



Szent István University

THESIS OF THE DOCTORAL (Ph.D.) DISSERTATION

BEHAVIOUR ANALYSIS OF THE HUNGARIAN SMALL AND MEDIUM ENTERPRISES  
REGARDING INFORMATION MANAGEMENT, ESPECIALLY TO THE INFORMATION  
MANAGEMENT ATTITUDE OF SENIOR EXECUTIVES

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# 1. INTRODUCTION

## 1.1. The notability and reality of the topic

The idea, that information has become an influential productive factor in the economic processes of companies has been long present in modern economics. Globalisation tendencies in the world economics, sharp-edged competition in the competitive markets, crisis symptoms of the macro and micro markets all show to the same direction, the empowerment of the efficacy of economics.

In my opinion any tool, principle or piece of information conducing to the efficacy of economics is actual. Information, in other words management of the information is a factor conducing to the efficacy of economics, therefore when I decided to focus my research on the information management of small businesses I believed that the topic is considered actual and notable for the executives of the companies involved in the research as well.

The value of the company, the brand equity is by multiplies dependent from factors ensuring the activities of the company and the stability of its market operations. The ability to control routine business processes, and economic control over the business development activities enjoy top priority among the values of a company. Information, information management systems and the economics of information are the basic components of the ability to control, consequently it is worth to examine these productive factors in a cause and effect relation.

In my opinion the question in the setting of small businesses today is not whether they employ information management information economics systems, or create and understand the results, but the manner of the processes. The efficacy of information economics, such as in the case of other productive factors, may have a crucial impact on the global economics of the company.

This statement is indeed true for small businesses, where the realization of the continuity of the business and the identification of bottlenecks, flexible and fast alignment to the market are the tokens of survival on the competitive markets. These players are the ones, lacking extra funds and reserves, who are exposed to and dependant from information, and where the faulty production and utilization of the information may lead to critical economics situations. The "economics accuracy" of the C-level executives may fundamentally influence the market positions of theses companies.

It is important to analyse and understand the attitude of the C-level executives of the small businesses , because in most of the cases emotional and subjective factors play an important role in making decisions in the hectic market conditions. In different fields of economics, where for example specific technical knowledge is essential to overlook the given field or sector, the amount of subjectivity may become crucial; informatics and information economics is inevitably an important field from this point of view. Understanding the root cause of non-planned or non-fundamental economic procedures, the alternation of these procedures is a crucial task in the operation of a company management.

## 1.2. Objectives and tasks to be solved

Researches on the topic summarise the "external" objective factors that support or block the successful implementation of information economics and information systems. The research I chose examines the corporate information economics from a new viewpoint, seeks answers to the question relating to the views how executives within a company see the information economics activity of their company, and how their attitude influence the efficacy of the information economics scheme employed at their company.

Based on the above mentioned I raised the following research questions:

- What are the fundamental problems of executives with the information economics of their company?
- Do they realize and understand the notability of information economics, that modern economics imputes to the field?
- Do they see their own limits?
- Where do they seek for support?
- How does the organisational structure and system of processes developed and managed by them correlate with their attitudes towards information economics?
- What are their plans concerning the information economics scheme applied at their company?

### **1.3. Drafting the hypotheses of the research**

H1. The C-level executives of Hungarian small businesses do not dispose adequate knowledge and experience on information economics, nor are aware of the information economics practice applied at their company.

H2. The executives of Hungarian small businesses use the Enterprise Resource Planning systems for tracking the economic activity of the company, the executive information functions of these systems are not utilised by them.

H3. The size and profitability of the company significantly determine the attitude of the C-level executives of small businesses towards information economics.

H4. Executives of small businesses with foreign owners perform more planned and structured information management activities as compared to the executives of 100% Hungarian small businesses.

H5. The C-level executives in the range of the examined businesses do not possess objective, measurable, processable and controllable system for measuring the efficacy and the influence of the applied information economics activity on the economics of the company. Consequently their attitudes towards corporate information economics is formed by subjective, and impressions that cannot be measured with economics measurements.

## **2. MATERIAL AND METHODOLOGY**

### **2.1. The methodology of the research**

Throughout my research I tried to follow interdisciplinary approaches. I used the aspects and toolkits of numerous sciences to build my research on the most exhaustive scientific basis. I utilized the theoretical and practical toolbox of business economics, micro-economics, information technology, executive finance, business finance, management and management theory and business management.

I started my research activity with processing the relevant literature in the topic. My major objective was to theoretically establish the following aspects:

- theoretical fundamentals of information management
- business management characteristics of small businesses
- theory of business management from the aspect of managing the resources of the company

To back up the methodology of my research I examined the qualitative and quantitative research disciplines. Qualitative research is a mainly unstructured method focusing on the understanding of the problem. Quantitative research identifies the data and evaluates them using statistical methods and principles. Due to the nature of my research I opted for the quantitative methodological approach. I chose the statistical cause-effect (determinist) method when setting up my quantitative research plan. This method reveals the causes and their effects from a statistical point of view rather than from direct observation (Scipione 1994)

I set up a research questionnaire, that I had planned to send to the companies to be involved in the research. When devising the questionnaire I used the guidance found in the book of Paul A. Scipione, titled Practical marketing Research (1994). The testing of the questionnaire was done with the involvement of 12 companies. As my research is focusing on the attitudes of C-level executives I tried to use a language that is still understandable from a business perspective, and to use special IT jargon only if necessary, when they are relevant to the discussion of information economics.

The method of collecting answers to the questions raised and its testing got the most and most radical feedback. The responding C-level executives noted that they would need the personal presence of the deviser of the questionnaire to properly answer the questions. Based on the feedback I decided to implement the initially quantitative questionnaire in the form of personal recording, supporting the efficacy of the completion of the paper, reducing the number of non-respondent subjects. Throughout the interviews I structured the interview in line with the order of the questions. I managed to reach my goal, as the interviewed accepted my request concerning the systematic processing of the questionnaire, which could have been realized only on condition the qualitative methodological goal was kept focus.

### **2.2. Defining the test sample**

One of the biggest difficulties in planning my research was to define the proper research target group. I chose the probability approach from the sampling processes, that is I chose at random from the examined population. This method ensures that the results of the research may be projected to the whole population with a predefined accuracy (Scipione 1994).

When planning my research I decided to perform the research on Hungarian companies, because:

- I wanted to accomplish a Hungarian research,
- no primary research of this kind - or in similar topic - has been done before at Hungarian companies,

- I could afford to conduct research only in Hungary,
- a more narrow (for example regional) or wider (for example covering other countries as well) research would not have established an ideal research volume, covering the scope of the population to be examined, the estimated number of responders or representation.

Another milestone of the research was that I studied the small business sector. My choice is underlined by numerous causes, including:

- I found this sector the most exciting from the perspective of executive information management and economics, as my presupposition was to find polarity in this segment, providing opportunity to reveal other contexts,
- at small businesses I presupposed that the C-level executives have more freedom in the field of resource management, than at big businesses, most of whom are operated in Hungary as a subsidiary of a multinational company, and who are given clear and ready to use methods from their parent company that have to be used without thinking. In my opinion these big business features would not have made possible the completion of a colourful research rich in context.

I tried to gather information from those C-level executives whose companies have been actively involved in the topic of information management and economics for some reason, that is my research is actual for them. In my opinion these companies, and their executives have relevant and useful experience that makes them capable of expressing clear views in connection with the questions, and are not only able to understand the quite wide range of information contained in the research but to answer them in a credible manner.

I found that companies employing 30-249 people, having net revenue between HUF 400 million and HUF 14 billion have institutionised information economics as a resource-planning question. I used the company register of Dun & Bradstreet to identify the company population, which named 5620 companies for this section. With the method of probability sampling I defined a company sample constituting of 400 elements whom I contacted with my research plan. My objective was to reach at least 25% of the CEO-s with my research. This objective was successful as I could involve 102 C-level executives into the research.

It is of crucial importance from the perspective of my research that I address C-level executives in the research and I evaluate their attitudes throughout my work. I defined the class of C-level executives as executives who have decision making competence at the given company in connection with the management of strategic resources, consequently in the field of information management as well. In most of the cases this criteria is met by the business executive, managing director or the CEO of the company, but among the 102 respondents we can find financial directors, or general and operative directors. I did not intend to involve IT managers into the research, as I supposed that their involvement is too influential in relevance with the questions of my questionnaire.

### **2.3. Applied quantitative analytical methods**

I conducted analyses by using three statistical methods on the database created with the questionnaire:

1. one dimensional analysis, in which I evaluated the replies given to the question on the basis of their frequency and then I defined the dominance of the replies given to a question.
2. multi-dimensional analysis with the help of cross-tables, where I tried to define contexts behind the answers given to different questions. The contexts between two nominal or ordinal variables were analysed with the Pearson chi-squared test ( $\chi^2$ ). After having consulted the relevant literature I performed 114 cross-table examinations taking into consideration my research

hypotheses. I dealt with those cross-tables where the 0 hypothesis was not justified, that is there was significant correlation between the row and the column variables. The Results section of my paper deals with the consequences of these cross-tables.

3. cluster analysis, where I used the toolkit of the hierarchic cluster analysis that can be defined in the Ward ordinal scale. The cluster analysis helped to find the answer whether it is possible to form homogeneous groups in the studied businesses, that share the same characteristic features based on the variables included in the analysis. In cluster analysis the researcher has to find those variables that cause the difference between the groups (Sajtos-Mitev 2007). In my cluster analysis I defined the variables based on my research expertise and the experience gathered as a result of the cross-table analysis.

At the compilation of my questionnaire I frequently used the answers measured on ordinal scales. The reason for this was the fact, that when testing the questionnaire I found that my C-level executive interview partners may be effectively guided through the elements of the questionnaire with such ordinal choice logic at the personal interviews. In the case of ordinal scales the categories may be sorted on the basis of a quantitative pattern, so we can say which of them are "better" or "more". However, the numbers do not indicate the volume of the difference between the objects (Stevens 1946). The Ward hierarchic cluster analysis proved to be the most suitable for the analysis of variables measured on the ordinal scale in the toolkits of the cluster analysis.

To implement the referred methods I used the SPSS v.19 software from IBM Inc.. The results of the guided execution of the software were exported to the Microsoft Excel database manager application, where I drew suitable diagrams. These diagrams are used in the Results section of my paper to demonstrate the results of the research.

### 3. RESULTS

In this section I will demonstrate the results of my research in the following structure:

#### 3.1. General features of the companies involved in the research

The companies taking part in the research show the following geographical distribution: 25% of the companies involved in the research are Budapest based, 15% have their headquarters in Pest county, the central region of Hungary seats 40% of the companies, the Transdanubian region is represented by 32% of the companies, while the businesses from the other regions of the country add up to 28%. More than half of the businesses (68%) are limited companies, 25% of the businesses are public limited companies, and 7% of them are unlimited partnerships. 59% of the C-level executives represented Hungarian businesses, so the rate of responders from companies with foreign owner is quite big, over 40%. Based on the data provided by KSH (KSH 2009) the majority of small businesses in Hungary (78%) were owned by Hungarian natural persons or companies. We can say that the proportion of companies owned by non-Hungarian entities is almost twice as much as their representation in the population. One may come to the conclusion that the C-level executives of businesses owned by foreign entities were more willing to answer the questions. In my opinion two motives may be identified in the background:

- the C-level executives of these businesses are generally more open towards scientific research,
- they have more experience in the field information economics and are happy to talk about them.

From the perspective of economic activity the studied businesses show a quite heterogenous picture as 18 industries were represented in the study. 27.5% of the businesses are involved retail trade, while 24% of the companies come from the FMCG sector. As for the net revenue of the companies 11% of them have less than HUF 500 million net revenue; approximately two third of the companies fall into the category of companies with a net revenue between HUF 500 million and HUF 1 billion, or HUF 1 billion and HUF 3 billion, while 30% of the companies realise more than HUF 3 billion net revenue. As for the number of employees most of the companies employ 50 to 500 people, 10% of the represented businesses employ less than 50 people. 6% of the companies employ more than 500 people.

Taking into consideration the profit and loss after tax I found that only 14% of the companies are not profitable, the majority of the responders belong to the prosperous companies. If we accept the assumption that the willingness to answer the questions correlate with the experience of the executive in the field of information economics, we can say that prosperous companies have more experience in the field of information economics. If we look at the export revenues we can see that more than half of the businesses realize export revenue between 1 - 30%, another 14% of the companies gain 50% of their revenues from export activities. 3% of the companies gain more than 70% of their revenues from export. Only 7% of the businesses are not involved in export activities. 43% of the interviewed companies do not have permanent establishment, while 26% of them have at least one establishment in the country. 15% of the companies have 2-4 establishments in the country, while only 11% of the companies have more than 5 establishments.

#### 3.2. Organisational characteristics of the studied businesses

The executive levels at the studied businesses are 2 or more. Only 5% of the companies apply structures with a sole executive level. This shows that the majority of the responders work in sophisticated organisational structures, where presumably ERP as an integration tool within the organisation plays an important role in the operation. The percentage of family businesses with single executive levels is negligible, so we can say that these businesses, where the existence of information economics is questionable, do not distort the results. 33% of the businesses employ

foreigners in the management. The percentage of those who have a degree in economics in the management shows a surprising result. As a result of the research it turned out, that 80% of the responders represent businesses, where the members of the management holding a degree in economics do not get a major vote. 70% of the surveyed businesses employ full time IT managers. At 18% of the surveyed businesses the person responsible for IT holds an executive position, at 44% head of department position, while at more than one third of the companies the IT technician is not held responsible for management issues. The overall picture is even more colourful, as only one quarter of the responding businesses assign roles to the head of the IT section in the strategical development of the management, and three quarter of the businesses do not ask the person responsible for IT in forming the company strategy.

The consequence of the research is therefore that at Hungarian small businesses IT and information economics does not enjoy dedicated attention from an organisational perspective, the CEO-s of the businesses identify the work of the IT manager basically with maintenance tasks, where the direct production of results on a company level and the resulting achievement based motivation is not characteristic. It is clear from the results of the research that almost all of the companies (91%) contract an external IT provider for performing IT tasks, but the distribution of the outsourced tasks is quite polarized: only 27% of the businesses order complex services, through which the IT structure necessary for the effective information economics could be provided in full scale. It is interesting to examine, that at 39% of the businesses the knowledge of the full time IT colleagues is poor about the business applications of the company, 33% of the companies evaluate this awareness as adequate, and only some of the companies were satisfied with the proficiency of the colleagues working on IT tasks.

To sum up the findings it is clearly visible, that the majority of the C-level executive think that the IT knowledge of their own team lacks major competences, though they spend on developing skills: only 12% of the surveyed companies do not spend on the skill development of the IT team, their majority (64%) spends maximum 10% of the IT budget on this purpose, another 18% spend up to 30% of this budget on training, while the proportion of companies spending more than 30% of the annual IT budget is negligible.

### **3.3. Usage characteristics of the IT solutions applied at the company**

The research revealed that 100% of the surveyed businesses apply an ERP system. These systems are mainly used for financial, accounting and sales operations or materials management operations.

The research revealed that CRM systems have not yet been popular among Hungarian companies. 10.8% of the surveyed companies apply some kind of mobile sales application, 7.8% of them run an on-line store, 6.9% of them have service solutions, and only 5.9% of them empower applications supporting sales. Marketing supporting functions have been introduced by 1% of the companies till the closure of the research. Business Intelligence applications are used by 20.6% of the surveyed businesses, mainly their ad-hoc reporting functions. The dashboard, simulation and balanced scorecard functions are seldom applied by Hungarian businesses. Among collaborative solutions the most popular one is the electronic banking solution - 33% of the companies apply it - and the built EDI connections, being present at 27% of the companies.

The majority of the businesses, 79% of them use their ERP system as only a transactional system. This finding is one of the most significant judgement on the information economics of Hungarian small businesses. Only 21% of the surveyed companies use business intelligence applications, and only half of them decided to use the same brand for BI solutions as for the ERP solutions.

At the time of the research almost 60% of the responding businesses had launched their ERP systems at least 7 years before the time of the survey. On the basis of the answers given by

executives of the companies involved it turned out that their majority calculates with an overhaul upgrade of the ERP system every 5-6 years, so we can estimate that they would like to upgrade information economics solutions more frequently in the future than they did in the past.

At 37% of the companies taking part in the research the VIA (corporate IT solutions) systems were operated solely internally, another 38% use them with internal and external operational support. Systems operated only in an outsourced scheme are negligible. It is important to note that 75% of the Hungarian small businesses develop and run their own VIA systems on internal infrastructural resources. This context is reflected in the pattern that two third of the responding executives handle IT systems as internal tools, but are likely to spend more on the fees of external service providers, than to the payment of the internal IT team.

I studied two more IT elements that represent the up-to-dateness of the ERP operation: 45% of the surveyed businesses do not have a save strategy and 76% of them do not have an emergency breakdown plan either. The last question of this section aimed to find out the opinion of the executives concerning the up-to-date state of the IT systems applied at their companies. 52% of the surveyed CEO-s are satisfied with the state of their existing systems, and evaluate their up-to-dateness as good or outstanding.

### **3.4. Launch and operational practices**

In 42% of the companies, the initiative to launch ERP systems started out from the related business executive, 23% of the cases it was the IT manager, 21% of the cases the launch was proposed by the management, while the owner was rarely initiative. This shows that information economics developments are basically operation oriented, that is are derived from transaction processing initiatives. This corresponds with another finding, namely that the majority of the business intelligence applications have only transaction-processing functions. The decision on the implementation of possible applications is made by the management in 66% of the cases. The executive responsible for IT related issues took part in the decision making process only in 12% of the cases, while the affected business executives took part in the process only in 17% of the cases. An earlier finding was also justified, that is the C-level executives do not regard the competences of their IT team adequate, therefore leave them out from making the decisions.

The vast majority of the companies involved in the questionnaire did no hire external advisors who could have supported or realized the selection procedures. This result in my opinion may also serve as a basis to evaluate the Hungarian small businesses and the information economics habits of their C-level executives: the earlier result bring to light those facts that underline that the surveyed executives are not aware of the context of information economics and do not think that their internal IT teams are professionally reliable, do not spend to develop the expertise of these teams, and spend more on external contractors than on their own employees, but on the contrary the majority of the executives do not turn to expert advisors when making decisions on the development of information economic questions, which are deemed so crucially important that in two third of the cases they retain the decision making rights to themselves. This contradiction, in my opinion is the root cause of several dysfunction and efficacy problems in the information economics of many Hungarian small businesses.

The answers given by the executives of the surveyed companies showed that half of the businesses failed to make a feasibility study for the project, 22% of them made it by using their own resources, and 29% of them contracted external service providers for the task. As regards project plans, 24% of the respondents said, that they did not compile a project plan for the feasibility project of the application, at the majority of them the internal colleagues made the plan, while potential suppliers were contracted in 27% of the cases. External advisors seldom took part in the compilation of project plans.

I also studied whether the executives make investment analysis examinations in case of information economics projects. The result is quite depressing: 43% of the respondents said that they neither made feasibility study or project plans, and only 13% of them make both.

I also studied the timing and schedule of the information economics projects. The most frequent timing was the 3 month preparation. As for the timeline for launch of the project 43% of the companies initiated the latest project for 4-5 months, from the start of the project to the launch of the live system.

In my study on information economics I also focused on the viewpoints taken into consideration by the executives when deciding on the supplier realizing the projects. At 31% of the companies price was the decisive factor, while at 22% of the businesses personal experience and proposals were taken into consideration. It is interesting to see, that professionalism proved to be convincing in 11% of the cases while references were taken into consideration at 8% of the companies. Among the decisive factors brand name, long term perspective, compatibility with existing applications, and same platforms running at the partners as a whole were deemed to be important only at one quarter of the companies.

The next set of questions I analysed in my research was the procedures applied throughout the information economics projects. I was curious how the executives of the studied Hungarian small businesses handle the information economics projects at their companies. 22% of the studied companies did not create a project sub-organisation at all in the company for the information economics projects. 47% of the companies involved said that though they created a project organisation, it did not work in line with the predefined characteristic features. 30% of the respondents said that the planned and realized project organisations correlated with each other. Based on the answers given to the question it turned out, that the 5 biggest and recurring problems were the following:

1. they did not define their needs accurately - 76%
2. people working in the project did not have enough time for working on the project - 69%
3. did not sign proper contracts with the suppliers - 64%
4. the planned schedule was prolonged - 61%
5. the planned project budget was exceeded - 60%

The first 5 problems reflects, that the studied executives mainly listed causes that depend on them or on the companies managed by them, so with other words they named their own operation as causes of the problems.

The information economics development projects realized at the studied businesses prolonged the timeframe secured for the project mainly by 10-15%. The budget allocated for the projects were usually exceeded by 20 - 30%. As a conclusion we can say that the studied Hungarian small businesses could hardly keep the allocated timeframe and/or budget for their information economics development projects. The results show that the budgets were exceeded by twice as much as the time allocated for the projects was prolonged. Because of the prolonged timeframe and the exceeded budgets executives may well say that these projects are uncontrolled.

### **3.5. Executive evaluation of the IT solutions applied at the company**

Based on the answers given by the executives of the surveyed companies the asset value of the introduced ERP system (including the licences, implementation, central host hardware) are between HUF 20 - 45 million in 70% of the cases and only 18% of the companies use assets worth more

than HUF 40 million. The average asset value in the sample was HUF 41 million. The average ERP operational value in the sample was HUF 8 million. The average ERP development value in the sample was HUF 3 million. From the study it is clearly visible that according to the executives of the surveyed companies there is inverse proportion between the asset value of the ERP systems and costs allocated for the operation and development of the ERP systems, demonstrated in the following breakdown:

*1. table: ERP asset value*

	ERP asset value		
	HUF 0 - 30 Million	HUF 31 - 50 Million	over HUF 50 Million
<b>Average ERP operational cost in the % of the asset value</b>	23%	19%	9%
<b>Average ERP development cost in the % of the asset value</b>	9%	7%	4%

*Source: own editing*

At 39% of the surveyed companies the IT manager has a predefined allocated IT budget, while 33% of the companies make budget calculations when they introduce a bigger IT investment. The survey pinpointed that 28% of the executives do not sign IT budget for their IT managers. The root cause of their decision is that executives do not assign budget responsibilities to the IT managers due to the lack of the management skills of the latter. I covered the financing aspects of the information economics related costs in the research. The majority of them (70%) use some kind of external financing, mainly tendering opportunities are favoured. Only 9% of the companies turn to banks for financing.

With the research I wanted to get to know what expectations the business executives had at the introduction of the ERP system. After analysing the results we can see that the executives' main motivation was to gain more control over the business processes, and as a result enjoy the benefits of a more secure operation and machine automated operation instead of human activities, that is the decrease in workforce.

The interviewed business executives listed numerous positive effects of the currently operated ERP systems. 71% of the surveyed companies highlighted the calculation of prime costs, but among others fine-tuned individual pricing and stock taking results (reduction in the stock levels, less costly stock financing, controlled procurement) were also mentioned among notable achievements. The familiarisation of customer habits and the accurate calculation of bonus has improved at more than 40% of the companies. It is interesting to note, that the two business objectives mentioned above - secure business operation, reduction in the staff - has been mentioned only at one third of the respondents. As for the negative results, 71% of the surveyed companies marked the increased transaction time, another 60% noted the radical increase in the IT costs. 52% of the companies think that their business processes have become more complex, and 47% of them evaluated negatively the dependency from the IT. 7% of the companies hired new employees in connection with the introduction of an ERP system. When analysing the negative results it turned out, that the responding business executives basically did not compare the positive and negative results of the information economics. When I asked them to quantify the advantages and disadvantages, it turned out almost without no exception, that the value of business benefits well compensate the increase in cost due to the introduction or extra investment need. The lack of value based analysis is backed up by other findings of the research, namely only 23% of the companies taking part in the research studied the payback effect of the introduced ERP system with investment economy calculations. At companies where the payback of the ERP was studied the average value of the internal rate of

return (IRR) was 16%, while the payback period (PB) was 14 month. I think that both values are good taking into consideration the yield and risks on the domestic investment markets.

67% of the surveyed companies said that the IT team is an appropriate partner in tasks related to the operation of the ERP system. This result basically contradicts some other findings of the research concerning the lack of trust in the competences of the IT team and IT has manager that has been stressed in the responses provide by the C-level executives.

Two third of the respondents noted among the problems that they were not aware of the payback and transparency of the investments and costs spent on the IT. Another basic problem of information economics at the surveyed businesses is that there is problem with the creation of the efficacy measurement values for the evaluations. The majority of the companies are open towards applying Key Performance Indicators (KPI) for the measurement of the efficacy of information economics.

In connection with the development of ERP applications 43% of the respondents said that they planned to develop their ERP system, 39% of them think that the development of business intelligence applications is important. 26% of the companies plan to develop their portals in the future. It is interesting to note, that only 10% of the companies intend to invest in the collaborative solutions and the management of customer relations.

### **3.6. The analysis of information economics attitude contexts with the support of cross-table analysis**

Based on my professional opinion and research hypothesis I chose those question pairs from the questions of the questionnaire where significant relationship may be assumed. In the research I discovered context worth evaluation among the following aspects:

#### **3.6.1. Contexts of the ownership**

I found significant context between the foreign ownership of a company and the full time employment of an IT technician. 83.3% of the companies in foreign ownership has an IT manager in the management, while this data reflected to the total population is only 69,6%. Similar context may be seen between the ownership and the strategic role of the employed IT manager. Though both ownership structures dominantly share the characteristic feature that the IT manager does not hold strategic roles in the economics of the company, but my observation underlined that in case of companies owned by a foreign entity, the assigned strategic roles mean almost twice as much representation as in the domestic companies. The relationship between the ownership and the number of the IT staff employed at the company can also be demonstrated. The Hungarian companies mainly (75.1%) employ 1 IT person, I rarely found an IT team consisting of more than 3 people. As opposed to their Hungarian fellows the companies owned by foreign entities employ at least 2 people in the IT team (28.6%), and 19% of them employ a team of at least 3 IT people.

The structure of ownership strongly correlates with the activity of external IT service providers employed by the company. Similarities may be experienced between the routines of the foreign owned and Hungarian companies in relation to the scope of services provided by external IT providers - office IT applications and the development of office+business IT. However, the difference is quite notable if we examine that the Hungarian companies do not put stress on the outsourcing of business IT applications (5%) as opposed to companies owned by foreign entities, whose positions in this field are almost three times bigger.

The same correlation may be visible among the operational principles of the VIA systems. 88.4% of the Hungarian companies use their VIA systems with internal operation or support, I did not meet companies using ASP. Hosting operation is also negligible in case of Hungarian companies, only 3.3% of them use it, though at companies owned by foreign entities the rate is almost 7.1%. In case of companies owned by foreign entities we can say that their operational map shows a more heterogeneous picture. We may come to the conclusion that the average asset value of the ERP system at companies owned by foreign entities is higher than in the case of Hungarian companies. The relation between the operational and development costs is about the same.

### **3.6.2. Industry contexts**

I looked at the effects of the industries of the companies taking part in the research. The findings show that in the 3 samples the among the most dominant industries executives of the metal and plastic processing companies use the most outsourced IT services, while on the other of this information economics model we find the companies involved in retail trade.

### **3.6.3. Revenue related contexts**

I found that the higher the net revenue of a company is, the more probable it employs a full time IT manager. Based on the results we may discover a significant relation between the net revenues of the studied companies and the operational form of the VIA systems. The analysis reveals that in case of different revenues different operational forms are applied. At companies where the net revenue is less than HUF 1000 million internal operation is dominant, in case of companies with net revenues between HUF 1000 - 7000 million this dominance is taken over by the hybrid of a partially internally and supported operation form. Companies with net revenues over HUF 7000 million hosting also comes into the picture (25%). I found that companies where the net revenue is less than HUF 500 million did not evaluate the payback of the ERP system (100%), though the rate at companies whose net revenue does not exceed HUF 7000 million falls below 40%. On the other hand, 50% of companies whose net revenue is over HUF 7000 million said that they had conducted ERP payback calculations. To sum up the findings we can say that, the business executives of companies whose net revenue is quite high pay attention to the professional economic analysis of the information economics investments at their companies.

### **3.6.4. Contexts of earnings after taxes**

I found that the higher the earnings after taxes of a company is, the more probable it employs a full time IT manager. The study revealed that there is significant connection between the strategic role of an IT manager and the earnings after taxes. I found that the earnings after taxes are proportional to the internal staff number of the IT team. It turned out from the results, that the connection is significant between the earnings after taxes and the activity of external IT providers. We may come to the conclusion that by the increase of the volume of the earnings the companies use more and more complex outsourcing services, mainly in areas with higher added value, for example in case of business intelligence applications.

### **3.6.5. Contexts of the management positions held by economists**

The significant effect of the composition of the management - by degree - was observed in 3 questions. We can say that managements containing mainly economists pay more attention to the information management and information economics in general. I also found, that the number of economists in the management has a significant effect on the fact whether the ERP system of the company is used as a transaction system or the company uses a BI (business intelligence) application as well. At 92.2% of the responding companies the ERP systems functions as a transaction system only. Only managements employing economists in at least 71% showed more

diverse distribution in the field. My research showed that nonetheless it is more probable in case of managers holding a degree in economics are in the possess of adequate knowledge and experience concerning the preparation and evaluation of investments, they are the ones who are more likely to hire external experts for these tasks.

### **3.6.6. Contexts of the internal IT team**

In my research I found that the more complex the activities of an internal IT team are, the more probable that the IT manager takes part in the development of the company strategy. One may notice connection between the activities of the internal IT teams at the responding companies and the operational form of VIA systems used at the companies. We may come to the conclusion that more complex internal IT team activities attract more colourful VIA system operation schemes. We may also say, that nonetheless the segregation of VIA operational constructions is more balanced in case of more complex internal tasks, the combination of internal operation with external support is more dominant in every row variable segment. In my opinion it is logical that the volume of outsourced activities increases with the complexity of internal IT tasks, as the executives having this kind of attitude are more likely to face the versatility of development and operational tasks, and are able to evaluate them with foresight based on the professional competences, risks and responsibilities. The evaluation of the factors above leads to the rational decision making, that is the executives may decide which activities or systems are worth investment in support from internal or external vendors.

### **3.6.7. Context of costs in relation to the professional knowledge of the internal IT team.**

My research showed that at companies where the management does not spend on the development of the internal IT team, they surprisingly not only save on the costs of internal support but do not hire (100%) external experts for planning the information economics developments. Those executives who spend more than others on the professional development of the internal IT team use more support from external advisors regarding the preparation of information economics projects. I found that the more a company spends on the professional development of the IT team from the annual budget, the higher the ranking was of the executive proposing the IT solution to be introduced. In segments where the budget is bigger for knowledge development the proposals of the C-level executives (members of the management, owners) are dominant. It is surprising to observe that the proposal activity of the IT managers does not increase in line with the amount spent on the development of the IT team. In case of companies spending the most on developing skills the proposal ability of the IT manager comes to an end.

## **3.7. Study of executive attitudes with cluster analysis**

Cluster analysis, as being a multi-variable statistical method, provides opportunity to analyse the responses given by the subjects of the research on the basis of any quantitative variable. Cluster analysis provides categories, groups and clusters - where those responders may be categorised whose responses show significant similarities - based on the similarities and differences between the individual response profile of the responders.

When defining the number of the cluster I tried to involve at least 5% of the responders into one cluster. Should less samples fell into the cluster, the deviant individuals may distort the result. From the perspective of my research I tried to ignore the distortion factor so that the analysis could remain intact.

In the sample containing 102 elements. I started to narrow the number of clusters from 5. My goal was to increase the number of elements in the clusters above 6, as I suppose that the findings of the

cluster analysis are relevant only if this condition is met. When narrowing the number of clusters only 3 clusters met the criteria of forming a group from 6 elements. In this case the smallest element number was 21 in the first cluster, which met the criterion above. Note: in case of 4 clusters the third cluster hosted only 4 individuals.

After defining the number of clusters eligible for further analysis I studied the characteristics of the given clusters.

The first cluster hosts 21 executives, that is this cluster contains the least CEO-s, only 20% of the responders. The ownership structure of these companies shares the same features, i.e are operated by foreign entities, their annual net revenues and the number of employees along with their earnings after the taxes puts them in the category of prosperous companies of bigger volume. The export orientation of these companies is quite high. In case of companies falling into the first cluster the number of executive levels is mainly more than 3, so the companies of this cluster work with a more sophisticated structural organisation. They tend to employ economists in at least 70% in the management, their IT staff usually consists from more than 3 people, the highest value in the sample. The executives of companies in this cluster appreciate the notability of the IT team and assign complex operational and development tasks to them. These executives spend the most within the sample on the professional development of the IT team. The executives of these companies agree on that the professionalism and competence of their IT staff is excellent, and the IT systems applied at the company are of excellent quality and are cutting edge technologies. As opposed to other executives found in the other two clusters they are likely to use outsourcing services in a greater proportion for performing information economics activities, including the professional expertise services in the preparatory phase of the IT development projects. As a conclusion we may say that they are the ones who conduct payback calculations before and after the information economics projects in the greatest number, but I have to stress that their activity of this kind falls below my expectations.

Taking into consideration the above mentioned, I named the executives falling into this category as *structured information economist* executives.

The second cluster hosts 43 executives, that is the majority of the 102 executives can be found in this cluster. A common characteristic feature of the ownership structure of companies managed by these executives is that they are operated solely by Hungarian entities, their annual net revenues and the number of the staff put them among the middle sized companies, their profitability is less than the average. The export orientation of these companies is moderate, the proportion of export is somewhere between 11 - 30%. In case of companies falling into the second cluster the number of executive levels is mainly 2 or 3, so the companies of this cluster work with about similar structural organisation. The proportion of people holding a degree in economics in the management is between 31 - 50%, their IT staff includes one full time IT manager, but the number of IT technicians is mainly 1. The executives falling into the second cluster assign mainly maintenance related or low complexity tasks in relation with infrastructure of low complexity to their IT teams. These executives spend about the same amount of the sampled population on the professional development of the IT team. The executives of these companies agree on that the professionalism and competence of their IT staff is adequate, and the IT systems applied at the company are of good quality. These executives outsource some of the services for performing information economics activities, but these external services only relate to the remote support of the information systems run on internal IT infrastructure. These executives seldom or never contract external expert advisers for the preparation of information economics projects. As a conclusion we may say that they are the ones who conduct payback calculations before and after the information economics projects in line with the average of the sample, but I have to stress that their activity of this kind falls well below my expectations.

Taking into consideration the above mentioned, I named the executives falling into this category as *ad-hoc information economist* executives.

The third cluster holds 38 business executives, which means that more than one third of the responders from the sample of 102 fall into this category. A common characteristic feature of the ownership structure of companies managed by these executives is that they are operated solely by Hungarian entities, their annual net revenues and the number of the staff put them among the smaller companies, their profitability equals with the profitability of the average. This cluster holds smaller but more profitable companies than the companies listed in the second cluster. The export orientation of these companies is quite low, the proportion of export is mainly below 10%. In case of companies falling into the third cluster the number of executive levels is mainly 1 or 2, so the companies of this cluster work with a less complex structural organisation than the average. They are likely to employ people holding a degree in economics in the management in less than 30%, they do not employ an full time IT technician, or in case they run an IT department, their number converges to 1. The executives falling into the third cluster assign mainly maintenance related or low complexity tasks in relation with infrastructure of low complexity to their IT teams. These executives spend less than the average of the sampled population on the professional development of the IT team. The executives of these companies agree on that the professionalism and competence of their IT staff is poor, and the IT systems applied at the company are not up to date. As the executives falling into this category do not or maintain only a minimal IT staff, they have to use outsourcing services provided by external vendors, but these external services relate solely to the remote support of information systems running on the internal IT infrastructure, the application of hosting or ASP is negligible, but more frequently used than at companies falling into the second cluster. These executives seldom or never contract external expert advisers for the preparation of information economics projects. As a conclusion we may say that they are the ones who conduct payback calculations before and after the information economics projects less than the average, but I have to stress that their activity of this kind as compared to the other two clusters significantly falls below my presuppositions.

Taking into consideration the above mentioned, I named the executives falling into this category as *passive information economist* executives.

We can say that one in five Hungarian small business executives can be categorised as structured information economist, the most common attitude is the ad-hoc information economist, and the rate of passive information economists is almost twice as much as the structured ones.

### **3.8. Summary of the new scientific findings**

My objective in the research was to find out the attitude and the underlying causes and contexts of the C-level executives at Hungarian small businesses towards corporate information economics.

The most important and new, or at least innovative, findings of my research are the following:

1. The findings of my research show that C-level executives of Hungarian small businesses do not dispose adequate knowledge and experience on information economics, nor are aware of the information economics practice applied at their company. In my opinion the fundamental condition of the business strategy and market competitiveness of small businesses is the adequate information economics activity. Based on my findings the deficiency experienced in the field of information economics at the C-level executives of the Hungarian small businesses directly affects the competitiveness of their company in a negative way.

2. In my research I found that the executives of Hungarian small businesses use the Enterprise Resource Planning systems for tracking the economic activity of the company, the executive information functions of these systems are not utilised by them.
3. The results of the research show that the size and profitability of the company significantly determine the attitude of the C-level executives of small businesses towards information economics.
4. In my research I found that executives of small businesses with foreign owners perform more planned and structured information management activities as compared to the executives of 100% Hungarian small businesses.
5. The findings of my research proved the statement that the C-level executives in the range of the examined businesses do not possess objective, measurable, processable and controllable system for measuring the efficacy and the influence of the applied information economics activity on the economics of the company. Consequently their attitudes towards corporate information economics is formed by subjective, and impressions that cannot be measured with economics measurements.
6. In my paper I am going to introduce the developed methodology with which the planning of the introduction of an ERP system may be supported from the perspective of economics.

## 4. CONCLUSIONS AND PROPOSALS

### 4.1. The study of the research hypotheses

In this section I am going to study the hypotheses raised in the beginning of the paper in the light of the results of my empirical study.

**H1 hypothesis The C-level executives of Hungarian small businesses do not dispose adequate knowledge and experience on information economics, nor are aware of the information economics practice applied at their company.**

The personal interviews proved that the majority of the responders were unable to answer my questions relating to information economics at first and could provide proper replies after having asked their colleagues. Most of the time the responses given at the interviews were modified by the C-level executives. Based on the answers it turned out that almost 50% of the questions remained unanswered or were misunderstood by the executives. In one third of the cases the questions related to information economics had to be explained in detail. The experience led to the conclusion that C-level executives of Hungarian small businesses do not dispose adequate information and experience on information economics, nor are aware of the information economics practice applied at their company.

This was the H1 hypothesis of my research, and its fulfillment was proven by the results of my research.

**H2 hypothesis The executives of Hungarian small businesses use the Enterprise Resource Planning systems for tracking the economic activity of the company, the executive information functions of these systems are not utilised by them.**

The results of my research results showed that in 79% of the cases the information systems applied at the companies managed by the interviewed business executives serve only transaction-processing functions. I also concluded that only specific function areas of transaction-processing are used dominantly by the businesses. The use of business information systems is critically low in Hungary. It turned out from the results of the research that the establishment of decision supporting capabilities as a development goal in the field of information economics seldom appeared in the answers of the executives.

Based on my findings I can state that the result proved the H2 hypothesis.

**H3 hypothesis The size and profitability of the company significantly determine the attitude of the C-level executives of small businesses towards information economics.**

The results of the research clearly show that the basic economic features of the companies managed by the C-level executives interviewed in the research, highlight revenues, number of employees and earnings after taxes fundamentally affect the information economics attitudes of the executives. The cross-table analyses show that the size and profitability of a company positively affects numerous information economics parameters - for example the role of the applied internal IT team, the type and volume of the outsourced information services, the quality and quantity of the economic analysis of information economy analyses, etc. The cluster analyses proved that the key features defining the type of the cluster the given company belongs to are the size and profitability of the company.

Taking into consideration the above mentioned I assume the H3 hypothesis justified.

**H4 hypothesis Executives of small businesses with foreign owners perform more planned and structured information management activities as compared to the executives of 100% Hungarian small businesses.**

The results of the research univocally show that the ownership structure of the companies managed by the C-level executives fundamentally defines the information economics attitudes of the executives. The cross-table analyses show that at companies where the ownership is in the hand of foreign entities the information economics results are more favourable - for example the role of the applied internal IT team, the type and volume of the outsourced information services, the quality and quantity of the economic analysis of information economy analyses, etc. The cluster analyses proved that the key features defining the type of the cluster the given company is owned by foreign entities as well or only by Hungarian entities.

Taking into consideration the above mentioned I assume the H4 hypothesis justified.

**H5 hypothesis The C-level executives in the range of the examined businesses do not possess objective, measurable, processable and controllable system for measuring the efficacy and the influence of the applied information economics activity on the economics of the company. Consequently their attitudes towards corporate information economics is formed by subjective, and impressions that cannot be measured with economics measurements.**

The results of the research univocally show that executives of the interviewed Hungarian small businesses are not likely to conduct investment payback calculations before and after their information economics developments. Consequently they do not have concrete or quantifiable economic expectations or economic evaluation affecting the realisation as regards the information economics developments. As the field of information economics is seldom involved in the formation of the company strategy, the exact evaluation of its contribution to the operation of the company does not have real grounds. The cluster analysis showed that the rate of passive and ad-hoc information economists is high in the sample, as in the case of information economics needs and initiatives 79% of them make executive decisions mainly emotionally, in an ad-hoc manner - due to the lack of information economics knowledge and experience.

Based on my findings I can state that the result proved the H5 hypothesis.

**4.2. Proposal - process model applicable for the introduction of ERP systems**

Based on the results of my research detailed above it univocal that the executives of Hungarian small businesses face one major problem in connection with information economics, i.e they are not aware of the toolkit through which they would be able form an effective information economics strategy based on the economic needs of their company. The results of my research show that the C-level executives of the studied small businesses do not know the proper methodology that would ensure that the needs of the different divisions of the company as regards information economics and the intensive pressure from the market of the solution supplier would be balanced. The executives do not possess the necessary methodology to evaluate the internal needs in the light of the company strategy. The results also showed that internal information economics needs and initiatives are judged most of the time by emotional and ad-hoc executive decisions - due to the lack of information economics expertise and IT experience . In my research I found the most dysfunctions in the field of corporate IT investments, the C-level executives of the interviewed companies could analyse the investment plans and proposals with the least efficacy. This is true to those C-level executives as well, who said that they carefully make decisions with the required foresight in the case of other investments.

In this section I will introduce a toolkit that I devised through the research and which may provide adequate solution to one of the biggest problems experienced in the field of information economics, i.e. the methodological deficiency in the planning and assessment of information economics investment projects. The following toolkit was devised at a company which took part in the research, and based on the results the managing director asked me to develop a theoretical model for its company, which could be implemented in the future for the assessment of corporate information economics needs and preparation of related projects. The CEO of the company gave me permission to introduce the model - without naming the company and within the frames of my paper.

In my opinion with the help of the developed methodology the planning of the introduction of an ERP system may be supported from the perspective of economics. The methodology detailed in my paper defines questions and point of views in a logical and effective order, which may help in the systematic analysis on the level of the management. By following the scheme, the decision makers may decide on the basis of the answers received in connection with the procurement/development of ERP systems.

### **4.3. Further research suggestions**

The closure of my research raised numerous ideas, which could serve as a basis of further research suggestions. In my present research I dealt with the attitudes of executives working at Hungarian small businesses, and based on the results of the research I think, that the topic may be further studied in the following fields:

- Information economics attitude study of C-level executives working at big companies in Hungary, and the comparison of results with the results of my research. I suppose that characteristic differences would turn out from this research.
- Similarly to the research conducted with Hungarian small business I think that a similar research with European small businesses would bring interesting results. This research could provide answer to the question that whether the attitudes of C-level executives working at Hungarian small businesses differ from the attitude experienced at companies operating in a more or less developed business environment.

## 5. CURRICULUM VITAE OF THE CANDIDATE

### EDUCATION

2002 –	<b>Szent István University</b> <b>Ph.D. degree</b>
1998 – 2000	<b>Budapest University of Economic Sciences and Public Administration</b> <b>M.Sc.B.A. degree</b> Department of Management and Organization
1997 - 1998	<b>Universität Mannheim</b> Scholarship of BUESPA
1994-1997	<b>Budapest University of Economic Sciences and Public Administration</b> <b>B.A. degree</b>
1994 - 1999	<b>Universität Passau</b> 5 years German speaking program for economic degree
1990-1994	<b>Károlyi Mihály Grammer School</b>

### WORK EXPERIENCE

<b>Business Unit Director</b>	<i>HostLogic Számítástechnikai Kft.</i>	2000 -
<b>Consulting Director</b>	<i>Moferr Consulting Kft.</i>	1998 - 2000
<b>Product Manager</b>	<i>Generali-Providencia Biztosító Rt.</i>	1997- 1998
<b>Demonstrator</b>	<i>BKÁE, Economic Policy Department</i>	1996 - 1998

### OTHER COMPETENCIES

#### *Language*

<b>Hungarian</b>	mother tongue
<b>English</b>	excellent
<b>German</b>	excellent

#### *IT skills*

**Office applications**  
**Internet applications**  
**ERP (SAP)**  
**CRM (Siebel, SAP)**

## 6. LIST OF THE PUBLICATIONS RELATED TO THE TOPIC OF THE DISSERTATION

### Scientific publications

#### *Revised scientific publications in English*

1. **Sümegei Zsombor – Molnár Attila:** International competitive analysis of wine producer small and midsize companies on enterprise resource management. International Journal of Horticultural Science, vol.15., nr.3. HU ISSN 1585-0404. Agroinform Kiadó. 23-26 p.
2. **Sümegei Zsombor – Molnár Attila:** International comparative analysis for enterprises resource management on the developing wine market of China. International Journal of Horticultural Science. vol.15., nr.3. HU ISSN 1585-0404. Agroinform Kiadó. 27-30 p.
3. **Sümegei Zsombor – Molnár Attila:** International comparative analysis for enterprises resource management on the developing wine market of China. Buletin of the University of Agricultural Sciences Gödöllő-Bulletin of Szent István University, HU ISSN 1586-4502. 193-201p.

#### *Revised scientific publications in Hungarian*

1. **Molnár Attila:** Vállalatirányítási rendszerek szerepe és jelentősége a kkv-szektor vállalkozásainak életében I. rész. Magyar Minőség 2007/5, HU ISSN: 1416-9576. 16-19 p.
2. **Molnár Attila:** Vállalatirányítási rendszerek szerepe és jelentősége a kkv-szektor vállalkozásainak életében II. rész. Magyar Minőség 2007/6, HU ISSN: 1416-9576. 17-20 p.
3. **Molnár Attila:** Vállalatirányítási rendszerek szerepe és jelentősége a kkv-szektor vállalkozásainak életében III. rész. Magyar Minőség 2007/7, HU ISSN: 1416-9576 17-20 p.
4. **Molnár Attila – Sümegei Zsombor:** A magyar kis- és középvállalkozások információgazdálkodási attitűdjei. Befogadás stádiumában. Piac és Profit HU ISSN: 1416-8219
5. **Sümegei Zs. – Véha A. – Gyimes E. – Molnár A.:** A jégbor készítés és piaci kihívásai gazdasági vállalkozások számára, Élelmezési Ipar, LXIII. Évfolyam 2009. 3. szám, HU ISSN 0013-5909. MÉTE Kiadó. 92-95 p.

### Lectures in scientific conferences, issued in conference publications

#### *Revised publication in English*

1. **Molnár Attila:** New chances in the IT management for the Hungarian small and medium enterprises – Application Service Provision. Pre-accession strategies in the national economy of accession countries towards the EU. (New Science 2002, Rackova Dolina, Slovakia 2002. október 3-4.) Előadás és poszter
2. **Molnár Attila:** New chances in the IT management for the Hungarian small and medium enterprises – Application Service Provision. Volume II. 251-257 p. ISBN 963-9483-05-2ö, 963-9463-06-9 (2 nd Int. Conference for Young researchers of economics, Gödöllő 2002. október 17-18.). 3 p. Előadás és poszter

3. **Molnár A. – Kovács Á., Dr. - Sümegei Zs. (2009):** The role of information management in the reply of the Hungarian small and medium-sized enterprises to the global economic crisis. Alternatív energiagazdálkodás. Georgikon Napok elektronikus kiadvány ([http://georgikon.hu/napok2/pub/Molnar\\_Attila.doc](http://georgikon.hu/napok2/pub/Molnar_Attila.doc)) ISBN 978-963-9639-35-5 (LI. Georgikon Napok, 1-2.10.2009, Keszthely). 7 p.

*Revised publication in Hungarian*

1. **Molnár Attila:** Új lehetőségek az IT menedzsment területén a magyar kis- és középvállalatok számára – alkalmazás szolgáltatás. Stabilitás és Intézményrendszer az agrárgazdaságban, XLIV. Georgikon Napok, Keszthely 2002. szeptember 26-27. Előadás és poszter

2. **Molnár Attila:** Információgazdálkodás ASP modellben. Alkalmazásslolgáltatás az üzleti gyakorlatban, Institute for International Research, Budapest 2002. december 3-4. Előadás

### **Other journals**

1. **Molnár Attila:** Tűz és víz között az alkalmazásslolgáltatók. Napi Gazdaság, 2001.03.07. HU ISSN 1217-5501 online megjelenés:

<http://www.napigazdasag.hu/default.asp?cCenter=article.asp&nID=66004>

2. **Molnár Attila:** Kialakulóban a „duopóliumok”. Napi Gazdaság, 2001.04.11. HU ISSN 1217-5501 online megjelenés:

<http://www.napigazdasag.hu/default.asp?cCenter=article.asp&nID=70249>

3. **Molnár Attila:** Egyre nagyobb az ASP választék. Napi Gazdaság, 2001.07.20. HU ISSN 1217-5501 online megjelenés:

<http://www.napigazdasag.hu/default.asp?cCenter=article.asp&nID=81631>

4. **Molnár Attila:** Elérhető vágyak a vállalati ügyvitelben. Napi Gazdaság, 2001.08.24. HU ISSN 1217-5501 online megjelenés:

<http://www.napigazdasag.hu/default.asp?cCenter=article.asp&nID=86103>

5. **Molnár Attila:** Lehet rosszul, jól és még jobban dönteni. Napi Gazdaság, 2002.02.28. HU ISSN 1217-5501 online megjelenés:

<http://www.napigazdasag.hu/default.asp?cCenter=article.asp&nID=109480>

6. **Molnár Attila:** A kérdés: ERP- házon belüli üzemeltetés, vagy külső szolgáltatás? IT Business, 2007.02.20. ISSN: 1589-3464

7. **Molnár Attila:** Unverzális vs. testreszabott. IT Business, 2007.03.05. ISSN: 1589-3464

8. **Molnár Attila:** Érdemes tanácsot bevonni – 3,5 milliárd vállalati folyamatmenedzsmentre. EuroAstra, 2007.07.24. online megjelenés: <http://www.euroastra.hu/node/12856>

9. **Molnár Attila:** Uniós pénz az informatikára, már élelmiszeripari cégek is pályázhatnak. Élelmiszer Online, 2008.05.14. online megjelenés:

<http://www.elelmiszer.hu/cikk.php?id=1479>

10. **Molnár Attila:** Élelmiszeripari cégek is pályázhatnak. Mai Piac, 2008.05.15. online megjelenés: <http://www.maipiac.hu/index.php/elemlzesek/1582-elmiszeripari-ck-is-patnak>