The Empirical Studies on IT Management Effectiveness in Japan: 2000, 2002 and Future

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Abstract Many corporate senior managers have not been fully convinced of successful IT management over a period of decades. In order to clarify the mechanism of IT management in companies, we conducted the surveys on IT management in 2000 and 2002. Through the surveys and analyses, we found the causal structure in IT management, developed “IT Management Effectiveness” as a new measurement tool, published ranking lists of high scored companies, and analyzed characteristics of industry/sizes of respondents and so on. Based on the surveys and researches so far, we would suggest future works, such as comparison of Japanese companies with overseas companies, time series analyses.

Key words IT management effectiveness; empirical study; ranking

Although the IT revolution is likely to be an irreversible movement in the long term, many corporate senior managers in Japan have not been fully convinced that IT is a valuable management tool. What will convince corporate senior managers to positively address IT-related issues in the e-business era? It is evident that IT management in the current e-business era is becoming more and more complicated for senior management because of aspects such as personalization of IT (e.g., PC and Internet) and coordination efforts to effectively utilize IT among multi-entities. These issues have been broadly relevant from the initial stage of IT usage through to the current e-business era, that is, over a period of decades.

IT Management effectiveness had been discussed in the past [1, 2]. As a result, however, many companies in practical business respond to IT revolutions as well as e-commerce (EC) development simply by increasing IT/EC investments and blindly following the lead of advanced companies. In addition, most do not even evaluate the business value is created by their IT/EC investments. This is why the frameworks and perspectives for resolving IT-related issues from the viewpoint of top management are still insufficiently comprehensive for today's e-business era.

1 IT Management Effectiveness in Japan in 2000 and 2002: An Outline of Surveys

Under these circumstances, we conducted a series of empirical studies on representative Japanese companies in 2000 and 2002, to measure “IT management effectiveness,” which is derived from both management and IT viewpoints. As we describe in Fig. 1, “IT management effectiveness” is defined as a set of organizational activities inside the individual company for effectively utilizing IT as a management tool. “IT management effectiveness” consists of six primary indicators: “Top management’s awareness and actions on IT”, “Linkage between management and IT”, “IT development capability”, “IT readiness”, “IT investment and deployment”, and “Business value creation from IT”. Our measurement framework could contribute to clarification of the mechanism of how IT management effects the creation of business value through IT, from the viewpoint of the internal complementary factors as well as external environmental factors of the individual company.

The first survey on IT management effectiveness was planned based on the measurement and structural
framework[3], and was executed in 2000. We conducted a questionnaire survey in 3 068 Japanese companies. First, from the database of a major credit agency, we selected 3 007 companies based on the criteria that the number of employees is more than five hundred and the revenue is more than thirty billion yen (for the year ending in April 2000). Then, we intentionally added sixty-one IT-related advanced companies that frequently appeared in IT-related magazines from 1997 to 1999.

The questionnaires are sent to the public relations department of each company and distributed to the CEO, CIO, IT planning department, and IT development department.

Valid responses were obtained from 509 companies (17%). The distribution of the responding companies by industry and size (head count) were sufficient for appropriate stratified analyses.

Also, we conducted the second survey in 2002 in the similar way to the first one in 2000. Valid responses were obtained from 415 companies (13%) in 2002.

We performed several analyses based on the data obtained from the surveys in 2000 and 2002.

First of all, we clarified the mechanism or series of causal relationships for creating business value from IT, as shown in Fig. 2. “Top management’s awareness and actions on IT” has a positive effect on the operation system related to “Linkage between management and IT,” “IT development capability” and “IT readiness”, and therefore, business value is created from IT through “IT investment and deployment”.

Based on hypothesis testing, we constructed a well-fitted path model ($p$-value of the goodness of fit=$0.243$, $GFI=0.996$, and $AGFI=0.982$) as shown in Fig. 2, all the existing path coefficients of which are positive and significant[3].

Second, based on the above causal relationships, we calculate the overall performance criteria based on the six primary indicators by applying the principal component analysis to identify the overall performance level and approaches of the IT management. This is why we recognize that such overall performance measures will be useful to identify enterprises that will successfully establish an effective linkage between the business and IT.

An overall performance is not necessarily evaluated appropriately by observation of a snapshot performance indicator. Particularly during transition to
the practice of e-business, internal activities relating to IT adoption at both managerial and operational levels of a company should be evaluated in order to predict the next stage of business infrastructure of the company.

According to the result of the principal component analysis to the six primary indicators, the proportion of total variation explained by the first principal component is 50%. And all the principal component loadings, which are equal to the correlation between the principal component score and the indicators, are positive; thus, the first principal component is interpreted as a size factor to differentiate the performance of the enterprises most effectively. It has a content validity for overall measures and also a criterion validity, because the principal component loadings on "Business value creation from IT" and “IT readiness,” which are typical performance measures, are the highest and the second highest, respectively. Therefore, the derived first principal component can be regarded as an overall performance measure called “IT management effectiveness.”

Third, we analyzed the relationship between “IT management effectiveness” and business category/size, and found that small-sized companies tend to score lower for “IT management effectiveness” and the other primary indicators. Also, we found that the different industries exhibit statistically significant differences for “IT management effectiveness”, and the other primary indicators. In particular, the electronic and electrical manufacturers have higher averages for all six indicators and “IT management effectiveness”.

<table>
<thead>
<tr>
<th>Tab.1</th>
<th>Top 10 companies of the surveys in 2002</th>
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<tbody>
<tr>
<td>Ranking</td>
<td>Company</td>
</tr>
<tr>
<td>1</td>
<td>Mitsui Sumitomo Insurance</td>
</tr>
<tr>
<td>2</td>
<td>Sumitomo Computer Systems</td>
</tr>
<tr>
<td>3</td>
<td>Kirin Breweries</td>
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<td>4</td>
<td>Toshiba</td>
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<tr>
<td>5</td>
<td>ANA</td>
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<tr>
<td>6</td>
<td>IBM.Japan</td>
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<tr>
<td>7</td>
<td>Ricoh</td>
</tr>
<tr>
<td>8</td>
<td>Fuji Software ABC</td>
</tr>
<tr>
<td>9</td>
<td>Unisys Japan</td>
</tr>
<tr>
<td>10</td>
<td>NEC Software</td>
</tr>
</tbody>
</table>

According to the similar procedure, we calculated the scores of IT management effectiveness based on the data of the survey in 2002. Tab.1 indicates the top 10 companies, which was published in Ref.[4]. One thirds of the top 30 companies of the survey in 2000 have remained within the top 30 in 2002.

![Fig.2 Estimation of the modified structural model](image)

3 Conclusions and Future Studies

Through these researches, we have performed several analyses in terms of causal structure model, the relationship between “IT management effectiveness” and business category/size, rankings of companies and so on. Also, we have publicized these results in scientific papers as well as in Refs.[3~5].

We would suggest that future studies are conducted as follows: 1) improvement and enhancement of the calculation mechanism of the IT management effectiveness, 2) comparison of Japanese
companies with overseas companies, and 3) evaluation of time-series data recorded during the progression of e-business.

We would like to continue to work to bridge the gap between the business and IT arenas as we move into the e-business era, so that we can better understand the mechanism of how IT investment creates business value in theory, and thus help senior business leaders to respond convincingly to IT related issues in practice.

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References

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