Portfolio management method in IT property

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Abstract: Corporate managers should manage their enterprise information systems from the view of corporate growth. In this paper, we propose the method to support investment planning of information systems. The feature of our method is to evaluate both a business impact and a long-term quality of information systems. In addition, our method can be evaluated restriction of order between projects and synergy effect between projects.

Key-Words: - Portfolio management, IT property, Enterprise information system, Investment planning

1 Introduction

Enterprise information systems are necessary to make competing domination. For growth of their company corporate managers should appropriately maintain enterprise information systems.

In property values of information systems, there are two different values, profitability and safety. Profitability is impact to the current business, and stability is flexibility to the future business changes. In our method, profitability is evaluated by relating each investment project to business issues, and stability is evaluated from the maturity level of entire system architecture such as "Union of data".

In addition, our method not only puts priority levels on investment projects but also puts execution orders by road map form. By which we can also consider restriction of order and synergy effect between projects.

2 IT property values and IT portfolio

There are two different sides in IT property values, profitability and stability. Profitability is the evaluated side where whether information systems have adjusted efficiently to the current business. It relates to the cash flow generated by system use in business unit. And managers are mainly interested in this side. On the other hand, Stability is the evaluated side where information systems are flexibly transmutable to the business changes in the future. It relates to the cash flow of the future that increases by quick system change to the business changes. And IT managers are mainly interested in this side.

IT managers should construct the assemblage of information systems with taking the balance on both sides, Profitability and Stability. Here, we call the assemblage of information systems IT portfolio. And we call the construction of entire information systems with taking the balance on both sides IT portfolio management.

In this paper, we propose the method of supporting IT portfolio construction.

2.1 Method of evaluating profitability

As a method of evaluating Profitability, using ROI (Return On Investment) is general [1]. However, time hangs in the calculation of ROI, and evaluated number of projects is abundant. So this method has the problem of high cost. In addition, there is another problem that managers don't necessarily select projects that ROI is higher.

In our method, in the beginning, we construct the business issue table where each investment project is related to business issues through management issues, as shown in Fig.1. Next, we set achievement weights to between business issues and management issues and

![Fig.1 The business issue table](image-url)
between management issues and projects in this table. This weight shows achievement degree of business issues, when related project will be executed.

According to this achievement degree of business issues, IT managers will be able to settle on the IT investment strategy that adjusts to the business maneuver. So they can show effectiveness of IT investment for their managers.

2.2 Method of evaluating safety
We define "System quality item" as a viewpoint that evaluates corporate information systems for the long term. "System quality item" shown in Table 1 assumed "Quality item of the software item" to be a base.

Here, we developed the method of calculating the value of "System quality item" from maturity levels of the information system. For instance, "Union of data", "Adaptability of business and system". Details are reported at another time.

Table 1. System quality item

<table>
<thead>
<tr>
<th>No</th>
<th>Main character</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Functionality</td>
<td>Degree that necessary function mounts</td>
</tr>
<tr>
<td>2</td>
<td>Reliability</td>
<td>Degree to be able to keep normally operating function on all conditions</td>
</tr>
<tr>
<td>3</td>
<td>Reliability</td>
<td>Quality of &quot;Easiness to use&quot; of system</td>
</tr>
<tr>
<td>4</td>
<td>Efficiency</td>
<td>Relation of amount of resource used and the degree of the accomplishing objective</td>
</tr>
<tr>
<td>5</td>
<td>Maintainability</td>
<td>Degree of labor necessary to repair</td>
</tr>
<tr>
<td>6</td>
<td>Portability</td>
<td>Ability of system when moving it to another environment</td>
</tr>
</tbody>
</table>

Fig.2 Management object of IT portfolio

3 Outline of IT portfolio management
Fig.2 shows the relation of management objects in IT portfolio management. These four ((a) Asset value, (b) IT property, (c) IT investment project, (d) IT development resource (manpower and cost)) are the management objects. For example, when development resources (d) are dropped and application development project (c) is executed. Business applications (b) are changed, and operation cost (d) increase, and achievement degree of business issues (a) improves.

There is a restriction in the amount of IT resource (d). The total of development cost / manpower and operation cost / manpower is necessary to install on entire resource upper bound.

And moreover, there are two types of projects (application development projects and IT platform development projects) in the IT investment project. Intuitively, application development projects contribute to improvement of achievement degree of business issues (profitability). IT platform development projects contribute to improvement of system quality (stability).

In IT portfolio management, IT managers control the balance of profitability and stability after considering the management objects' relation and the restriction. For that, we think that we should construct IT investment road map and IT property transition map.

3.1 IT investment road map
The investment road map is figure where the execution order was shown at execution timing and period, based on the listed projects. The SABC method [6] that compares each project and gives the priority level is general. However, in the method for comparing, there is a problem of not considering the condition of execution order between projects. For example, A can be executed only after project B is ended. Our method can present the priority level in which the order conditions are considered by construction of the road map. In addition, the execution order can be calculated in consideration upper bound condition of budget, upper bound condition of cost and synergy effect between projects.
3.2 IT property transition map
IT property transition map is figure where the transition of the system configuration is shown when each project is executed according to IT investment road map. As shown in Fig.3, it is composed of the total assets value, total cost and operation cost of each system.

As shown in Fig.2, the complementary position has with the development cost and the operation cost. By this transition map, we can construct investment plans corresponding the depreciation timing of assets. In addition, by total cost grasp, we can also construct plans to constant reduce of operation costs, for example, a plan to reduce operation cost by 5% in annual rate.

3.3 Process of IT investment planning
IT investment planning process is how to construct IT investment road map and IT property transition map. Table 2 shows the input and the limiting condition for construction. The process (From STEP1 to STEP6) shown in Table 3 is repeatedly executed until the property evaluation value is maximized. And final maps are constructed.

4 Application
We applied this method to making the mid-term management plan concerning information systems of the manufacturing enterprise.

Because this case was the case where all systems are completely replaced, so we did not evaluate a current property, and constructed only the investment road map. In this case, the inputs were 68 IT projects (48 application improvement projects and 20 IT platform improvement projects).

We arranged these 68 projects to the management problem arrangement table (Fig.1), and set various weights from the discussion with the IT managers of this enterprise, and calculated the achievement level of the business issues for each project. Moreover, by the discussion with the IT managers, we set the limit conditions of each project (budget, time, and human resource) and the limit conditions (related to upper bound of the budget, time, and human resource) in the entire enterprise. And, we constructed the road map for five years shown in Fig.4.

In Fig.4, the horizontal axis shows time (every half a year, total five years), and the upper row shows the total value of cost, human resource, and achievement level every half a year. The rectangles in figure show each project. A rectangular left edge shows beginning time, and a rectangular width shows period of each project. In addition, lines where they connect between rectangles show order conditions between projects. The vertical axis shows the business issues, and the total values of achievement level are shown.

The effectiveness of this method is not only to be able to make the road map, but also the idea of each IT manager concerned (project execution orders and project scales etc.) was able to be shared. For example, in this case, by using conventional method, the plan the open application development project had been constructed before open platform introduction project.

In this method, because the plan can be constructed to consider the conditions of beginning time and order between projects, we can discuss the execution order that cannot be discussed by conventional method.

Table 2. Input and Condition
<table>
<thead>
<tr>
<th>Input</th>
<th>IT property list</th>
</tr>
</thead>
<tbody>
<tr>
<td>Condition</td>
<td>Order condition between projects</td>
</tr>
<tr>
<td></td>
<td>Resource upper bound</td>
</tr>
<tr>
<td></td>
<td>Execution time limit of each project</td>
</tr>
</tbody>
</table>

Table 3. Process of IT investment planning
<table>
<thead>
<tr>
<th>Step</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Step1</td>
<td>Making of initial road map idea</td>
</tr>
<tr>
<td>Step2</td>
<td>Calculation of resource and cost</td>
</tr>
<tr>
<td>Step3</td>
<td>Correction of investment road map idea according to conditions</td>
</tr>
<tr>
<td>Step4</td>
<td>Construction of IT property transition map</td>
</tr>
<tr>
<td>Step5</td>
<td>Calculation of property evaluation value</td>
</tr>
<tr>
<td>Step6</td>
<td>Restructuring of investment road map idea that maximizes property evaluation value</td>
</tr>
</tbody>
</table>

Fig.4 Constructed IT investment road map
5 Conclusion
We propose the IT portfolio management method by evaluating the achievement level of business issues and the improvement level of system quality of each project. This method enabled IT investment planning that considered order conditions and synergy effects between projects by taking road map form. And, we showed the effectiveness by the application.

Future tasks are to monitor the effect after the investment is executed. In this paper, we presumed the achievement level by connecting IT projects and business issues. However, in the future, the monitoring method how much actually issues are achieved and the method of restructuring plans with this monitoring result are necessary.

References: