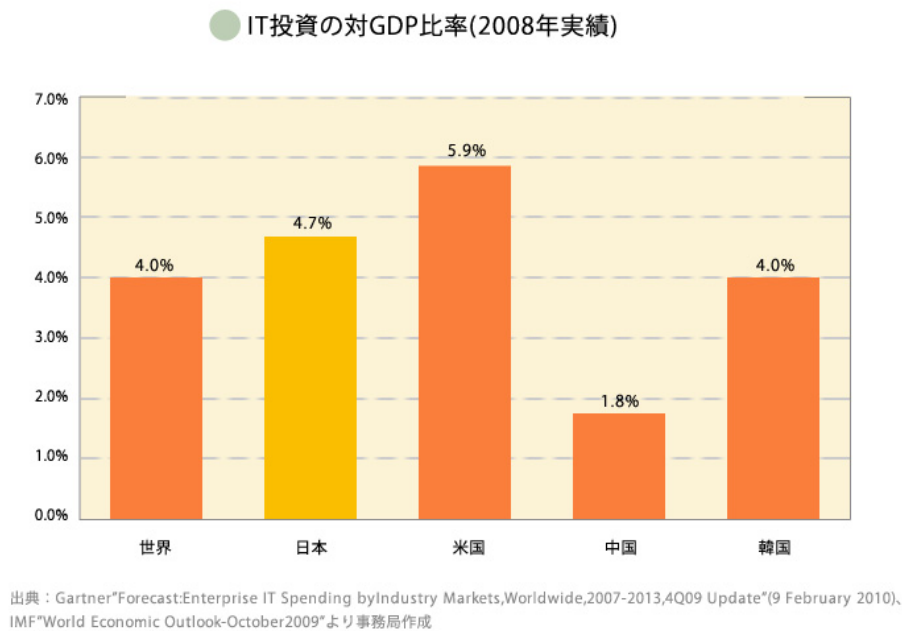


Figure 1. Ratio of IT investment to GDP (2008 figures)

The parameter on the horizontal axis represents the global average and the major countries (Japan, the US, China, and South Korea). That of the vertical axis indicates ratio of IT investment to GDP.

Source: JUAS Report of Research Results, “Ideal Management of IT Investment” (2014) (currently non-public)

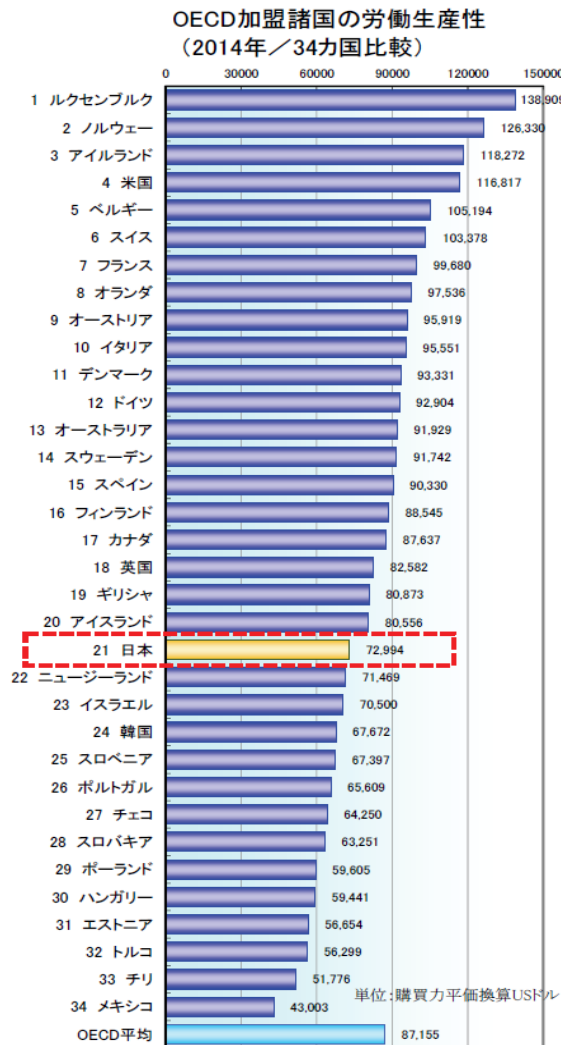


Figure 2. Labor productivity in OECD nations (2014 figures, compared between 34 nations)  
The parameter on the vertical axis represents the labor productivity in 2014 of the 34 OECD countries and the average. That on the horizontal axis indicates labor productivity, with US dollars converted into purchasing power parity.

Source: The Japan Productivity Center, “Japanese Productivity Trends (2015 version)”

### 3-1-2. Value changes in the scale of IT investment in Japan and the US

IT investment in Japan and the US gradually increased after 1980 because its importance attracted attention (see Figure 3) (Japan Users Association of Information Systems, 2014). Investment in Japan became sluggish after 1990 but maintained levels roughly similar to those in the US until around 1996. However, the difference between the two countries widened after 1997, resulting in Japanese investment becoming only around 40% of the US investment by 2008. As an overall trend, Japanese IT investment increased at a constant rate, while the US rapidly accelerated its investment after 1997. The US economy was in a low interest rate environment from 1998 to 1999, making it easier to start a venture company or raise investment funds for IT-related firms. This environment was considered one of the reasons for the rapid increase in US investment in IT. When the IT bubble burst from 1999 to 2002, US IT investment temporarily stagnated but then recovered and continued at a rate similar to its rate after 1997. Japanese IT investment appeared to lag behind for reasons such as the small number of IT-related companies founded, the conventional business procedures in Japan such as paper-based payments, and the longer time required to adapt security and workflow frameworks to the use of the Internet.

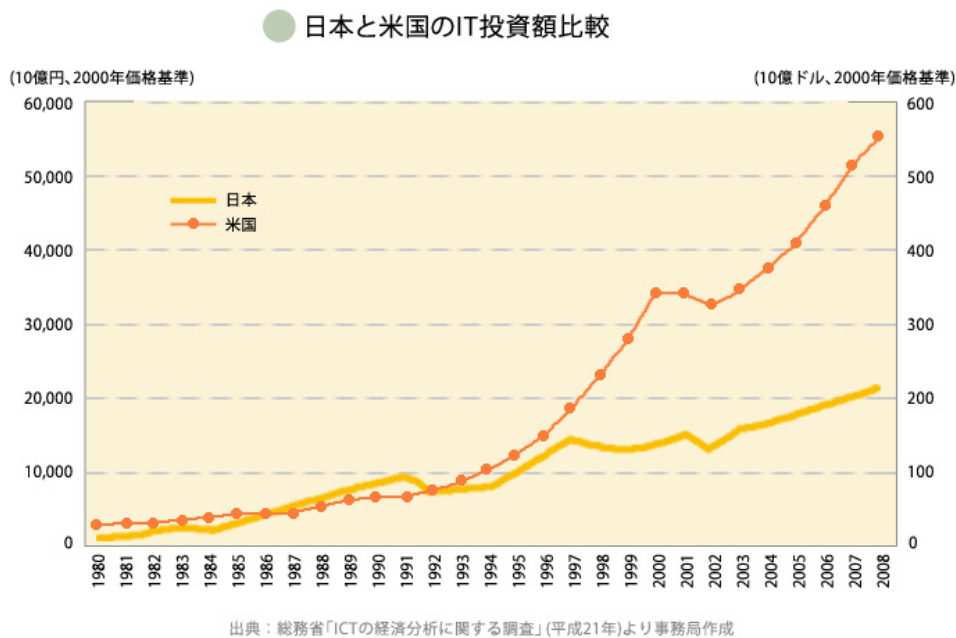


Figure 3. Comparison of IT investment between Japan and the US

The horizontal axis represents year (Western calendar). The vertical axis indicates IT investment, in billion yen. The unit on the left vertical axis is based on the price in 2000, and that on the right is based on 1 billion dollars based on the price in 2000. The value changes in Japan and the US are shown. Particularly remarkable changes are seen around 2000 and are surrounded by the red dashed line.

Source: JUAS Report of Research Results, “Ideal Management of IT Investment” (2014) (currently non-public)

### 3-1-3. The difference in productivity between Japan and the US

The charts in Figure 4 show Japanese labor productivity levels by industry and their percentages to US figures (Ministry of Economy Trade and Industry, 2013). The horizontal and vertical axes represent added value and labor productivity levels, respectively. The manufacturing industry is in red and the others in blue. The values are averages from 2003 to 2006. The charts show that only Japan’s general machine and chemical industries had higher productivities than those in the US. The labor productivities of Japanese industries that accounted for more than 60% of GDP are below 60% of those in the US, demonstrating Japan’s extremely low labor productivity. Concerning regulated industries among the non-manufacturing industries, such sectors as electricity, gas, and water had productivities as low as approximately 50% of those in the US; the same holds for the transit and warehouse sectors of the transportation-related industry.

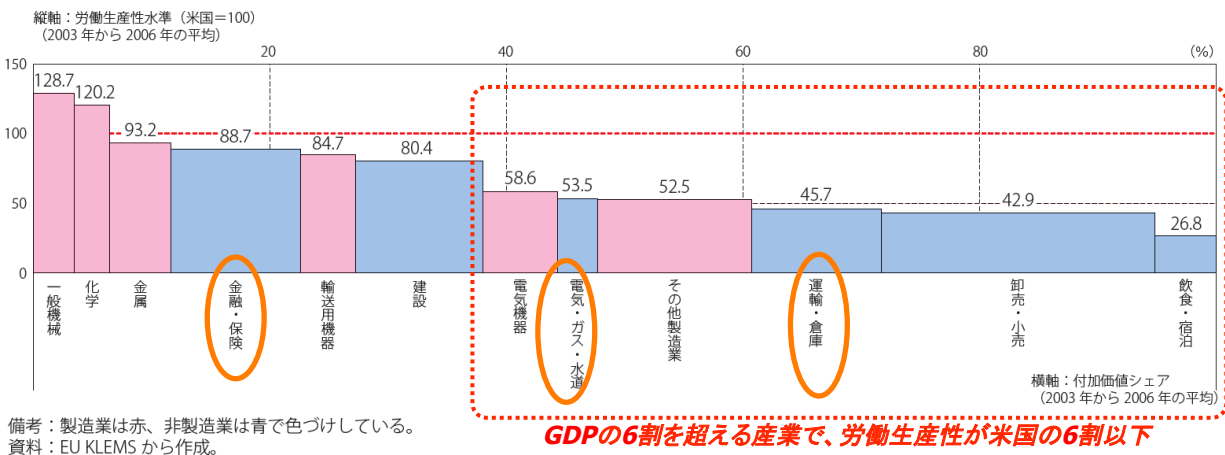


Figure 4. Japanese labor productivity level by industry (ratio to the US)

The horizontal axis represents the market shares of each industry accounting for the entire added values, and the vertical axis indicates the ratio of the labor productivity level of each industry to the US. Both of them are averages from 2003 to 2006. The industries with labor productivity less than 60% of that of the US are surrounded by the red dashed line.

Source: Ministry of Economy Trade and Industry, “Trade white paper 2013” (2013)

### **3-1-4. Companies’ IT investments and productivity**

The relationship between a company’s IT investment and its productivity is shown in the US study results shown in Figure 5 (Erik Brynjolfsson, et al., 1998). The horizontal and vertical axes represent IT investment and productivity, respectively. There is an obvious positive correlation between IT investment and productivity. However, improving productivity through IT investment appears to require organizational reform and personnel training (Tokyo Stock Exchange, et al., 2015).

Less-active IT investment is considered one of the causes of Japan’s low productivity (see Figure 4). The industries circled by the red dotted line in Figure 4 were late to introduce IT and have recently become targets of the Internet of Things (IoT). As an example of efficient service, online room booking is currently available in many hotels and inns. The wholesale industry is also promoting the introduction of IT, spreading its use in supply chain management. The abovementioned regulated industries are in an environment where system changes are required every time a regulation changes. The need to spend money addressing regulations, in addition to the low overall IT investment level, might prevent effective IT use, which could otherwise improve productivity. The issue of investment is examined closely in 3-2.



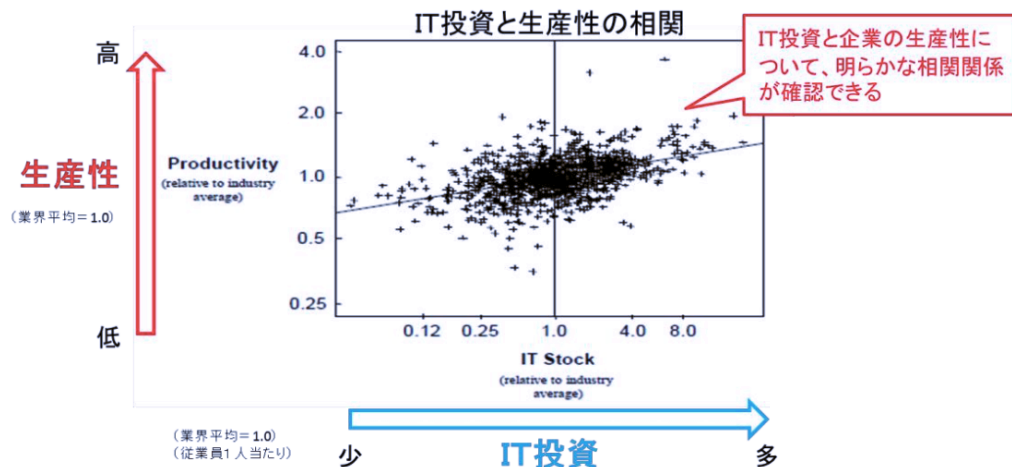


Figure 5. Correlation between IT investment and productivity

The horizontal axis represents IT stock (relative to industry average), and the vertical axis indicates productivity (relative to industry average). Both of them are the values per employee, with an industry average of 1.0. On the horizontal axis, the larger values show greater IT investment. On the vertical axis, the larger values indicate greater productivity (the source is Source 1, but Source 2, to which some description was added, was cited).

Source 1: “Beyond the Productivity Paradox: Computers are the Catalyst for Bigger Changes,” August, 1998, Erik Brynjolfsson and Lorin M. Hitt

Source 2: The Ministry of Economy, Trade and Industry, “The Competitive IT Strategy Company Stock Selection” (May 2015)

### 3-2. Characteristics of IT investment in Japanese companies

#### 3-2-1. The purpose of investment

The tendency of IT investment in Japan is different from that in the US. To understand this difference, it is helpful to look at how budget increases are used in companies that have increased their IT investments (Tokyo Stock Exchange and Ministry of Economy Trade and Industry, 2015; The Japan Electronics and Information Technology Industries Association, et al., 2013). Survey results are shown in the radar charts in Figure 6, with the use of 15 indexes. The 15 indexes were divided into two groups, indicated by two different colors, depending on the characteristics of the investment: the “defensive IT investment” group (indicated in blue) and the “offensive IT investment” group (in red). Defensive IT investment focuses on streamlining or

optimizing existing business fields or work processes, while offensive IT investment enhances the development of products or services utilizing IT or reforms business models, thereby seeking to create new value, which could increase competitiveness. In the radar charts, the Japanese investment shown in the blue chart extends to the left, indicating that defensive IT investment is predominant in Japan. The US chart extends to the right, showing that offensive IT investment is predominant in the US. Thus, the purpose of investment differs considerably between the two countries, as does the amounts of investment involved (as illustrated in 3-1-2, Figure 3).

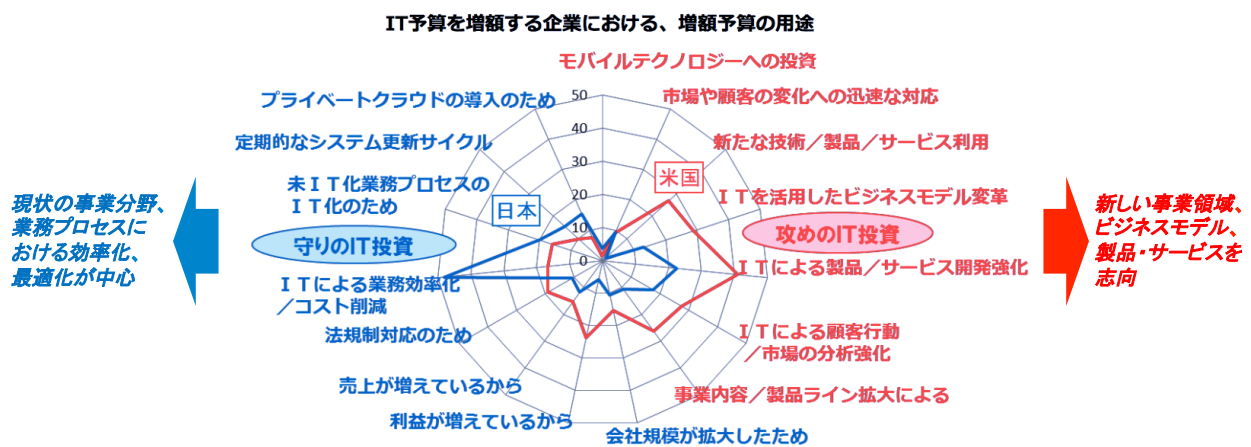


Figure 6. Use of increased budget in companies where IT budget is increased

The radar chart with the 15 indexes. The indexes representing offensive IT investment include the following seven: investment in mobile technologies, prompt response to changes in market or customer, utilization of new technology/product/service, reformation of business model with IT utilization, enhancement of development of product/service with the use of IT, reinforcement of analysis for customer behavior/market with the use of IT, expansion of business contents/product line. The indexes indicating defensive IT investment include the following eight: aiming at the introduction of private cloud, regular renewal cycle for system, aiming at the introduction of IT for operation processes with no introduction of IT, streamlining and cost reduction of operation with the use of IT, aiming at adherence to laws and regulations, because of increased sales, because of increased profit, because of expansion of company size.

Source 1: The Japan Electronics and Information Technology Industries Association (JEITA), IDC Japan Co., Ltd., the survey results of “Analysis of difference in management utilizing IT between Japanese and U.S. companies” (October 2013)

Source 2: The Ministry of Economy, Trade and Industry “the Competitive IT Strategy Company Stock Selection” (May 2015)

The purposes of IT investment are compared between Japan and other countries (Japan Users Association of Information Systems, 2014). Investment purposes were divided into nine indexed categories and quantified in the bar graphs in the reference, which illustrated the survey results for Japan, North America, Europe, and the Asia-Pacific region. Similarly to the trends seen in Figure 6, the graphs illustrate that Japan focuses on “operation streamlining” or “operation cost reduction,” forms of defensive IT investment. Meanwhile, Japan’s offensive IT investment rates for “sales growth,” “new customer acquisition,” and “new business and product developments” are low, only slightly exceeding 10%. In contrast to these Japanese trends, the parameters corresponding to defensive IT investment are low in North America, Europe, and the Asia-Pacific region, while the rates of offensive IT investment are high. In addition, the three regions show similar trends in the graphs: Japan lags behind in investments aimed at “competitive advantage gain.” Because of the difficulty of referring the graph, please see the reference (Japan Users Association of Information Systems, 2014).

### **3-2-2. The targets of investment**

Japan and the US were analyzed regarding their degree of IT system introduction. The results are shown in Figure 7 (Trade and Industry Research Institute of Economy, 2007), where 11 parameters are used. The US is ahead of Japan in the introduction of IT systems. Both countries have introduced IT systems for “sales order management,” “inventory management,” “accounting procedures,” and “personnel and payroll management.” A large difference between the two countries is observed in the “market analysis/new business building” and “supporting corporate strategy formulation” parameters. Again, Japan is shown to lag behind in offensive IT investment.

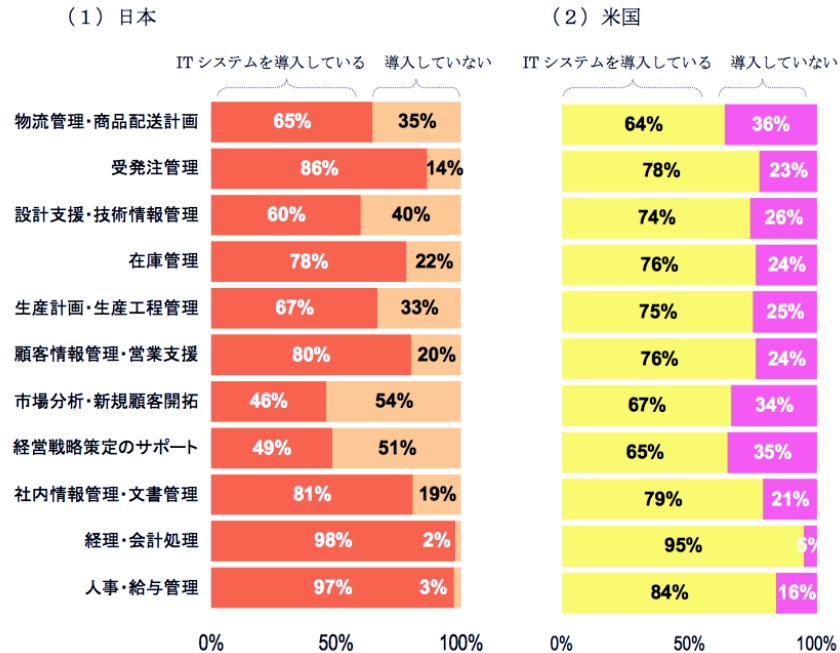


Figure 7. IT system introduction status by company business type (the numbers of companies giving valid responses in Japan and the US are 317 and 200, respectively) Market analysis/new customer acquisition and support of management strategy formulation, the parameters that differ particularly widely between Japan and the US, are surrounded by the blue dashed line.

Source: The Research Institute of Economy, Trade and Industry, “The international comparison between Japan, the U.S., South Korea in IT strategy and corporate performance” (2007)

### 3-2-3. The form of investment

The subjects of investment include computers, communication devices, and software. Investment levels in computers and communication devices are similar between Japan and the US. The survey results examined below focus on the forms of investment in software (see Figure 8) (Kazuyuki Motohashi, 2010). Software can be classified into three kinds: package software, build-to-order software, and self-developed software. Figure 8 shows the characteristics of software investment in Japan, where investment in package software is extremely low, and investment in build-to-order software is high. In the US, the investment rates for all three kinds of software are similar. Generally, package software can be expected to lower its price. It is also introduced to firms more quickly than build-to-order or self-developed software is, leading to the expectation that the effects of the investment will appear quickly. It can thus be said that the form of Japanese IT investment is likely to involve higher costs and take

longer to be introduced than in the US. A longer period until introduction may be associated with changes in a firm’s circumstances. Thus, by the time a company completes the introduction, a new customization of the software may be required. This must be unfavorable to the efficiency of investments.

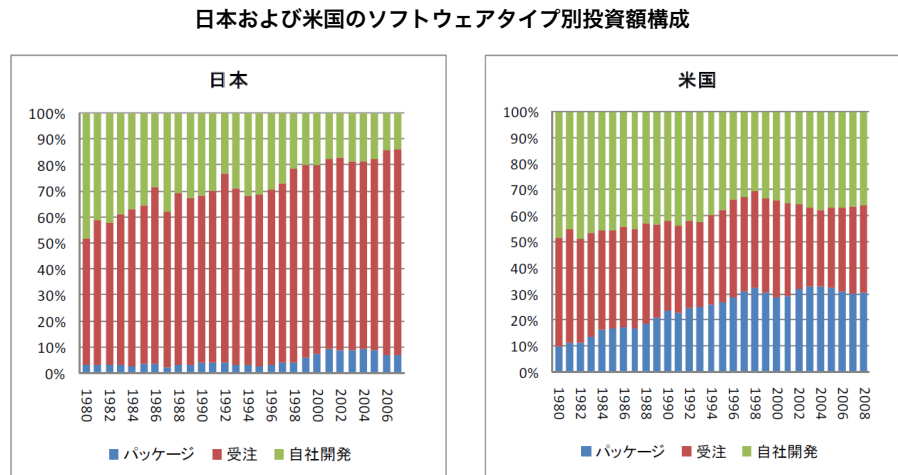


Figure 8. Composition of investment by software type in Japan and the US. The horizontal axis represents the year (Western calendar), and the vertical axis indicates the proportion of each type of software relative to the whole.

Source: Kazuyuki Motohashi, “Comparison between Japan and the U.S. in IT and productivity: quantitative analysis both from macro and micro aspects” (2010)

### 3-2-4. Positioning of investment in corporate strategy

The positioning of IT strategies in Japan, the US, and South Korea is illustrated in Figure 9 (Trade and Industry Research Institute of Economy, 2007). We focus on the difference between Japan and the US. The contribution of IT investments to issues considered “management challenges” has been assessed. The result reveals that Japanese companies emphasize such subjects as “enhancing competitiveness in the core business,” “maintaining the pre-existing customers/improving customer satisfaction,” and “improving sales ability.” However, the contribution of IT investment to these issues was low, at approximately 53%. IT investment is currently applied most often to operation streamlining/cost reduction, while US firms prioritize such management challenges as “enhancing competitiveness in the core business,” “new business development,” and “maintaining the pre-existing customers/improving customer

satisfaction.” The contribution of IT investment to these tasks was high, at 63%, indicating that the IT investment strategy is clearly incorporated into US management strategy.

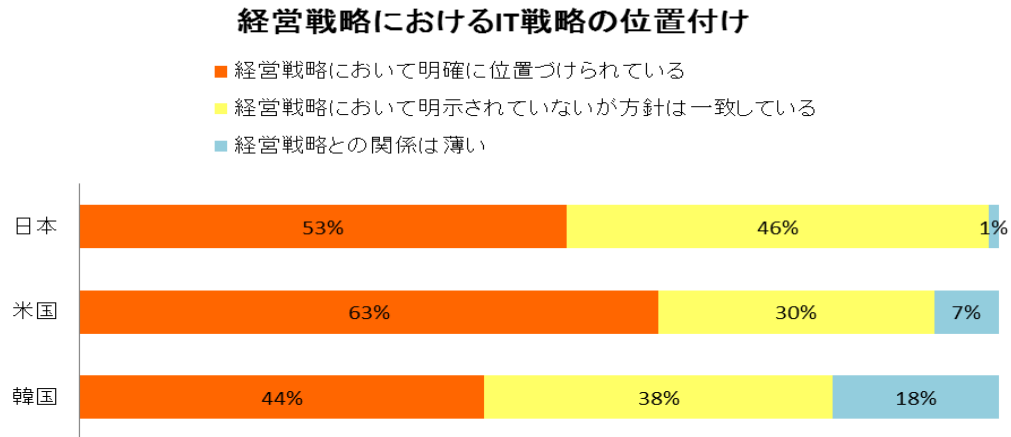


Figure 9. Positioning of IT strategy in management strategy. The survey results obtained from Japan, the US, and South Korea are shown. The positioning of IT strategy is evaluated on a three-point scale, and their proportion is exhibited in the horizontal axis.

Source: Prepared by the Mitsubishi Research Institute, based on the Research Institute of Economy, Trade and Industry, “The international comparison between Japan, the U.S., South Korea in IT strategy and corporate performance” (2007)

The results of analyzing management strategy and IT’s contribution are shown in Figure 10 (Kazuyuki Motohashi, 2007). Descriptive regression analysis, used in the reference (Kazuyuki Motohashi, 2007), was performed to examine the difference between Japan, the US, and South Korea. The “+” and “-” signs in the US and South Korea columns on the right-hand side of the table indicate whether each of the two countries is superior or inferior to Japan when assessed with the parameters below. One sign represents a difference at the 5% significance level, and two signs in a row represent the 1% significance level. Thus, two signs show that the assessment results of the parameter are different from those for Japan with a higher significance. In Figure 10, the 5% significance is colored in orange, and the 1% significance in blue. Concerning the difference between Japan and the US, first, the relationship between IT and management strategies was analyzed, the results showing that US companies recognize that they position their IT and management strategies more clearly than Japanese firms do. Japanese

companies place more emphasis on such management parameters as “enhancing competitiveness in the core business,” “promptly responding to the market needs,” and “improving sales ability” than do US companies. However, the results indicate that an IT strategy was not clearly positioned in these tasks. The degree of IT contribution was evaluated with the 12 parameters, the results showing less IT contribution in Japan than in the US for such management challenges as achieving sales growth (including “developing new product, service, business,” or “enhancing competitiveness in the core business”). Meanwhile, greater IT contribution was seen in Japan than in the US for such management challenges as cost reduction (including “indirect cost reduction” or “inventory cost reduction”).

目的	項目	日本企業	米国企業
売上高拡大	<ul style="list-style-type: none"> <li>「新商品・サービス・事業開拓」</li> <li>「主要事業の競争力強化」 など</li> </ul>		ITの貢献： <b>高</b>
経費削減	<ul style="list-style-type: none"> <li>「間接コスト削減」</li> <li>「在庫コスト削減」 など</li> </ul>	ITの貢献： <b>高</b>	

図表3：経営戦略とIT貢献度

	経営戦略としての重要性	
	米国	韓国
IT戦略の有無		--
IT戦略と経営戦略の関係(注)		
経営戦略に明確に位置づけ	++	
両者の関係は薄い	+	++
経営戦略としての重要性		
新商品・サービス・事業開拓		
主要事業の競争力強化	-	
市場ニーズへの迅速な対応	-	
新規顧客開拓	++	
既存顧客満足度向上	+	--
市場分析・マーケティング		++
製品開発スピード迅速化		
営業力向上	--	
間接部門コスト削減		--
在庫コスト削減		--
サプライチェーン見直し	+	++
社内情報共有	++	
ITの貢献度		
新商品・サービス・事業開拓	++	
主要事業の競争力強化	++	+
市場ニーズへの迅速な対応	-	++
新規顧客開拓		
既存顧客満足度向上		+
市場分析・マーケティング		+
製品開発スピード迅速化		
営業力向上		
間接部門コスト削減	--	--
在庫コスト削減	--	--
サプライチェーン見直し		
社内情報共有		--

(注) ベースカテゴリは経営戦略に明示されていないが方針は一致  
 ++、--……1%有意  
 +、-……5%有意

Figure 10. Management strategy and contribution degree of IT. Descriptive regression analysis was performed to examine the difference among Japan, the US, and South Korea. The “+” and “-” signs in the US and South Korea columns on the right-hand side of the table indicate whether each of the two countries is superior or inferior to Japan when assessed with the parameters below. One sign represents a difference at a 5% significance level (in orange), and two signs in a row represent a 1% significance level (in blue).

Source: Kazuyuki Motohashi, “Comparative analysis of IT management in Japanese, the U.S., and South Korea” (the Research Institute of Economy, Trade and Industry) (2007)

### **3-2-5. Management challenges and status of IT introduction in Japanese firms**

Degrees of potential IT utilization vary depending on business type, business conditions, and company size, making it very difficult to determine how to measure it. However, as indicated in (Kazuyuki Motohashi, 2007), evaluating degrees of IT system utilization is possible. We must “first...understand items that a company considers as important in management strategy, then...examine what degree the IT system contributes to its achievement.”

Figure 11 shows the subjects Japanese companies consider to be typical management challenges, as well as the results of their evaluation of each parameter (The Information-Technology Promotion Agency, 2011). The following five measures were used for the evaluation: (1) importance in past management, (2) whether or not IT was introduced in the past, (3) the degree of satisfactory effect in past IT introduction, (4) whether or not its importance to management will increase, and (5) whether or not IT will be introduced/further introduced in the future. The parameters (4)-(1) and (5)-(2), representing dissociation degrees, were added in the table. The values in yellow represent the top 10 management challenges in each column; those in light blue indicate the bottom five.

Overall, IT introduction is low in importance as a management challenge. More than 80% of the firms place importance on the following management challenges: “creating competitive products/services,” “improving sales ability,” “acquiring new customers,” “improving the quality of products/services,” and “being thought of as a credible company.” However, less than 40% of these challenges are addressed by IT introduction. In particular, “creating competitive products/services,” “acquiring new customers,” and “improving the quality of products/services” are included in the top 10 of the important management challenges but not in the top 10 of IT introduction. This IT investment is far from adequate to address management challenges.



	①これまでの経営上での重要度	②これまでIT化に対応していた	③これまでのIT化の満足度・効果(効果があった)	④今後経営上の重要度が増す	乖離度 ④ - ①	⑤今後IT化する/さらに進める	乖離度 ⑤ - ②
社員を採用したい	64.3%	39.1%	54.7%	58.0%	-6.3%	57.8%	18.7%
社員を育成したい	78.4%	16.6%	53.3%	63.3%	-15.1%	51.9%	35.3%
社員のITリテラシーを向上させたい	48.8%	28.1%	79.2%	61.9%	13.1%	65.5%	37.4%
社員のモラルを向上させたい(法令順守)	78.4%	24.0%	76.2%	73.9%	-4.5%	60.7%	36.7%
社員を適正に評価したい、適正に配置したい	75.1%	15.6%	72.8%	64.6%	-10.5%	54.1%	38.5%
競争力のある製品・サービスを作りたい	82.3%	30.8%	57.9%	71.4%	-10.9%	63.0%	32.2%
製品・サービスを上手く宣伝したい	73.9%	44.7%	51.0%	68.4%	-5.5%	70.8%	26.1%
販売力を強化したい	82.4%	39.2%	65.0%	74.9%	-7.5%	72.2%	33.0%
既存顧客を維持し、顧客単価を上げたい	75.4%	29.2%	63.4%	60.6%	-14.8%	53.2%	27.0%
新規顧客を増やしたい	85.3%	35.6%	50.8%	67.9%	-17.4%	63.9%	28.3%
製品・サービスの品質を向上させたい	85.2%	28.1%	69.6%	67.5%	-17.7%	56.3%	28.2%
製品・サービスの提供スピード(納期など)を早めたい	70.3%	33.5%	72.7%	61.0%	-9.3%	58.1%	24.6%
製品開発力や技術力を高めたい	71.6%	29.8%	78.1%	63.8%	-7.8%	57.8%	28.0%
新しい収益源・市場・販路を確立したい	77.3%	29.9%	62.4%	67.8%	-9.5%	63.3%	33.4%
売上を伸ばしたい	92.6%	62.5%	56.6%	83.4%	-9.2%	82.9%	20.4%
利益・財務体質を改善したい	89.3%	62.6%	77.6%	81.9%	-7.4%	79.9%	17.3%
人件費を削減したい	59.9%	28.6%	89.3%	54.7%	-5.2%	52.2%	23.6%
仕入や外注費などの変動コスト全般を削減したい	74.1%	26.5%	64.9%	62.0%	-12.1%	54.0%	27.5%
必要ときに最低限のコストで製品やサービスを提供したい	65.1%	21.5%	68.0%	58.9%	-6.2%	54.3%	32.8%
電話代、紙・文書などの事務通信費を削減したい	70.0%	49.9%	76.9%	63.7%	-6.3%	68.3%	18.4%
設備などの固定費を削減したい	61.8%	19.0%	67.1%	51.2%	-10.6%	44.3%	25.3%
資金調達・資金繰りを改善したい	64.8%	25.1%	75.0%	57.4%	-7.4%	52.9%	27.8%
社内の情報を共有・有効活用したい(コミュニケーションを活性化させたい)	75.0%	43.9%	76.7%	70.4%	-4.6%	68.1%	24.2%
業務の見える化・標準化を図って行きたい	72.7%	34.7%	76.1%	71.1%	-1.6%	68.4%	33.7%
業務情報を電子化して効率化したい(受発注業務や社内業務をコンピュータで管理したい)	70.9%	54.6%	85.6%	72.1%	1.2%	75.2%	20.6%
信頼のある会社と思われたい	88.0%	37.1%	65.8%	68.1%	-19.9%	62.3%	25.2%
経営者の意思決定を早めたい	73.0%	25.7%	80.5%	66.6%	-6.4%	59.6%	33.9%
災害対応を含めたリスク管理を強化したい	63.5%	23.2%	77.4%	67.4%	3.9%	62.7%	39.5%
親会社・関連企業との連携を強化したい	48.4%	25.4%	82.1%	49.0%	0.6%	50.3%	24.9%
親会社・関連企業からのセキュリティ要求に応えたい	49.3%	48.4%	90.5%	62.7%	13.4%	67.5%	19.1%
新規事業に進出したい	42.7%	9.8%	73.6%	45.2%	2.5%	43.5%	33.7%
海外との取引や事業拠点の進出を実現したい	22.9%	5.8%	84.9%	27.2%	4.3%	28.1%	22.3%

※黄色は各列の全経営課題中のトップ10、水色はボトム5

Figure 11. Management challenges and the condition of IT introduction in Japanese companies. The following five measures were used for evaluation: (1) importance in past management, (2) whether or not IT was introduced in the past, (3) the degree of satisfactory effect in past IT introduction, (4) whether or not its importance to management will increase, and (5) whether or not IT will be introduced/further introduced in the future. The parameters (4)-(1) and (5)-(2), representing dissociation degrees, were added in the table.

Source: The Information-Technology Promotion Agency, "Investigation of actual condition on IT utilization in small and medium-sized companies" (2011)

### 3-2-6. Levels of IT introduction in Japanese companies

IT investment can be classified into several stages. The schematic diagram in Figure 12 illustrates the current status and future challenges of IT investment in management, with a classification into four stages (Ministry of Economy Trade and Industry, 2007). Stage 1 represents the introduction of the information system. This is where IT has been introduced but is not fully utilized, or where IT has just been introduced. Stage 2 represents optimization within the department. This represents partial optimization, where IT utilization is advanced but not completed in all departments. Stage 3 indicates optimization within the organization, where IT has been optimally used in the entire organization. Stage 4 represents optimization between companies, where IT has been optimally utilized not only in one's organization but also in a cross-industry manner between companies, such as clients or customers. At this stage, IT introduction is fully utilized.

Which IT stage has each Japanese company reached in Figure 12? The current stages of IT introduction in Japan, the US, and South Korea are shown in the bar graphs of Figure 13 (Japan Users Association of Information Systems, 2014). Close attention is paid below to Japan and the US. The survey included 1101 Japanese and 150 US companies. The results reveal that Japanese firms have a higher proportion of initial levels of IT introduction (Stages 1 and 2) than US companies do and have low rates of Stage 4. Thus, IT utilization has not encompassed all of the companies nor has begun to occur between them; instead, optimization remains partial. By contrast, almost 70% of US firms are at Stage 3 or 4 (with over 20% reaching Stage 4), which suggests that many of them have an environment of full IT introduction.

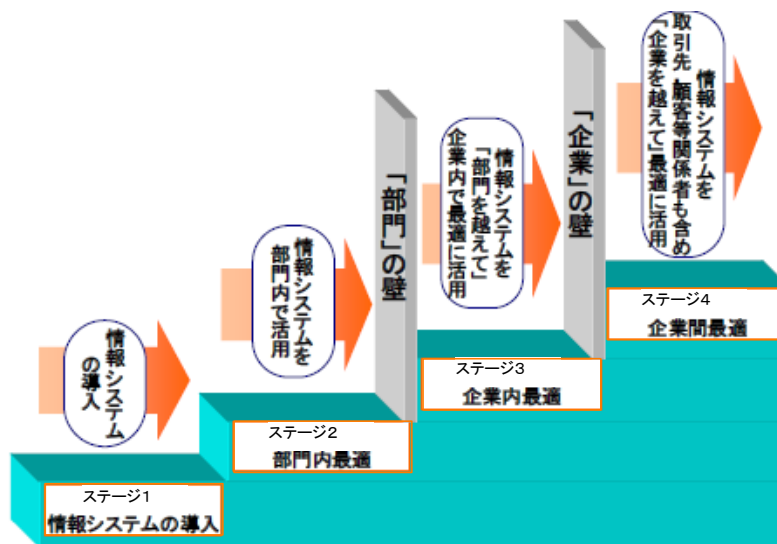


Figure 12. Levels of IT investment in Japanese firms. The relationship of Stage 1 (introduction of IT system), Stage 2 (optimization within department), Stage 3 (optimization within organization), and Stage 4 (optimization between companies) is schematically shown.

Source: The Ministry of Economy, Trade and Industry, “Current status and challenges of IT management”

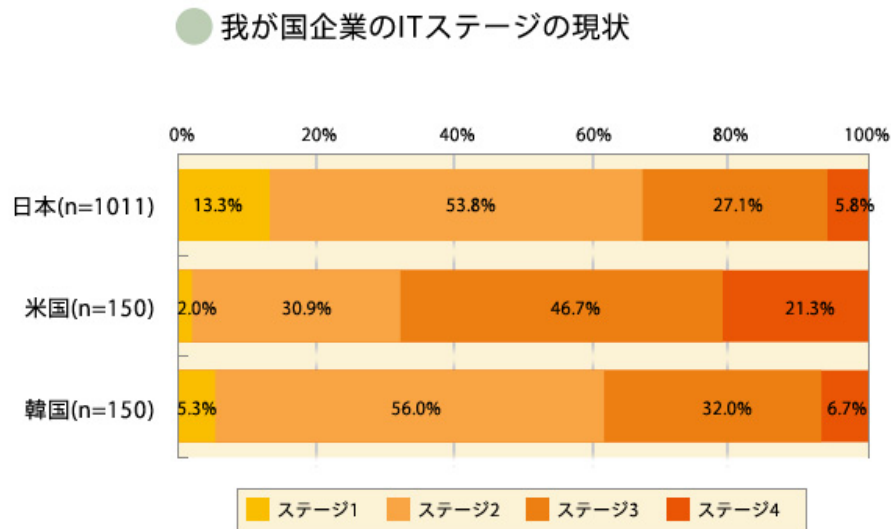


Figure 13. Current condition of IT stages of Japanese and Korean companies. This shows which stage each company has attained among the four shown in Figure 12. The horizontal axis indicates the ratio of the survey subjects to the whole. The numbers of response in each country were the following: 1011 for Japan, 150 for the US, and 150 for South Korea.

Source: JUAS Report of Research Results, “Ideal Management of IT Investment” (2014) (currently non-public)

### 3-2-7. Summary of the effect of companies’ IT introduction (international comparison)

The effect of IT introduction is compared between companies in Japan, the US, Germany, and South Korea in six fields (see Figure 14[a]): “management aspect,” “performance aspect,” “customer aspect,” “operation aspect (cost),” “operation aspect (added value),” and “workplace aspect.” (Akihiko Shinozaki, et al., 2008) These six fields are further classified into 18 parameters (see Figure 14[b]; these are described in detail later). The radar charts demonstrate

that companies in Japan show less of an effect of IT introduction than do those in other nations. Five fields (all except “operation aspect [cost]”) show a significantly lower effect of IT introduction in Japanese firms than in the firms of the other countries. Particularly, “the effect in management aspect” and “the effect in operation aspect (added value)” are significantly lower in Japan than in all other countries.

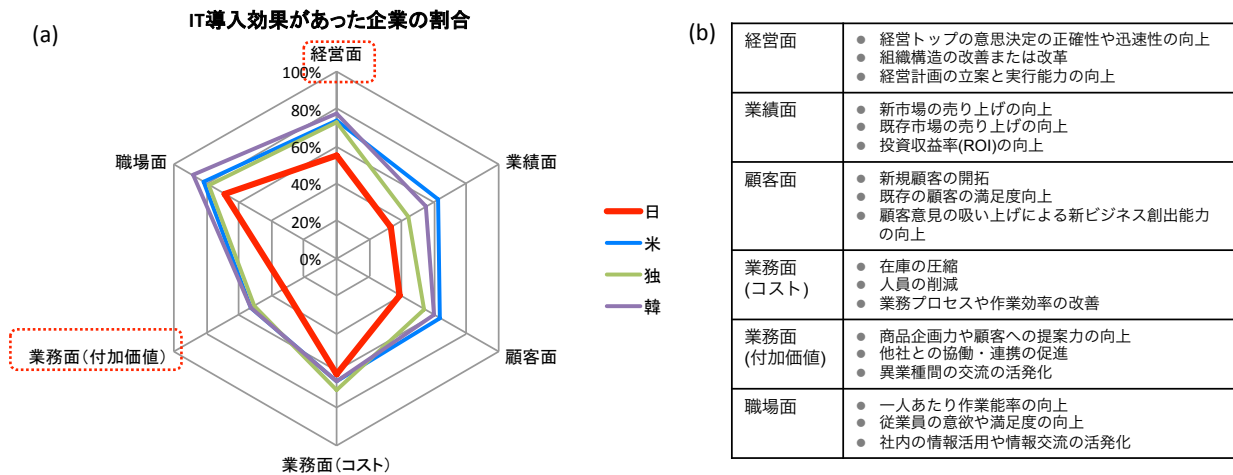


Figure 14. Summary of the effect of IT introduction in companies. (a) Shows the proportion of companies that answered that they saw the effects of IT introduction. The results are illustrated in the radar charts with the six parameters. Japan is shown in red, the US in blue, Germany in green, and South Korea in purple. (b) provides a further classification of the parameters in (a)

Source: Prepared based on Akihiko Shinozaki and Yusuke Yamamoto, “International comparison of corporate reform and effect of IT introduction” (2008)

### • Management and performance aspects

Each parameter of the radar charts will be examined in detail. The survey results for the effects on management aspects are shown in Figure 15 (Akihiko Shinozaki and Yusuke Yamamoto, 2008). The contribution of IT investment was evaluated using three parameters: “improvement in the accuracy and promptness of decision-making by top management,” “improvement or reform of organization structure,” and “improvement in designing and executing capabilities of business plan.” Japanese companies showed lower levels than firms in the US, Germany, and South Korea for every parameter. Questions were then asked about the effects on performance for three parameters (Figure 16): “improvement in the sales of the new

market,” “improvement in the sales of the pre-existing market,” and “improvement in the return on investment (ROI).”<sup>12</sup> The countries’ rankings varied depending on the parameters, but Japan consistently ranked worst on every one, being particularly low in “improvement in the ROI.” On the other hand, the US ranked highest on all parameters.

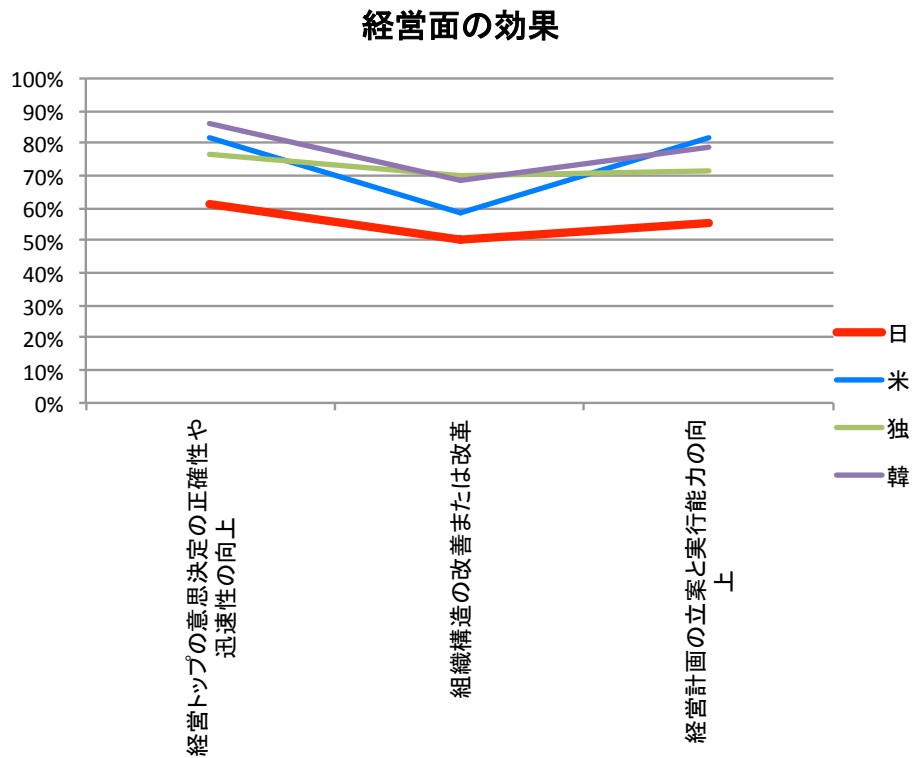


Figure 15. Detailed results about the “management aspect” described in Figure 14. The horizontal axis represents the three parameters, and the vertical axis indicates the degree of attainment. As in Figure 14, Japan is shown in red, the US in blue, Germany in green, and South Korea in purple.

Source: Prepared based on Akihiko Shinozaki and Yusuke Yamamoto, “International comparison of corporate reform and effect of IT introduction” (2008)

## 業績面の効果

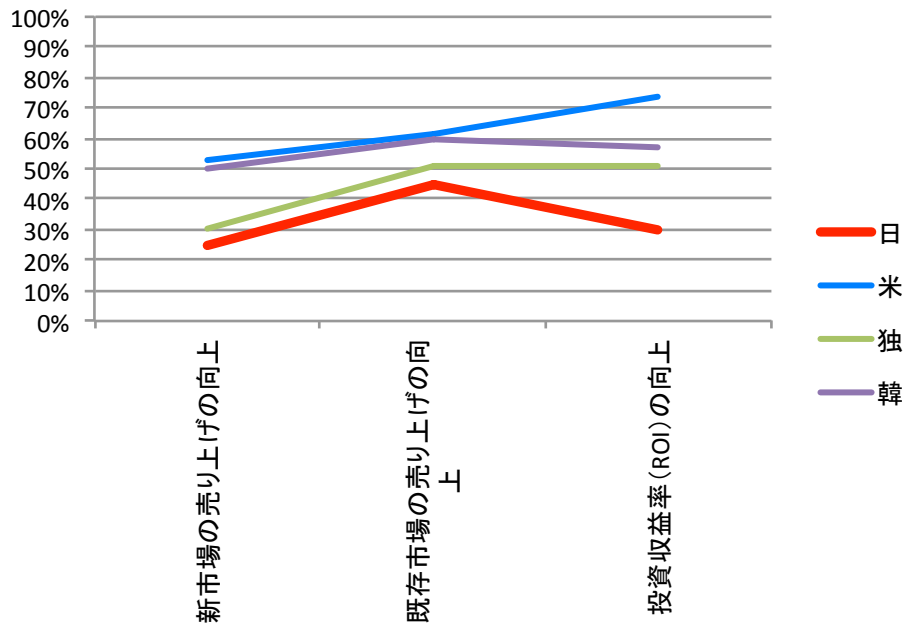


Figure 16. Detailed results about the “performance aspect” described in Graph 15. The horizontal axis represents the three parameters, and the vertical axis indicates the degree of attainment. As in Figure 14, Japan is shown in red, the US in blue, Germany in green, and South Korea in purple.

Source: Prepared based on Akihiko Shinozaki and Yusuke Yamamoto, “International comparison of corporate reform and effect of IT introduction”

- **Customer and workplace aspects**

The customer effect was measured using three parameters (see Figure 17): “new customer acquisition,” “improvement in the pre-existing customers’ satisfaction,” and “improvement in the capability of new business development by collecting customers’ opinions.” The US and South Korea showed high IT contributions, with Germany slightly lower, but Japan exhibited a considerably lower contribution than all the others. To measure the effect on the workplace, inquiries were made concerning three parameters (see Figure 18): “improvement in operating efficiency per employee,” “increase in motivation or satisfaction of employees,” and “activation of information utilization and exchange in companies.” Although the differences

between countries were smaller than those for other evaluation parameters, Japan again had the lowest levels in all of them.

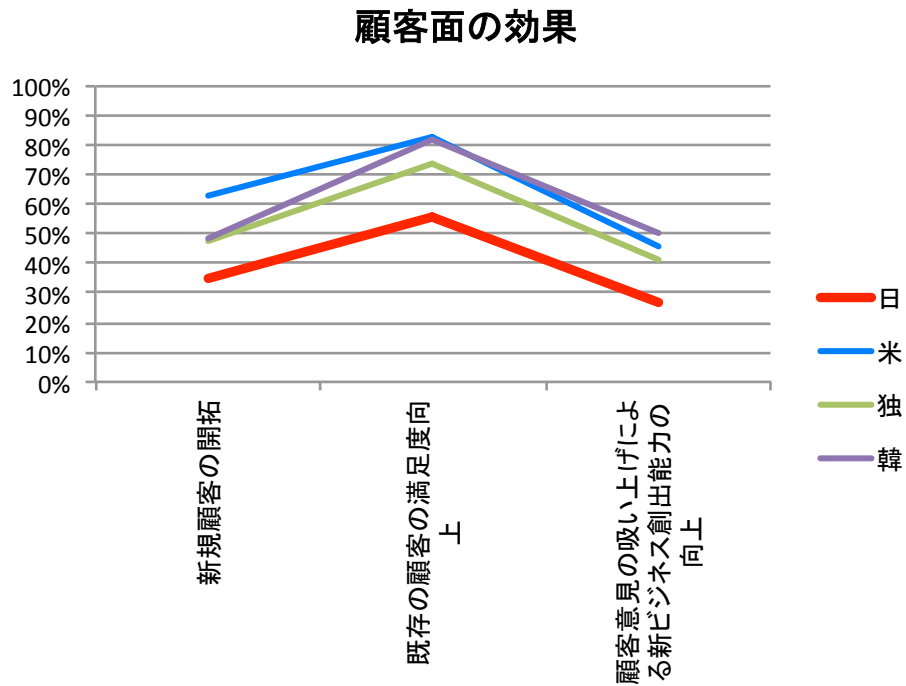


Figure 17. Detailed results about the “customer aspect” described in Figure 14. The horizontal axis represents the three parameters, and the vertical axis indicates the degree of attainment. As in Figure 14, Japan is shown in red, the US in blue, Germany in green, and South Korea in purple.

Source: Prepared based on Akihiko Shinozaki and Yusuke Yamamoto, “International comparison of corporate reform and effect of IT introduction” (2008)

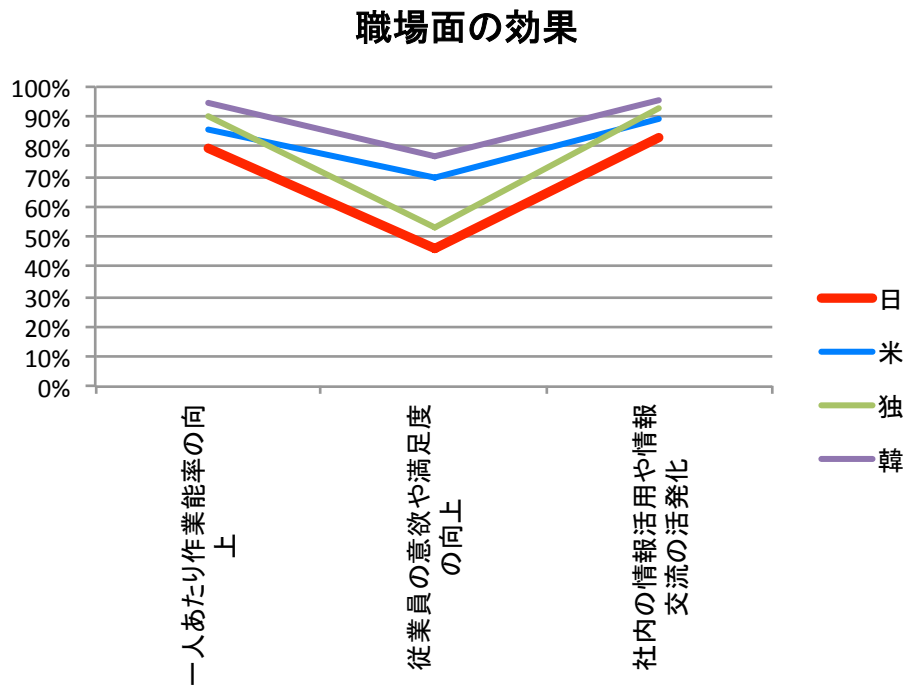


Figure 18. Detailed results about the “workplace aspect” described in Figure 14. The horizontal axis represents the three parameters, and the vertical axis indicates the degree of attainment. As in Figure 14, Japan is shown in red, the U.S. in blue, Germany in green, and South Korea in purple.

Source: Prepared based on Akihiko Shinozaki and Yusuke Yamamoto, “International comparison of corporate reform and effect of IT introduction” (2008)

- **Operation aspect (cost, added value)**

To measure the effect on the operation aspect, the analysis was divided into two factors—cost and added value. First, the operation aspect (cost) was measured with three parameters (see Figure 19): “inventory reduction,” “personnel reduction,” and “improvement in operation process or efficiency.” Overall, Germany had the most favorable results, while Japan showed almost the same levels as the US and South Korea. Japan had the worst results for the operation aspect (added value) for the three parameters of “improvement in product planning and its proposition to customers,” “promotion of collaboration and cooperation with other companies,” and “activation of exchanges between business types,” indicating significant differences from the other countries (see Figure 20).



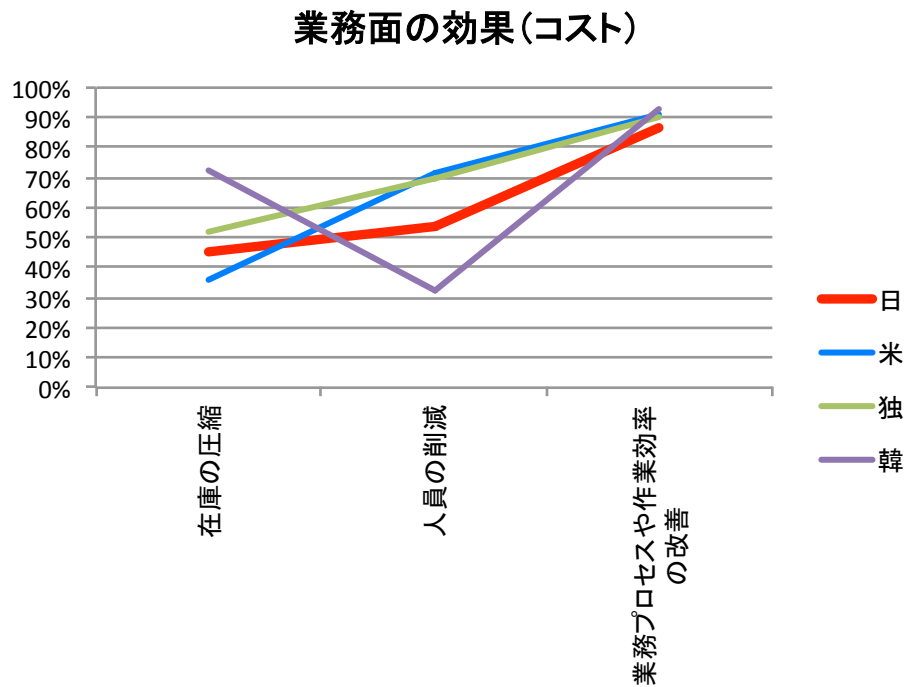


Figure 19. Detailed results about the “performance aspect (cost)” described in Figure 14. The horizontal axis represents the three parameters, and the vertical axis indicates the degree of attainment. As in Figure 14, Japan is shown in red, the US in blue, Germany in green, and South Korea in purple.

Source: Prepared based on Akihiko Shinozaki and Yusuke Yamamoto, “International comparison of corporate reform and effect of IT introduction” (2008)

### 業務面の効果(付加価値)

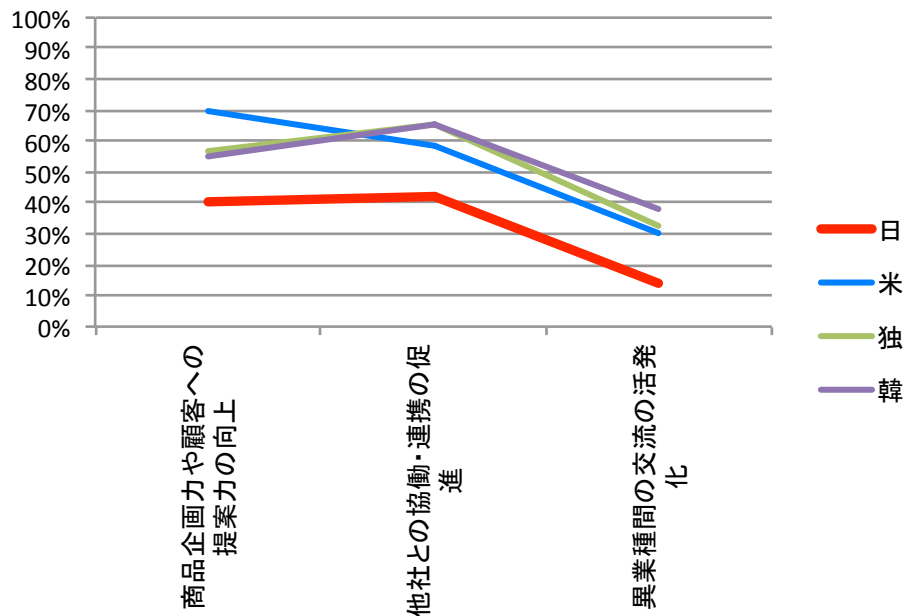


Figure 20. Detailed results about the “customer aspect (added value)” described in Figure 14. The horizontal axis represents the three parameters, and the vertical axis indicates the degree of attainment. As in Figure 14, Japan is shown in red, the US in blue, Germany in green, and South Korea in purple.

Source: Prepared based on Akihiko Shinozaki and Yusuke Yamamoto, “International comparison of corporate reform and effect of IT introduction” (2008)

#### 3-2-8. Japanese firms with offensive IT investment

A survey on IT investment and utilization was conducted by the Ministry of Economy, Trade and Industry in December 2014 that included all the companies listed on the Tokyo Stock Exchange. For the analysis, these companies were divided into two groups according to whether their return on equity (ROE) was 8% or more (if so, they were classed as “high-revenue” companies). The six parameters shown below are cited from the survey (Ministry of Economy Trade and Industry, 2015). The bar graphs in orange show high-revenue companies; those in blue represent all others (with ROE under 8%; see Figure 21):

- (1) Interest of top management in IT investment
- (2) Assignment of personnel familiar with IT to the Business department

- (3) Fostering of personnel familiar with IT in companies
- (4) Maintenance and renewal of information system
- (5) Addressing information security risks
- (6) Sending information on IT utilization

The high-revenue companies were clearly different from the others regarding all aspects of IT investment, showing positive results of more than 40% for all parameters. The survey results demonstrate the relationship between positive IT investment and company performance. Parameters 1 and 4, concerning recognition and action by top management, have values in high-revenue firms that are more than double those in the others. This suggests extremely high interest in IT among the leaders of high-revenue companies. Such firms also allocate and foster human resources specialized in IT and externally publicize their activities (including to stockholders).

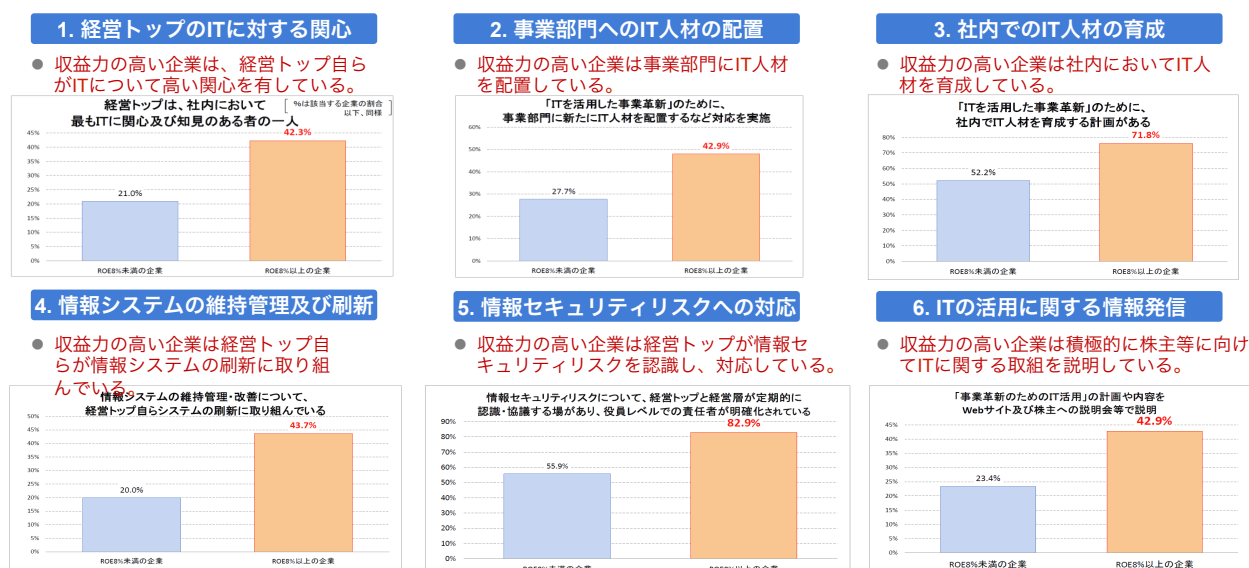


Figure 21. Condition of IT utilization in Japanese firms that perform offensive IT investment. With the six parameters, the bar graphs in orange show the high-revenue companies; those in blue represent the others (with ROE under 8%). The vertical axis of each graph indicates the rate of attainment.

Source: The Ministry of Economy, Trade and Industry, “Characteristics of IT utilization in high-ROE companies” (2015)

### 3-3. Challenges in IT investment for Japanese companies

### 3-3-1. The recognition of “IT management” and status of action

IT management aims at maximizing corporate value by combining management, operation, and IT (Ministry of Economy Trade and Industry, 2010). We examined how Japanese companies recognize “IT management” and take action on behalf of it.

Figure 22 was sourced from a 2014 study (Ministry of Economy Trade and Industry, 2010). As Figure 22(a) shows, 67% of the companies understood IT management, but only 19% knew how IT management played a role in their firm. The larger the company, the more strongly it recognized IT management. The survey results on the actions on behalf of IT management are shown in Figure 22(b). Though 55% of the firms had taken some action, only 13% were actively addressing the issue. As in Figure 22(a), this parameter’s trends depended on company size, with more activity seen in the larger firms. The overall tendency in 2010 was that Japanese companies recognized IT management but had not yet taken much action about it.

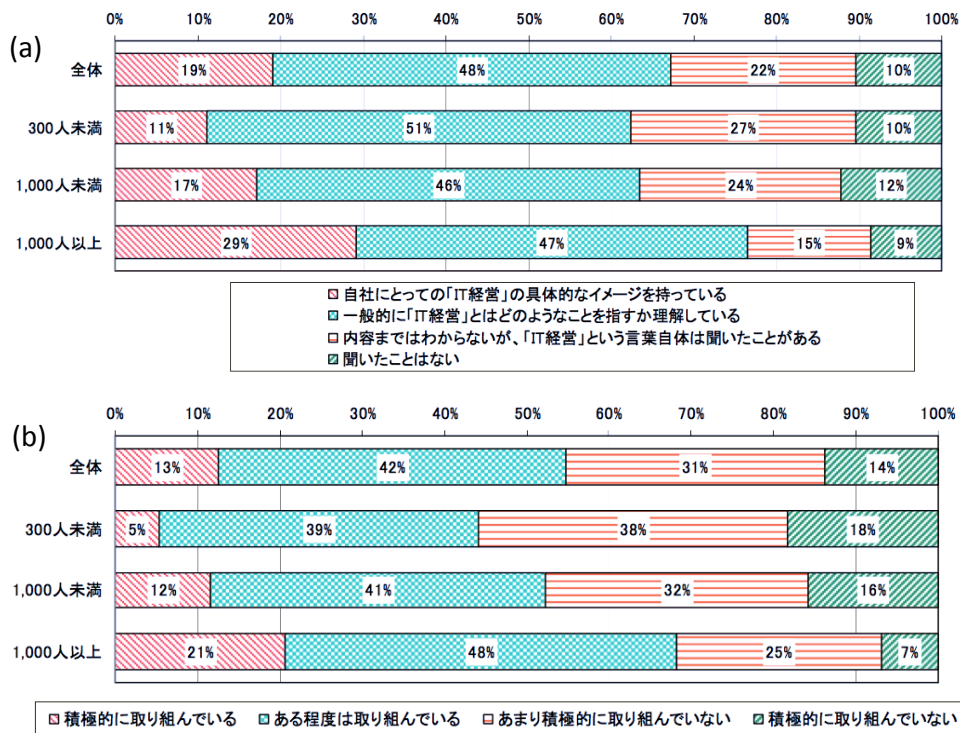


Figure 22. (a) Recognition of “IT management.” (b) The status of addressing “IT management.” The degree of attainment is evaluated on four levels. The horizontal axis shows the proportions of each level. In addition to the averaged results, the graphs illustrate the results of classifying

companies into three groups: fewer than 300 employees, fewer than 1000 employees, and 1000 employees or more.

Source: The Ministry of Economy, Trade and Industry, “Research aiming at promoting the spread of IT management” (2010)

### 3-3-2. Why Japanese companies make only defensive IT investments

The above-cited survey results show that most Japanese firms are making only defensive IT investments. We will now examine survey results concerning why they do. The questionnaire was conducted among managers and persons in charge of departments other than IT departments in domestic companies with a consolidated number of employees of 500 or more. Answers were obtained from 331 of them, as shown in Figure 23 (JEITA, et al., 2015). The results show that more than 40% of the companies that made only defensive IT investments recognized that “streamlining and creating new values with the use of IT are difficult.” In addition, 24% considered that “the current competitive advantages do not need to be enhanced with IT use.” The failure of Japanese firms to go beyond defensive IT investments is thus due to three factors: difficulty, feasibility, and necessity.

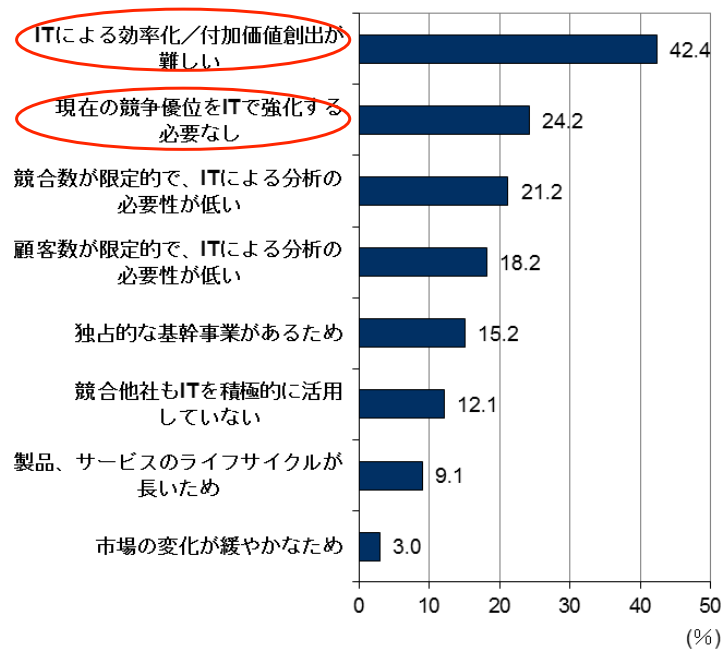


Figure 23. Reasons why companies make only defensive IT investment. The questionnaire survey was conducted among domestic companies with a consolidated number of employees of

500 or more; answers were obtained from 331 of these. The “the necessity or value to utilize IT is not felt (n = 33)” item obtained among the 331 companies is divided into eight reasons, with the percentages shown on the horizontal axis.

Source: JEITA, IDC Japan, “The JEITA conducted an investigation of the actual condition of ‘offensive IT investment’ in domestic companies: Offensive IT investment was seen in 42% of them, and effect as well as requirements for success were revealed” (February 23, 2015)

### 3-3-3. Challenges of enabling active IT investment

We now discuss the challenges impeding active IT investment. According to the JEITA’s survey results, the challenges that most strongly impeded IT investment included “the personnel who can combine IT and business,” “the proposal ability in the information system department,” and “clarification of return on investment” (see Figure 24) (JEITA and IDC Japan, 2015).<sup>3</sup> Overall, there are many concerns about the abilities of personnel and organizations and about the effects of investment.

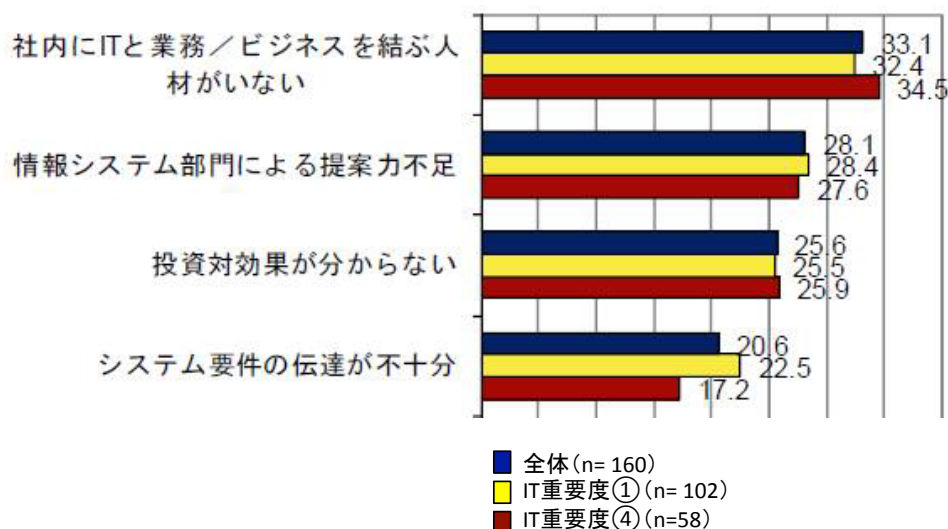


Figure 24. Challenges for actively moving forward with IT investment (reasons for lack of IT utilization). The graphs show four major categories of challenges. Answers from all the subjects (n=160) are shown in blue; those from companies for which IT use is considered to be highly important (n=102) are indicated in yellow, and those from companies for which IT use is considered to be less important (n=58) are shown in red.

Source: JEITA, IDC Japan, “The JEITA conducted an investigation of the actual condition of ‘offensive IT investment’ in domestic companies: Offensive IT investment was seen in 42% of them, and effect as well as requirements for success were revealed” (February 23, 2015)”

### 3-3-4. Status of establishment of chief information officer and its responsibility

The chief information officer (CIO) is the senior director who manages information or information technologies. This position strongly influences IT utilization in companies (Kiyotaka Kaneko, 2015). A survey was conducted on the establishment of CIOs in Japanese companies; the results are shown in Figure 25 (The Ministry of Internal Affairs and Communications, 2011). Only about 20% of Japanese firms have established the position of CIO, and a lower percentage of CIOs focus exclusively on their primary duties; most simultaneously engage in other work. A total of 73.1% of Japanese firms answered that they did not have a CIO and did not plan to have one, indicating that the CIO was not significant to them. Classifying the companies by capital size revealed that major companies with a larger capital size were more advanced in the establishment of personnel as CIO, while minor firms with a smaller capital size were less advanced (see Figure 26).

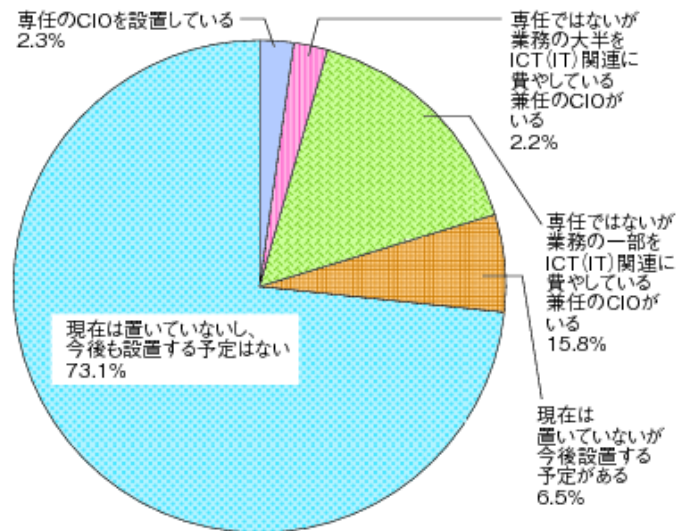


Figure 25. Status of CIO assignment

Source: The Ministry of Internal Affairs and Communications, “Communications Usage Trend Survey in 2011 compiled” (2011)

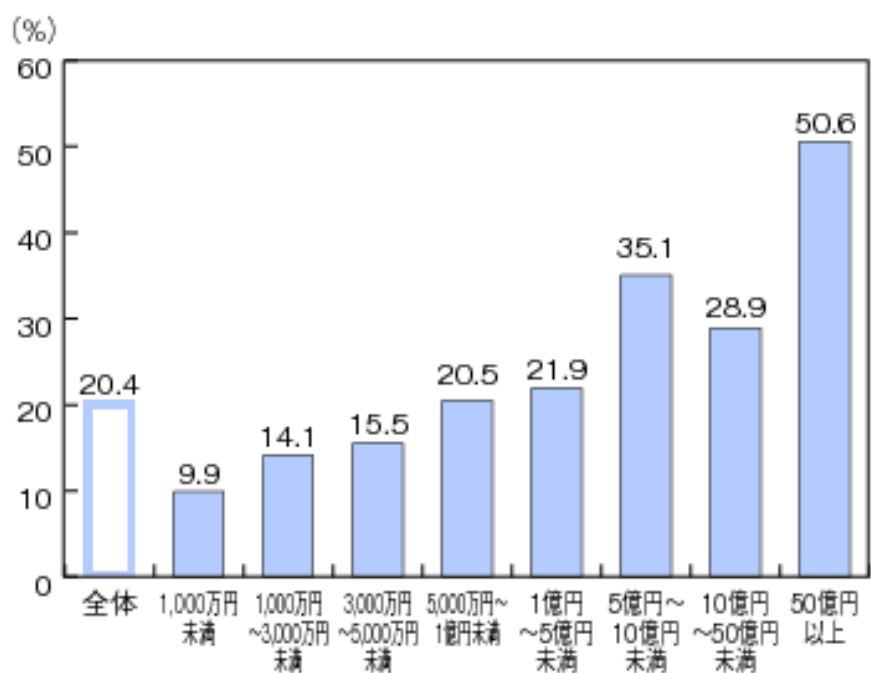


Figure 26. Status of CIO assignment (companies classified by capital size). The horizontal axis represents the surveyed companies classified according to capital size, and the vertical axis indicates the percentages of CIO assignment.

Source: The Ministry of Internal Affairs and Communications, “Communications Usage Trend Survey 2011” (2011)

Other survey results (Ministry of Economy Trade and Industry, 2011) indicate that 58.3% of Japanese firms had established the position of CIO, while 83.1% of US and 71.3% of South Korean firms had (see Figure 27). These results may indicate a higher percentage of Japanese companies because the latter survey’s definition of “CIO” might include not only directors (as the original definition does) but also heads of Information System departments. In any event, the CIO establishment rate is lower in Japanese firms than in US and South Korean ones. Moreover, the responsibility and positioning of the CIO differ between Japan and the US. Figure 28 diagrammatically illustrates how CIOs in Japan and the US function(Masanori Saito, 2012). Most Japanese CIOs do not exclusively work or specialize in information systems. It is therefore more difficult for Japanese companies than for US firms to build a strategic information system aimed at total optimization representing “revenue increase or growth maintenance in the entire



company,” which is associated with top-down business reform or reorganization. As a result, IT investment in Japanese firms is done only for “business streamlining and cost reduction.”



Figure 27. Percentages of companies that assigned in-house CIO in Japan (n=1011), the US (n=150), and South Korea (n=150) firms

Source: Ministry of Economy, Trade and Industry, “Present survey of IT use and utilization in companies with IT management power index”

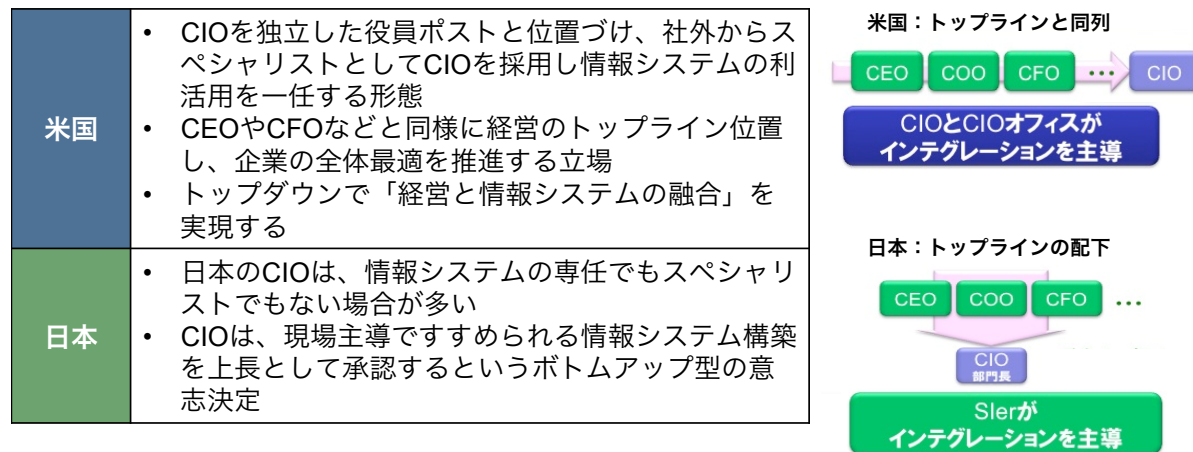


Figure 28. Recognitions of the function of CIO in the US and Japan

Source: ZDNet Japan, “Difference in CIO between Japan and the U.S.”

### 3-3-5. The “5 Nots” that should be overcome as reasons for Japan’s less advanced offensive IT investment

Trade and Industry in 2007 described challenges to IT management in small and medium-sized companies as the “5 Nots.” (Ministry of Economy Trade and Industry, 2007) The reasons discussed below for why offensive IT investment is impossible were abstracted from Reference (the National Association of Trade Promotion for Small and Medium Enterprises, 2012), with the contents organized and summarized as the “5 Nots” (see Figure 29).

For example, after companies make an investment, many expect to see effects immediately. However, a trial-and-error process is required after an investment, which takes substantial time and effort. Some companies end up not utilizing the IT invested. This corresponds to the first “Not,” the “inability to realize the advantage of IT introduction.” The “failure to spot opportunities for IT introduction” and “catering too much to the needs of the actual workers” are included in the second “Not,” the “inability to independently formulate a management strategy with future prospects.” The third “Not,” the “insufficiency of knowledge, know-how, person, and money,” is caused by a “lack of personnel familiar with information,” “dependence on IT vendors,” and a “lack of CIT exclusively engaging their duties.” The remaining fourth and fifth “Nots” are “insufficiency of support for implementing IT management” and “concerns about support after introduction of IT” respectively. It is essential to overcome these “Nots” if offensive IT investments are to be realized.

なぜ「攻めのIT」ができないのか	5つの「ない」
<ul style="list-style-type: none"> <li>・投資後、すぐに納得がいくほどの効果が出るものではない。この状態をブレークスルーできる企業もあるが、上手くいかず成果を実感するには至らない場合も少なくない</li> </ul>	① IT導入のメリットが実感できない
<ul style="list-style-type: none"> <li>・IT導入の好機の見極めを間違える</li> <li>・現場のニーズを汲み取り過ぎる</li> </ul>	② 将来を見通した経営戦略を自力でつけない
<ul style="list-style-type: none"> <li>・ITベンダーのアドバイスに従う</li> <li>・ITベンダーとの関係性</li> <li>・IT投資を評価できない</li> <li>・IT経営のための重要な成功要因として無形の資産、すなわちインタンジブルズ(ブランド、特許、従業員・経営者の能力などキャッシュフローを生み出す無形の経営資源。人的資本、組織資本、情報資本などが含まれる。)の整備不足</li> </ul>	③ 知識・ノウハウ、ヒト、カネの不足
<ul style="list-style-type: none"> <li>・特定の部門や業務毎に導入されている</li> </ul>	④ IT経営実践のサポート体制の不足
<ul style="list-style-type: none"> <li>・大きな初期投資なしにIT資源を快適に活用できる環境が整う</li> </ul>	⑤ 導入後のサポートに対する不安

Figure 29. Reasons why Japanese firms are less advanced in offensive IT investment

Source: “A guidebook of IT investment for small and medium enterprises” by the National Association of Trade Promotion for Small and Medium Enterprises (2012)

### 3-3-6. Necessity of data utilization

The Ministry of Economy, Trade and Industry has compiled a guideline for offensive IT utilization (see Reference (Ministry of Economy Trade and Industry)). This was used to classify the offensive IT strategies companies should follow in a competitive environment according to purpose, as shown in Figure 30. The three major objectives of “marketing,” “management,” and “in-house system” were further broken down, and the tasks required to achieve them were defined; these included automation, optimization, data acquisition, analysis, and sharing/communication, the need for which was indicated by a circle. The results suggest that offensive IT investment requires both data acquisition and analysis and that effective data analysis is particularly important. Thus, it is critical for Japanese firms to have a strategy for utilizing their data.

目的	すること					備考
	自動化	最適化	データ取得	分析	共有・コミュニケーション	
<b>マーケティング</b>						
<b>市場への浸透Market Penetration</b>						
販売チャネル変革	○	○	○	○		適切かつ効果的なタイミング（セグメント、商品、エリア、時間等） 売上や利益、在庫等の情報を把握 検索エンジン最適化
物流改革	○	○	○	○		取引電子化 商流管理システム（SCM） 流通経路、物流コスト、配送スピード、情報の流れ等の現状を把握できる仕組みを整備
関連商品・サービスの拡大/価値向上	○		○	○		顧客や市場の声、要望を収集、分析 モバイル端末対応 顧客への生産者情報等の提供 顧客に応じた情報発信 製品やサービスに関する詳細な情報等を顧客に提供
顧客満足・リピート率拡大		○	○	○		市場や販売傾向の予測 SaaS等の活用により、顧客要望への即時対応を実現
ブランド強化			○	○		効果的なHPの作成 WEB等を活用して顧客への自社ブランドのアプローチ
<b>市場の開拓Market Development</b>						
異なるマーケットへの参入			○	○		国内外の人口、所得、文化、趣向等の現状と動向 進出しようとする商品分野・サービス分野の需要動向 事業の採算性・実現性 ネット販売対応
新規顧客獲得			○	○	○	ユーザービリティ向上
<b>製品開発Product Development</b>						
業務フローの見える化/効率化	○	○				流通量やコスト、スピードに関する想定プロセスのシミュレーション等を行い、新ビジネス・プロセス（サプライチェーン等）を構築 業務を部品化/標準化し、柔軟に効果的な実行体系に組み替える
異なる商品への参入			○	○		国内外の需要・競合状態を分析し、販売動向予測を反映した同業他社とは異なる商品・サービスを創出 ニーズとニーズのマッチング
アイデアの取得					○	ディスカッションができる仕組み等を構築し、時間と場所を越えた業務推進体制を整える
<b>多角化Diversification</b>						
新たなビジネスモデルの創出			○	○	○	ビジネスモデル（バーチャルカンパニー、ECOシステム、組合新事業等）の創出のため、企業間の連携や共同化の各種ビジネスモデル・シミュレーション等を行い、流通改革の経済性・実現性を検証
<b>経営</b>						
<b>経営判断</b>						
情報の伝達・把握スピード向上	○	○	○	○	○	専用ソフトや専用SaaS等を利用し、経営情報をテラリーで管理して活用 現在の経営情報を多角的に可視化して活用 先読み判断実現の為、業績予測、キャッシュフロー予測等のシステムを活用し、一歩先の手を打てる体制を構築 クラウドやSNS等を活用し、社外での業務処理を実現 位置情報等を活用し営業スタッフの適正化 センサー等により従業員の行動を計測し、行動パターンを分析、最適な人員配置を行なう
適切な人員配置・資源活用		○	○	○	○	
<b>事業継続体制の確保</b>						
セキュリティ/BCP体制整備		○	○	○	○	インシデントの予防や発生時対応を効果的に行えるように、全社のセキュリティポリシーを策定し、具体的な行動に結びつく仕組みを構築 外部からのアタック、不正アクセスを予防、コンピュータウイルスの侵入やサイバー攻撃等の未知の脅威を分析、ファイアウォールやセキュリティツールを導入し、外部の攻撃からのセキュリティを大幅に高める
<b>社内制度</b>						
人材育成・ITリテラシー向上等		○	○	○		・活用に関するスキルやキャリアパス等を整備 ベストプラクティス共有
組織活性化			○	○	○	・業務負荷分析 従業員の能力や希望業務等の把握 社内電子掲示板（BBS）

Figure 30. Offensive IT strategy that companies should use in a competitive environment

Source: “A guideline for utilization of offensive IT investment” by Ministry of Economy, Trade and Industry

#### **4. Summary/suggestions**

##### **4-1. Summary**

The above discussion has indicated the following. Japanese IT investment has stagnated. Though some Japanese companies are investing in IT, this does not represent offensive IT investment. Analyses of productivity revealed low productivity among some business types and fields, where significantly fewer benefits were being produced by IT investment. The size and subject of IT investment were the main reasons for the low productivity. Firms’ IT investments were analyzed in terms of their revenues, revealing a clear difference between high-revenue companies and the others: firms with higher revenues invested in IT more aggressively and used it more actively in their management.

The reasons for Japan’s situation are as follows. First, the positioning of IT investment in Japanese management is unclear. Obstacles to solving this problem include a low recognition of IT investment among managers, a limited positioning of CIOs among managers and the CIOs’ limited authority, the gap between the challenges of management and those of IT investment, the lack of a formulation and implementation framework for IT strategies, lack of funding, concerns about technology assessments or investment risks, and the absence of an authority or framework allowing for decision-making. Additionally, no implementation mechanism for IT investment has been established in Japan, which is a major cause of Japan’s current status. Basic problems include an insufficiency of personnel assigned as CIO and insufficient CIO authority; insufficiencies of personnel, budget, and authority in IT departments; concerns about the assessment, operation, and support of technology; and dependence on vendors. Furthermore, Japanese firms have not recognized the advantages of IT management or of offensive IT investment, which is impeding the acceleration of IT investment. Moreover, many companies have not considered “what they can begin with, and what effect they can expect.”

##### **4-2. Interpretation of the above “summary” and perspectives on IT investment for growth**

Japanese IT investment is small, and defensive investment is disproportionately emphasized, which is one cause of sluggish productivity growth among Japanese firms and of

stagnation in the Japanese economy. Switching to offensive IT investment might foster growth. Many of the industries with low productivity have not advanced in IT investment and are thus expected to experience substantial growth. However, offensive IT investments cannot be carried out by simply introducing typical solutions. It is necessary to address the issue by satisfying all the requirements and overcoming the challenges mentioned in the previous section. High-level challenges include IT strategy and IT investment planning that correspond to the management strategy and the recognition and execution of top management. Specific tasks include the development of persons in charge of and organizational engagement in IT investment and the securing of investment funds with a consideration of the risks. These two kinds of challenges should be faced simultaneously; this would be most difficult for Japanese firms, as they would puzzle over which issues to address first. There is no one way to solve the problems; however, it is important for Japanese companies to determine their manageable ranges and levels and gain experience little by little, thereby obtaining consent within their companies.

Additionally, unlike in 2010, when many of the surveys and studies used in this report were conducted, the use of smart devices and wireless broadband infrastructure is widespread. The emergence of cloud services and other platforms with ever-expanding scales and functions are lowering barriers to the use and introduction of technologies. Given these advances, Japanese companies should conduct IT introduction beginning with technologies that are familiar to users, including cloud services. This will enable more companies than ever to make offensive IT investments.

### **4-3. Suggestions**

#### **4-3-1. Suggestions for companies**

The objectives about which the entire company agrees should be determined, including business growth, revenue increase, or improvement in customer satisfaction. This is necessary for lowering the obstacles to formulation, decision making, and assessment (the main aspects related to management) as well as to implementation and organization (the main aspects related to IT departments and operation). It would be best to begin with systems of a proper size, preexisting cloud services, or systems with minimum customization and then gradually broaden the range of services. Instead of adhering to preexisting “legacy IT systems,” new technologies that can be easily introduced should be emphasized.

It is important that companies make one of their managers their CIO and take inventory of their IT hardware, software, and infrastructure as well as other relevant items. This would not only facilitate IT strategy formulation and decision making but also enable the visualization of IT investments aimed at improving efficiency. In addition, opportunities to check the IT system and business data would allow a consideration of which strategy to employ to use those data. Offensive IT investments highlight the importance of data analysis beyond routine work such as data recording. Amid the recent discussions of Big Data and the data-driven society, where data are referred to as the “oil of the 21st century,” companies should be ready to improve the infrastructure of management and make full use of data for future growth.

Defensive IT investments need not be discontinued immediately. It is important to discuss the issue of timing, such as for renewals of IT systems, and consider which techniques are realistically available. Discussing IT utilization is also essential, even in fields that have not been considered as “requiring IT.” The immediate introduction of a full-scale system is not necessary. Instead, discussions should take place about whether methods matching the project budget and scale are available (however, a thorough consideration of data continuity and compatibility is necessary). When IT is introduced, companies should not adhere to customization but carry out business reform even during IT introduction. Business reform is associated with resistance to the preexisting power structure, and IT introduction can be thought of as a good opportunity to shape up the business. Seeking immediate completion is not required; it is necessary to start strategically with a manageable scope. Starting is an important first step, particularly for small and medium-sized companies. Business reforms and management strategies addressed by IT investments should appeal to stockholders. This would also give top management and directors an opportunity to consider whether IT investment is truly necessary.

#### **4-3-2. Suggestions for government**

The main objective of IT management and offensive IT investment should be increasing productivity at both the macro and micro levels. Two policies could assist this goal: (1) providing the factors needed to realize IT management and offensive IT investment that firms lack, (2) and encouraging firms to complete the cycle of IT management (the cycle from the planning and implementing of an investment to assessing the results).

- (1) Providing the factors needed to realize IT management

Support should be given to help companies obtain the management resources they need to carry out IT management and offensive IT investment. The following measures have already been taken: the development and introduction of CIO personnel, the publicizing of successful cases of IT management and offensive IT investment, the selection of IT investment stocks, and the development of human resources for IT. In addition, enhancing support measures is preferable to lowering investment risks or reducing implementation and operational burdens. Good ideas include providing incentives through the tax system or building a complementary safety net for the risks of data leakage. Obviously, measures for encouraging investment should be taken immediately. These include publicizing successful or model cases of manageable challenges and holding workshops. For small and medium-sized firms, their introduction of broadband in offices, use of email, and acquisition of custom domains should be investigated. This information is needed because, as a high-speed and large-capacity communication infrastructure is being developed, smaller companies unable to access this infrastructure might lag behind. These companies might also face difficulties in improving their productivity, as demonstrated in this report. Though unspectacular, other possible strategies include enhancing IT education for management support staff across Japan or having job searches in unemployment offices prioritize companies that are making active IT investments. Through such measures, all government agencies should do what they can to move forward with a cycle that promotes active IT investment, improves productivity and revenue, and increases wages.

(2) Encouraging completion of the IT management cycle

Another policy could be that of completing the cycle of IT management and offensive IT investment. Though some companies may understand that “improvement in productivity or performance can be expected with IT management,” they often lack the required investment funds, the personnel needed to implement investments, knowledge and know-how, or a specific vision of success. As a result, fewer companies pursue IT management. This situation could be improved through the support described above (in point 1) as well as by the external promotion of the cycle of “investment and its outcome.” Measures could include offering grant money for IT investment or tax exemptions. However, simply investing in IT is not enough; the investment needs to be “offensive,” and is should be assessed as to whether it meets the requirements. Since it would be difficult for the government to offer such services, investment products designed for IT investment would also be conceivable. Examples are given below:

- Creating investment trust products aimed at companies expected to improve their performance or increase their stock prices via the IT investments (conditions might be attached in terms of business type or company size). The investment values would be partly applied to the IT investments of these companies.
- The increased stock prices of the company would serve as the return on the investment
- Investments combined with tax reductions would enable the generation of investment funds. When the investment is selected, the subject of the investment would be evaluated.

## **5. Direction of future research**

This report has demonstrated based on the literature that Japanese IT investments are not leading to offensive IT investment. It has discussed the reasons for this situation and possible measures to take in response. Paradoxically, turning IT investment into an offensive type requires a firm defensive foundation. When attention is paid to the operation of a firm's core system, the issue of the so-called "legacy core system" becomes serious. Legacy systems involve aging technologies and enlarged, complicated, or black-box systems. Such a system, an "unsteady defense," would cause valuable IT investments to be spent on system operation and maintenance tasks that are not constructive. Japanese firms have difficulty moving away from these legacy systems, which is the essence of the stagnation of Japanese IT investment. Japan's IT industry, offering IT solutions, is also affected by the disruption of the conversion of legacy businesses to innovative, highly profitable ones.

This issue is also deeply related to the "regulatory industry." Companies want to break away from legacy systems and innovate but are trapped by regulations and laws. Thus, there will be discussions on what directions or policies are required to allow Japanese firms to break away from legacy systems and the regulatory industry. This will help convert IT investment into offensive investments and improve firm productivity, revenue, and compensation package of engineer.



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