Summary

of Ph.D. thesis entitled "Functional, efficiency and economic assessments of computerised information systems at small and medium sized enterprises"

Let me begin this summary with the history of my choice of the subject. My original qualifications are: a teacher of mathematics, informatics and project geometry. The primary reason for choosing these majors is that I have been attracted to mathematics since my childhood and besides, I wanted to get acquainted with the science of informatics, which was new at that time. My interest in economy evolved during my years at university already and over the years I have been making attempts to obtain professional and other qualifications in this field as well. During the years as a teacher at a university it has become a major consideration that I should equip my students with knowledge they may use as best as possible when they have graduated. This interest of mine led me to make use of the opportunity to study systems of administration first and then to learn about and teach integrated business management systems. This educational activity, my own experiences and the advice and inspiration from my supervisor led me to choose the assessment according to different considerations of computerised information systems at small and medium sized companies as my field of research.

My thesis deals with the subject in five chapters. In the first, introductory chapter the reasons for choosing this subject are given together with the topicality of the subject area and the research objectives and the methods used are also listed here.

The fist part of the second chapter deals with the history of the evolution of information systems. The evolutionary process of ERP systems follows the demands for information of large-scale companies. It was considered important to study this evolutionary process as it was the security to found the research as best as possible. The supply and demand aspects of the ERP market are also investigated in this chapter. The demand aspect was analysed through conducting surveys. In c carrying out the investigations I relied on my own surveys and the ones by BellResearch, GKI and other the publicised surveys by other companies. It can be stated that ERP is not yet wide-spread in SMEs but there are favourable trends observed. The supply market can be called saturated since besides international developing businesses small local companies are also found on the market. Subsidies from central government sources can also be said to have had a favourable effect on the implementation of ERP. The spread of newly emerging services (SOA, SaaS) is expected in the coming years and the number of small and medium sized enterprises using ERP may increase as a result of these services.

According to my survey businesses consider the financial module to be the most important one, which is followed by the general ledger module, the sales module and lastly by the stock management module. Businesses feel both the advantages and disadvantages if introducing ERP. Here I would like to stress the faster and better flow of information, the transparency of business processes and as regards the disadvantages, the extra amount of work and the time factor related to the introduction of the system.

The third chapter deals with the functional assessment of ERP systems. The system of requirements has been divided into two main groups: general requirements and module requirements. In order to define the general requirements concerning software quality were taken into consideration. General requirements are: safety, reliability, simple manageability, modularity, conformity to standards, ability to address parameters, freedom from redundancy, national acceptance, integratedness, interactivity, completeness, openness, system flexibility, flexible changeability. The chapter also enlarges on describing ERP systems with functionality suitable for TÉSZs and the extra functionality requirements set by food industry enterprises. The results of the analyses by functions were made use of in developing selection assisting models and the economic evaluation model.

Chapter four dealt with the selection and implementation of the ERP system. According to my findings in the technical literature the risk factors disadvantageously affecting the implementation of ERP may be as follows: concentration on technology, disregard for business aspects, lack of interest on the side of the partner taking part in the implementation, the popularity rather than performance effect, poor project planning, weaknesses in the system-planning approach of the company, the current state of affairs of the life cycle of the company's system, need for a performance assessment model. Two important moments were selected from the implementation process, pre-selection on the one hand and comparative evaluation on the other. Pre-selection means a selection whereby the offers are narrowed down to the solutions functionally suitable for addressing the requirements of the processes of the business. In order to support this pre-selection process an aid was designed, which was realised as an Internet service. This aid is a web based user interface where both interested people and users can register. The interested people fill in a data sheet compiled on the basis of a given set of considerations and would receive assist their decisions with a list of ERP systems meeting their criteria. ERP distributors prepare data sheets of the programs they sell on the basis of a given set of criteria, which then would be stored in a database and lists for interested parties would be made on the basis of this database. The involvement of ERP distributors is considered very important as this is the only way to ensure that the database is

up-to-date. The comparative evaluation establishes an order among the systems remaining in contest after the pre-selection. In order to enhance this process a decision supporting system was developed on the basis of a multifactoral evaluation system, with the help of which several ERP systems can be evaluated and an order can be established thereby assisting the taking of the suitable decision. The considerations pertaining to the individual projects and the weighing factors related to the considerations can be given in the multifactoral evaluating process at three levels of the hierarchy. The different systems are then compared on the basis of these data.

In the first part of the fifth chapter the methods applicable in evaluating ERP investments are collected. They are TCO, NPV, ROI and the time needed till earnings are made. The evaluation process differs from project to project but there are standard points that occur in most implementations. For the purpose of evaluating ERP systems a decision supporting system ERP_{Eco} was developed, which consists of several sequential modules. As regards giving the data, there are three important modules: “Licence calculator”, “Expenses” and “Quick calculator” modules. The “Licence calculator” calculates the price of the licence depending on the functions. Minor expenses, such as, hardware, software, consulting, personal costs and other categories related to the implementation of ERP can be given in the “Expenses” module. The “Quick calculator” quantifies into functions of certain factors, direct and indirect earning resulting from increases in income and decreases in costs. The calculator does the evaluation in the “Summary”, “FIA” and “Diagrams” modules. The textual evaluation can be prepared in the knowledge of these data. The three case studies conducted for the purposes of this thesis were also included in this chapter. The three case studies were prepared at three very different businesses. The reason for this is that I wanted to test the operational ability of the ERP_{Eco} system in different situations, in projects of different purposes. The first case study showed a very instable picture while the other two seemed to bring returns within three years. There seemed to be differences in putting together the quick calculators as well. New ones tailor-made for the specific project had to be made for each project after the situation was analysed. No conclusions as regards the repayment of ERP project can be drawn on the basis of the three case studies but attempts were made to amend the calculator with all possible characteristics so that it could be applied in an ever widening circle.

It can be drawn as a general conclusion that businesses in the SME sector do not make a full use of the functions of ERP systems. In the period of introduction and also in the subsequent one(s) users stick to the methods and processes already well-established and begin

using the full functionality of the system after a considerable period of time has passed. This can give an explanation for the fact that the total number of businesses surveyed uses the functionality of ERP only up to 27.6% and in small business this percentage goes down to an even smaller figure of 25.7% (ABERDEENGROUP, 2006). This is the reason why, of course, they have to pay more TCO per function. The Aberdeen group strongly recommends that small businesses should aim to counterbalance the limits caused by the implementation itself by making good use of the advantages and the lower TCO. Where ERP is still to be implemented, hardware price performance and a supply model like SaaS remove the obstacles to the implementation and ERP can make it possible to businesses to become competitive on the market. Furthermore, small businesses should endeavour to balance business processes and software potentials, to automate earlier manual processes that were based on the spreadsheet and to extend the implementation to all their basic business activities. On the other hand, they should never fall into the trap of believing that any single ERP implementation will ever be complete.