

# Economic Information Systems for Small and Medium Businesses and Evaluation of Return

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*Abstract:* From manager's viewpoint, the most fundamental requirement in the process of information gathering is simple and quick information obtaining process. That implies technically stated requirement – information system has to be technically capable of providing information in optimal rate, in the fastest and the safest possible manner. Next criterion stems from the structure of users, because their IT literacy and abilities in the area of computer technology can present a certain limitation of up-to-date technologies usage. Decision of implementation of new information system is, therefore, a problem including not only technical, economic, but also human aspects. The aim of this article is to describe valuation of return rate of information system used in practice and to present the valuation on an example. Further, analysis of ERP systems offered in the Czech Republic to small and middle-sized businesses is performed with relationship to managers' requirements.

*Key words:* Economic Information System, Requirement for Information System, Return of Investment

## 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 [4], [10], 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 [5].

## 2 Problem Formulation

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 [14].

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 [6] – 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

Every company attempts to organize its activities in the most effective way [11]. 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 value:

- Volume of information – for high volumes it is necessary to value, 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 value utilization for years to come, development possibilities, compatibility with other systems or subsystems and so on [7].

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.

#### 3.1.1 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.

### 3.1.2 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 valued 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.

### 3.1.3 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.

$$\text{ROI} = (\text{contribution} / \text{IS costs}) * 100 [\%]$$

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

		<b>Total</b>	<b>P 1</b>	<b>P 2</b>	<b>P 3</b>	<b>P 4</b>
<b>Employees</b>		40	10	10	10	10
	<b>Savings hours per month</b>	<b>370</b>	<b>50</b>	<b>20</b>	<b>10</b>	<b>40</b>
<b>Document 1</b>	Number of employees	8	2	2	4	0
	Percentual load / docs		10	20	5	0
	Worker equivalent	0.8	0.2	0.4	0.2	0
	<b>IS contribution (hours)</b>	<b>40</b>	<b>10</b>	<b>20</b>	<b>10</b>	<b>0</b>
	Number of docs/month	1,000	250	500	250	0
<b>Document 2</b>	Number of employees	10	5	0	0	5
	Percentual load / docs		20	0	0	20
	Worker equivalent	2	1	0	0	1
	<b>IS contribution (hours)</b>	<b>80</b>	<b>40</b>	<b>0</b>	<b>0</b>	<b>40</b>
	Number of docs/month	2,000	1,000	0	0	1,000
<b>Document 3</b>	Number of employees	20	0	0	10	10
	Percentual load / docs		0	0	20	30
	Worker equivalent	5	0	0	2	3
	<b>IS contribution (hours)</b>	<b>250</b>	<b>0</b>	<b>0</b>	<b>125</b>	<b>125</b>
	Number of docs/month	10,000	0	0	5,000	5,000

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:

$$\text{Contribution} = \text{saving of hours per month} * \text{price of one standard hour} * 12 \text{ (for 1 year)}$$

Sample calculation for price of one standard hour was set 60 CZK, assuming 5 years usage:

$$\begin{aligned} \text{Contribution} &= 370 * 60 * 12 * 5 \\ &= 1,332,000 \text{ CZK} \end{aligned}$$

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:

$$\text{ROI} = (\text{contribution} / \text{purchase price of IS}) * 100 [\%]$$

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.

**1<sup>st</sup> alternative:** contributions are expressed only by amount of contributions expressed by numbers:

$$\text{ROI} = (1,332,000 / 3,500,000) * 100 = 38.06 \%$$

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 of for instance DMS systems (generally 1 to 3 years).

**2<sup>nd</sup> alternative:** contributions include hard to quantify 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 %.

$$\text{ROI} = (1,731,600 / 3,500,000) * 100 = 49.47 \%$$

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

### 3.2 Economic systems for small and middle sized businesses

In this section of the article selected economic systems are described offered in the Czech Republic for small and middle sized businesses. Currently, there are 109 systems on the Czech market which are designated as economic systems for small and middle sized businesses, but not all of them are suitable from corporate management viewpoint. The

EIS application helps companies to manage the diversity of national and international trade [2].

Selection of ERP systems is performed for companies with more than 25 employees; requirements for information system were consulted with managers from 12 production companies. Required modules in ERP are used mainly for financial management. Requirements of managers were fulfilled only by 6 products which could be characterized in following manner:

AZ.PRO (product of PROSPEKS-IT, a. s. [12]) - information system for Microsoft platform, modular system includes areas Economics and Finance, Long-term properties, HR and Wages, Marketing and Sales, Purchases and Storage and other applications.

BYZNYS VR, BYZNYS WIN (product of J. K. R., spol. s r. o. [9]) – tools for complex planning and management of all key business processes. Extent of modules offered and high level of variability makes ERP systems of BYZNYS level capable of covering needs of organizations from various branches.

ERP i/2 easy (product of Polynorm Software AG [3]) – pre-set corporate information system for business and distribution companies. Price includes powerful database Progress and modules Purchase, Sales, CRM, Storage, Financial accounting and Properties. It is possible to add other modules, for instance Cost centers, e-shop and more.

IFS Application (product of IFS AB [8]) – stable and robust information system with short response time and extended globally. A great advantage is the fact that the product is multi-lingual.

SAP BUSINESS ONE (product of SAP ČR, spol. s r. o. [13]) – fully integrated, affordable and localized ERP solution for small and middle sized businesses, delivered and implemented by local certified partners. Support of transaction process of data storage, built-in CRM functionality, intuitive control, Software Development Kit for implementation partners, simple integration with other third-party products and SAP products, patches and new versions in guaranteed time intervals, full support according to SAP company standards.

More detailed comparison of selected ERP and their modules is stated in Table 2.

**Table 2** Characteristics of ERP and their modules

Product name	AZ.PRO	Business VR	Business Win	i/2easy	IFS Application	SAP Business One
<b>CUSTOMER SUPPORT</b>						
Number of customer support service employees/hot-line	5	14	14			24
Number of product consultants in CR	20	30	30		47	142
Regional representation		YES	YES			YES
<b>SYSTEM FUNCTIONALITY</b>						
Double entry accounting	+	+	+	+	+	+
Cost accounting	+	+	+	+	+	+
Claims and liabilities	+	+	+	+	+	+
Cash	+	+	+	+	+	+
Bank	+	+	+	+	+	+
Purchase – sale	+	+	+	+	+	+
Property	+	+	+	+	+	+
HR and wages up to 25 employees	+	+	+	+	+	+
HR and wages above 25 employees	+	+	+	+	+	+
Financial planning, financial analysis	+	+	+	+	+	+
Storage economy	+	+	+	+	+	+
Transport	+	+	+	+	+	+
Production	+	+	+	+	+	+
<b>OTHER FUNCTIONS AND CHARACTERISTICS OF THE SYSTEM</b>						
Accounting in foreign currencies and currency gaps	+	+	+	+	+	+
Report generator, report adjusting possibilities	+	+	+	+	+	+
Reports provided by default	+	+	+	+	+	+
Trip book	+	+	+	NO	NO	+
Link with MS Office	+	+	+	+	+	+
Link with e-commerce (internet shop)	+	+	+	+	+	+
Barcode processing capability	+	+	+	+	+	+
Link to homebanking - internetbanking	+	+	+	+	+	+

Possibility to invoice more companies at once	+	+	+	+	+	+
Logging of changes in data	+	+	+	+	+	+
Arbitrary fiscal year	+	+	+	+	+	+
Activ tax calendar	+	+	+	NO	NO	+
Cash flow management (including reporting)	+	+	+	+	+	+
Claims Management	+	+	+	+	+	+
Replication of data HQ - branches	+	+	+	+	+	+
Checker sale	+	+	+	+	+	+
Intrastat	+	+	+	+	+	+
CRM - active management of customer relations	+	+	+	+	+	+
Reporting according to other norms (IAS, IFRS, GAAP)	+	+	+	+	+	+
Users and user roles in system administration	+	+	+	+	+	+
Monitoring of insolvent registry function	+	+	+	+	+	+

Source: Own elaboration

Table 3 summarizes the technical details of the offered products and also indicates how long these information systems on the market are.

Service is usually not included in the price; the customer pays for one hour service around 900 crowns.

Information on prices of products not listed because the price depends on system configuration and the number of users.

**Table 3** Technical characteristics of ERP

Product name	AZ.PRO	Business VR	Business Win	i/2easy	IFS Application	SAP Business One
<b>SYSTEM ARCHITECTURE AND SYSTEM PLATFORMS (BRIEFLY)</b>						
<b>System architecture</b>	client/server, web, modular web-client/desktop-client, off-line client, mobile client	client/server, double-layer, thin client, modular, mobile client	client/server, double-layer, thin client, modular, mobile client	Triple-layer, 4GL, mobile client	NET, CORBA, InterNET, intranet, client/server component based, mobile client, thin client, triple-layer, web-client/desktop-client	Double-layer, client/server, web-client/desktop-client

<b>System platform – server operating system</b>	Linux, Unix, Windows 2000, Windows 98, Windows XP	Windows 98, Windows 2000, Windows XP, Windows NT 4, Windows 2000 Server, Windows 2003 Server	Windows 98, Windows 2000, Windows XP, Windows NT 4, Windows 2000 Server, Windows 2003 Server	Windows 2003 Server, Linux, HP Unix, IBM AIX(Windows Server 2008)	HP Unix, HP-UX, IBM AIX, Linux, SUN Solaris, Unix, Windows 2000, Windows 2003 Server, Windows NT 4	Windows XP, Windows 2000 Server, Windows 2003 Server
<b>System platform – client’s operating system</b>	Windows 98, Windows 2000, Windows XP, Windows NT 4, Windows 2000 Server, Windows 2003 Server, Linux	Windows 98, Windows 2000, Windows XP, Windows Vista, Windows 7, Windows NT 4, Windows 2000 Server, Windows 2003 Server	Windows 98, Windows 2000, Windows XP, Windows Vista, Windows 7, Windows NT 4, Windows 2000 Server, Windows 2003 Server	Windows 2000, Windows XP, Windows Vista, Windows 7	IBM AIX, Linux, SUN Solaris, Windows 2000, Windows 7, Windows NT 4, Windows Vista, Windows XP	Windows 2000, Windows XP, Windows Vista, Windows 7, Windows 2003 Server
<b>System platform - database</b>	Oracle, MS SQL Server, Progress ODBC	MS SQL Server	MS SQL Server	Progress	Oracle	MS SQL Server
<b>Mobile technologies – remote access</b>	+	+	+	+	+	+
<b>How long has the system been on market</b>	10 years	since 2007	since 2000	since 2005	9 years (in CR)	7 years, 5 years in CR

Source: Own elaboration

Table 4 sums up data about branches in the Czech Republic, where individual information systems are used.

**Table 4** Users of information systems in the Czech Republic – classification by branch

<b>USERS IN CR</b>						
<b>In which branches does the system have references in CR</b>	<b>AZ.PRO</b>	<b>BYZNYS VR</b>	<b>BYZNYS Win</b>	<b>i/2easy</b>	<b>IFS Applicat.</b>	<b>SAP Business One</b>
<b>Business and distribution</b>	+	+	+	+	+	+
<b>Services</b>	+	+	+	+	+	+
<b>Finance</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	+	+
<b>Public and state sector</b>	+	<b>NO</b>	<b>NO</b>	<b>NO</b>	+	+
<b>Utility</b>	+	+	+	<b>NO</b>	+	+
<b>Traffic and logistics</b>	+	+	+	+	+	+
<b>Production companies</b>	+	+	+	+	+	+



<b>Number of product installations (in CR)</b>	73	65	1180	100	38	300
<b>Volume of the largest installation (in CR)</b>	600	65	370	300	250	170

Source: Own elaboration

## 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 valued 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 valued 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.

If we focus on utilization of information systems for economists of small and middle sized businesses, then we can state that not all the products offered on the Czech market comply to management requirements. In accordance with technical parameters selected by MSP management, only six products offered were found compliant, but decision about implementation will be greatly influenced by their price and, therefore, also their rate of return.

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