

## SYNERGY OF INTEGRATED ENTERPRISE RESOURCE PLANNING WITH ECONOMIC RELATED GEOGRAPHIC INFORMATION SYSTEM

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### Abstract

From technical and economic aspects the study examines that how the version of the most advanced GPS-based positioning system developed for agricultural is able to help the companies in the practice and how it collaborate with ERP systems. The provided data by the system make available for direct (online/offline) database building, not requiring manual recording of data, and link it to other databases, and provide a possibility for several further economic analysis based on these data. The aims of the research are:

- defining the structure of the database based on the requirements by the corporation;
- identifying and organizing the manageable tasks and methods during management, (process) monitoring, decision establishment;
- measuring the required data needed for the databases;
- describing further options and possibilities.

The study covers not only the recording the data of the machine operation, but also facilitate the optimization of production process and evaluate the possibilities helping protection of corporation property as well as installing it to ERP systems.

### Objective

The authors of the examined bibliography agreed that information – similar to capital or labour (i.e. human capital) – has become a resource. Information management is not only the science of management information system, nor the technique of creating end user software, nor just informatics or system organization, but all the aforementioned jointly. Probably somewhat more than these: an approach, economic technique for economists, system organizers and engineers, whose aim is a cheaper use of information resources and making a better use of the corporate information assets. (DOBAY, 2003.)

Multi-faceted information and the smooth flow of these among the interlinked areas concerned are indispensable of creating and maintaining the economic system of a company. Information flowing within the company appears in various shape and ways, and requires differentiated management according to their characteristics. (PARÁNYI, 1999)

For a company to be competitive and successful, several resources are needed. According to ANTAL-MOKOS (1997) et al. resources are the inputs of a company's value chain that could be interpreted most widely; i. e. includes all factors that are needed in production and service activities. Such resources are labour, raw material, energy, capital and eventually information, knowledge. (KOPÁNYI, 1991; ARATÓ – SCHWARZENBERGER, 1993).

The role of information increases in each and every sector of social life, in education, in public administration, in research and development, in entertainment, and last but not least, in the economic life, production and services as well. Information as a resource is created, communicated, used, maintained, retrieved, re-used, re-wrapped, re-communicated and made available in the life-cycle of information. (CHIKÁN, 2003). RAFFAI (2006) also highlights the resource aspect of information and that information has to be produced, purchased and used similar to other resources.

Business-intelligence software can gain data from diverse sources, ensuring their plenitude and redundancy-freeness. These software can implement reports and focus on the main competencies of the company. Additionally these can proactively identify, provide priorities to and solve problems. Moreover, these can improve organizational cooperation, increase the exploitation of resources, and help in elaborating fact-based decision making methods that apply to the entire organization. Corporate proceedings become more transparent, more information is available and the consistency and accountability of operational processes increase.

Harmonic collaboration between GPS systems and corporate information systems could play an important role in achieving, promoting and maintaining these.

In case of agricultural companies in Hungary, the Itineris Ltd. has the biggest market share among the companies dealing with GPS technology; almost 600 companies use their system. The activities of the company cover the neighboring countries, too. In the research, the company was reviewed as software developer.

### Materials and methods

Information was revealed via conducting depth interviews. The depth interviews were conducted among the leadership and the affected employees of the user company, and also the leadership of the merchandiser, service providing company.

Besides the leadership of the software developer, service provider company, the research also included leaders and nearly 30 employees (end users, operators, administrators, middle management, quality management executives) of 5 agricultural companies.

The companies that were subject to the query belong to the significant agricultural companies of the Northern Great Plain Region.

The software developer company in the survey has the most significant market share in merchandizing GPS technology. The interviews covered 6 main areas: logistics and controlling, cost efficiency, safeguarding assets, planning, and collaboration with ERP and user support.

The responses were ranked on a scale graded 1 to 5, thus numeric values were assigned to the responses, which enabled the use of quantitative statistical methods.

### Result and discussion

Based on the Figure 1 significant difference can not be found among logistics and controlling, cost-efficiency, safeguarding of assets and user-support.

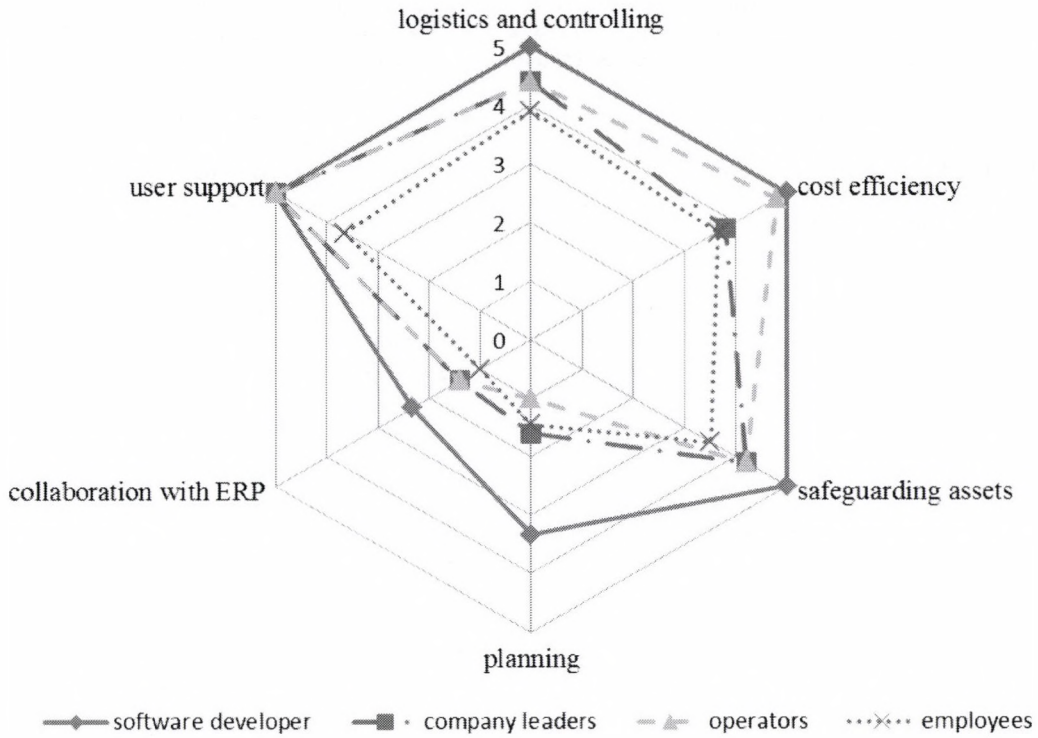
In user support, the reviewed software-developing company operates prominently. The partner companies were satisfied with them at almost every level of this area.

Differences in opinions regarding cost-efficiency are caused by the costliness of the system that can be balanced with financial support.

As it can be seen in the Figure 2, according to the results of the survey, logistics and controlling, cost-efficiency, and user support are not significantly different. This was to be expected based on the radar chart constructed from the means.

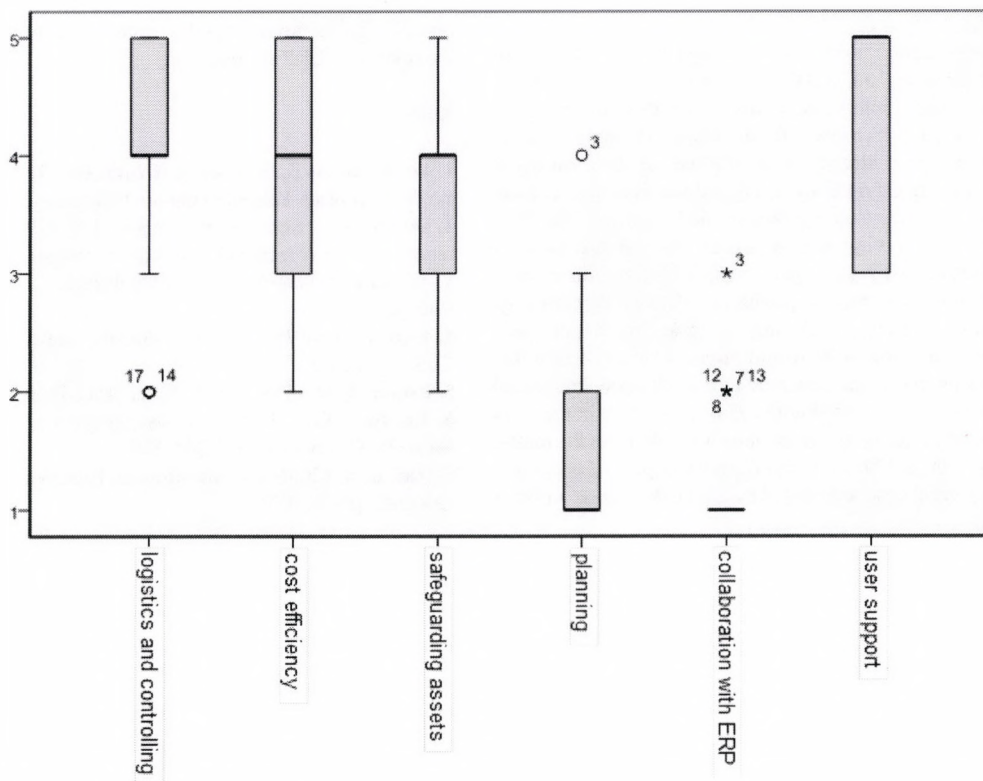
However, there is a significant difference among safeguarding of assets and logistics and controlling, since these are in different ranges.

Based on the depth interviews it can be stated that the role of the system in logistics and controlling does not come to an end by checking the execution of the delivered task; it continues having an effect in the optimization of the activities, too.



Source: Own construction

Figure 1. Average values of factors according to the depth interviews



Source: Own construction

Figure 2. Boxplots of factors

During a fulfillment-examination there is the possibility of making quality and quantity examination beyond the yes-no results. These options can further increase the efficiency of the operation since the process can be analyzed in a causal relation. An interrupted process can be analyzed precisely, and the knowing the exact phase and state of things facilitates the termination.

Quality analysis of the activities performed offers further opportunities for the company to have its processes in grip and have a complete control over them; since the quality of the work done significantly relates to the quality and value of the product produced.

With the help of the information provided by this system, the optimal transportation and driving route can be analyzed, which could result in significant cost-reduction. Quality analysis is an option in the case as well, thus the problems revealed during these examinations can be solved in the short-run. This way the company can decrease the possible losses to the minimum; the losses which would come from deficiencies and not accurately done activities. Thus the profit can be maximized.

Opportunities provided by the system include the use of working hours, and optimization of working within the boundaries of the legal framework. In this case notions of effective working hours, ignition off, ignition on (ACC), and obligatory resting time has to be mentioned. The aim is to increase effective working hours to the maximum whereas decreasing ignition off and ignition on (ACC) to the minimum, so that obligatory resting time comply with the legislative provisions. Optimal resource usage can be defined when all these conditions are fulfilled.

Regarding the safeguarding of assets especially the protection of the presence of devices that does not mean preservation of their conditions. With the introduction and spread of the opening sensor of the fuel system that is to be developed, if continuing its development for the inner defense, a higher standard could be reached in this field, too.

Both figures depict very well the significant differences, especially in planning and collaboration with the ERP system.

Based on the depth interviews it turns out that the difference in fields of planning has its roots in the alternatives that the software developer companies already have worked out to completely maintain the planning functions, but in order to proceed, a closer cooperation of the partner companies would be needed. That does not only mean observing the machines through the supplier system and introducing a company owned fuel station system, but a complete insight into the production data of the company. Knowing these, company leadership excludes this opportunity. Because if several companies would improve this system to the level of planning that would mean that all production data would get into the same hand, production data of several companies would be stored at the same server, thus it would raise the matter of trust, which should be observed from the aspect of economic moral, or in several case are treated by the leadership as a matter of principle.

In our opinion a feasible result of these is that in the case of Hungarian agriculture companies in the area of ERP systems breakthroughs were born mainly in leadership decision support systems. Two significant companies are on the market: Agrovir and Agroorg. The sum of the software-users of these companies does not reach up to the half of partners of the GPS software-developer company examined in our survey. Based on these the conclusion can be drawn that nowadays in Hungary the joint usage of GPS systems with decision support systems is not typical, even though the opportunities of collaboration among these systems are given and would result in numerous advantages.

The cooperation of these two segments is in progress. There are several examples of partial data transfer. Still GPS technology offers numerous possibilities apart from the above mentioned unexploited by the present decision support systems.

When conducting the research we brought up, that it could become an ERP for e.g. service provider companies. It records the activities done, can print operation log form and route-sheets, thus it could also prepare an invoice or its records of expenses could serve as a base of internal accounting.

## Conclusions

As a result of the developing technical equipment companies possess ever more precise devices, which could mean a huge advantage on the market compared to the competitors who are not able to keep up, but could also pose hidden dangers. Fear of the new and lack of trust often occurs during the innovation procedures. These have to be learnt to handle in the right way, because they can provide opportunities for the company to emerge and cope with the market leaders.

As the query shows, it is a continuously and dynamically developing program; moreover they are in a really good relation with their partners. Great opportunities lie in these which when used effectively not only supports the work of the companies and makes them successful as GPS systems, but could also take over the role of an ERP system.

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