EVALUATION OF INFORMATION SYSTEM
CONTRIBUTIONS TO COMPANY AND VALUATION OF ITS
RETURN RATE FROM MANAGERS’ POINT OF VIEW

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Abstract: A decision about introduction of an information system into a company is always connected to evaluation of its contributions to activities within the company. It is a very complex problem, because opinions of managers, IT experts and even common users within a company vary. Technical parameters, user requirements and financial intensity for implementation or change in the information system are main, but not the only criteria, which influence final decision-making. The aim of this article is to describe in practice used process of decision-making on implementation or change in corporate information system. The same process can be used in corporate practice to solve and valuate decision about extension by subsystem or partial information system changes.

Key words: information system, return rate, ROI.

1 Introduction - Requirements for information system

The main task of an information system (IS) is to ensure information, which is presentable not only by hard data (usually quantifiable), but also by soft data related to people [1].

Partial requirements for IS result from goals delimited for information system behaviour [2], which are:
- To support decision making of managers on all levels including necessary coordination when dealing with partial problems or parts of problem with more workers,
- To reflect on type of decision making, which could be independent, sequent or group,
- To support all decision making phases and especially to allow not only analysis, but also creation and selection of alternatives,
- To focus mainly on poorly structured problems which could be solved easier with support of information system,
- To allow adjusting of the system to individual style of a manager,
- To ensure easy usage of information system [3].

Corporate information system efficiency is highly dependent on whether the optimal implementation was selected. Its returns are evaluated related to so-called Total Cost of Ownership (TCO), which is related to ownership, operations and maintenance of information system. In this context purchase price of hardware and software, installation, training, support and development costs are included [6].

2 Problem Formulation

From economic viewpoint the system is considered efficient when total returns outweigh total information system purchase price. In order to determine information system efficiency we can use also limitation theory by E. Goldratt, which is based on the presumption that any newly implemented technology is efficient and beneficial, if it reduces the impact of existing limitations on corporate operations.

Source of information system inefficiency could be even company employees [4] – it is, therefore, vital not only to optimize information system of the company, but also to change appreciation of respective workers so that they could fully utilize possibilities
provided by the new or innovated information system.

Application of information technologies, therefore, has to be based on requirements of information system users; processing of such information that supports reaching of set corporate goals.

3 Problem Solution

3.1 Manager’s decision-making about implementation or change of information system – practical example

Implementation or change of an information system in a company is a result of major decision-making of company management, because it projects to a number of corporate activities. Even in decision-making phase there are a number of alternatives; this problem includes economic and technical viewpoints. Synergy effect can be reached only if requirements in both areas are fulfilled optimally.

From the technical viewpoint it is necessary to valuate:
- Volume of information – for high volumes it is necessary to valuate, how the archiving and support of archiving is performed. If it is not possible to simply archive the data within certain time periods, system will be slowed down as a result of higher volume of data stored,
- System support – from time viewpoint it is necessary to valuate utilization for years to come, development possibilities, compatibility with other systems or subsystems and so on [5].

If we presume that technical parameters of the system were precisely delimited and approved by corporate management, economic evaluation of selected alternative follows.

Further described process is the same even in case of extending by a subsystem only or in case of partial change.

From economic viewpoint, total costs of system including purchase price, but also operations, are compared to contributions resulting from its application. Decision about utilization of information system in practice is made based on calculation of the ROI indicator.

The return of investment is calculated based on analysis of corporate activities and presumed savings which the system would bring – it is a strategic decision and it cannot be done without consideration of presumed development of the company and its environment.

The usual time interval for calculation is the outlook for 5 years period. The volume of cost determination is usually specified to reflect financial resources use within time line.

A part of the analysis could also be sensitivity analysis of decisive cost elements by means of graphical expression, or eventually by means of formulas, but it is not necessary.

3.2 Total information system costs

Determination of total volume of costs includes:
- Purchase costs of hardware,
- Purchase costs of software including license prices,
- Cost of implementation of solution: analysis, specification, implementation, training, documentation and so on,
- Specification of operational costs of information system for a period of five years:
  - maintenance costs,
  - upgrading,
  - HR costs,
  - eventually other operational costs.

Sum of these partial costs would be total costs of respective information system, which expresses investment price for the calculation of ROI.

3.3 Specification of material and intangible contributions of information system

Specification of material and intangible contributions of information system is related to characteristics of contributions.

Quantifiable contributions are set based on calculation with parameters such as number of documents, processing time, space, wages and others. These contributions are nested mainly in:
- Minimization of paper copies – it is not necessary to copy,
- Reduction of costs of standard archive – it is not necessary to fully service including transport, discarding, room and equipment, security, air-conditioning and so on.,
- Reduction of costs of individual workplaces – limitation of local storage rooms, folders, stationery and such,
- Increase of work productivity – that means saving of time when searching for information and documents
- Saving of operational costs by means of truncating and quickening of document processing processes within information system,
- Saving of communication costs – it is not necessary to solve individual problems by means of fax and / or telephone, time lags in communication are eliminated,
- Savings and quicker solving of customer inquiries and problems,
- Lowering of requirements for hardware upgrades.

**Hard to quantify contributions** are:
- Impossibility of losing or destruction of document,
- Cooperation of workers during document creation,
- Management and evaluation of project documentation administration,
- Higher work productivity of individual workers in course of document processing,
- Multiple usage of documents instead of creating a new document,
- Less elaborative routine document processing.

- Unquantifiable contributions are represented by:
  - Better knowing of management,
  - Faster decision-making processes,
  - Improved transparency of business processes,
  - Usage of documents in various context processing,
  - Improved communication among workers,
  - Improved employees’ satisfaction.

Return of investment is in practice valuated based on volume of ‘quantifiable contributions’.

It is advised to include ‘hard to quantify’ and ‘unquantifiable’ contributions in course of return of investment calculation in such manner that contributions expressed in numbers are included to schedule base and hard to quantify and unquantifiable contributions are estimated in percentage volume.

### 3.4 Calculation of return of investment

In order to calculate return of investment, basic formula for ROI (Return of Investment) indicator is used as a base. Concrete values of expected contribution and total costs of information system are installed to the formula.

\[
ROI = \frac{\text{contribution}}{\text{IS costs}} \times 100 \%
\]

Expression by numbers is often source of disputes in scientific literature – whether to use net current value or whether to include tax rate. In practice, contribution is most often expressed in numbers by direct savings of operating costs.

**Determination of selected contribution** expressed numerically consists in direct savings as a result of lowering the elaborateness of document processing is stated for instance in Table 1.

#### Table 1: Expression of direct savings numerically as a result of lowering elaborateness of document processing

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>P 1</th>
<th>P 2</th>
<th>P 3</th>
<th>P 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employees</td>
<td>40</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Savings hours per month</td>
<td>370</td>
<td>50</td>
<td>20</td>
<td>10</td>
<td>40</td>
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<tr>
<td>Document 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Number of employees</td>
<td>8</td>
<td>2</td>
<td>2</td>
<td>4</td>
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</tr>
<tr>
<td>Percentual load / docs</td>
<td></td>
<td>10</td>
<td>20</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Worker equivalent</td>
<td>0.8</td>
<td>0.2</td>
<td>0.4</td>
<td>0.2</td>
<td>0</td>
</tr>
<tr>
<td>Document 1</td>
<td>IS contribution (hours)</td>
<td>40</td>
<td>10</td>
<td>20</td>
<td>10</td>
</tr>
<tr>
<td>------------</td>
<td>------------------------</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td>Number of docs/month</td>
<td>1 000</td>
<td>250</td>
<td>500</td>
<td>250</td>
<td>0</td>
</tr>
<tr>
<td>Number of employees</td>
<td>10</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>Percentual load / docs</td>
<td>20</td>
<td>0</td>
<td>0</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Worker equivalent</td>
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<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>IS contribution (hours)</td>
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<td>0</td>
<td>40</td>
</tr>
<tr>
<td>Number of docs/month</td>
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<td>1000</td>
<td>0</td>
<td>0</td>
<td>1000</td>
</tr>
<tr>
<td>Number of employees</td>
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<td>0</td>
<td>0</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Percentual load / docs</td>
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<td>0</td>
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<td>30</td>
<td></td>
</tr>
<tr>
<td>Worker equivalent</td>
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<td>2</td>
<td>3</td>
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<tr>
<td>IS contribution (hours)</td>
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<tr>
<td>Number of docs/month</td>
<td>10 000</td>
<td>0</td>
<td>0</td>
<td>5 000</td>
<td>5 000</td>
</tr>
</tbody>
</table>

Source: Own elaboration

**Meaning of data in Table 1:**
- P1 – P4 individual workplaces
- Number of employees number of workers within certain workplace who process or file given document type
- Percentual load / docs percentual utilization of workers processing given document type (% per day)
- Worker equivalent elaborateness of processing of given document type formulated in equivalent unit (number of employees * percentual load per document) formulated in worker equivalent units
- IS contribution estimation of time saving (in hours) of workers based on preliminarily specified functionality of future information system – time savings on searching, processing and such,
- Number of docs/month number of documents of given type processed in the workplace per month – it is a test data to valuate elaborateness and savings.

Calculation of direct annual savings based on reduction of elaborateness according to Table 1:

**Contribution** = saving of hours per month * price of one standard hour * 12

Sample calculation for price of one standard hour was set 300,- CZK:

Contribution = 370 * 300 * 12 = 1 332 000 CZK

Further direct savings of costs can be reached for example by reduction of costs for printing of documents, storage, and reduction of workers on reception in filling room and so on. The amount of savings has to be determined based on analysis or current state of the company.

Amount of total costs of information system (assuming 5 years usage) is expressed in this model case as follows:
- Purchase price 2 000 000,- CZK
- Maintenance price 300 000,- CZK / year, (1.500.000,- CZK for 5 years), which means that total costs are 3 500 000,- CZK.

By installing the value obtained, we can calculate value of ROI indicator:

\[ \text{ROI} = \frac{\text{contribution}}{\text{purchase price of IS}} \times 100 \% \]

Calculation is done in two alternatives. The first alternative is based only on contributions, which can be expressed in numbers; the other alternative considers contributions which are hard to express numerically or even those which could not be expressed numerically at all, which are included by means of schedule base.
1st alternative: contributions are expressed only by amount of contributions expressed by numbers:

\[
\text{ROI} = \left( \frac{1\,332\,000}{3\,500\,000} \right) \times 100 = 38.06\%
\]

**Return period** in years is determined by reciprocal normalized value ROI value and for this particular case it is **2.63 years**.

Return of investment period in this case equals 2.63 years, which is similar to common ROI periods for instance DMS systems (generally 1 to 3 years).

2nd alternative: contributions include hard quantifying and not quantifiable contributions:

- hard to quantify contributions were estimated as 20% of volume of contributions expressed in numbers,
- unquantifiable numbers were estimated as 10%.

\[
\text{ROI} = \left( \frac{1\,731\,600}{3\,500\,000} \right) \times 100 = 49.47\%
\]

**Return period** with consideration of all the contributions was shortened to **2.02 years**.

4 Conclusion

Significance of relevant information obtained in real time rests in lowering the risk of manager’s incorrect decision. Approach to information, obtaining of information, transfer and valuation is purposeful – its aim is to find and utilize hidden reserves to increase corporate potential. In some companies implementation of economic part of ERP is preferred, not considering reaching of planned economic contribution or innovation of corporate processes. Valuation of information from economic viewpoint is important, but in course of obtaining the information we have to consider information viewpoint.

Costs necessary to obtain the information needed could be lowered by selecting suitable information system. Investments related to purchase or extend of information system are usually valuated by means of ROI indicator. Quantification of expected return within this indicator is, in scientific literature, source of disputes – whether to use current net value and whether to include tax rate. In practice the return is most often expressed by direct savings of operational costs and return of investments is usually valuated based on enumerable returns. It is recommended though that those returns which are hard to express or even not possible to express in numbers would be included to calculation of return of investment. Schedule base is then determined by enumerable returns. Quantifiable returns and unquantifiable returns are then estimated in percents.

**References:**


