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**DATA SOURCES OF EXECUTIVE DECISION-MAKING IN
THE MIDDLE AND LARGE-SIZED FOOD INDUSTRY
ENTERPRISES OF THE SOUTHERN GREAT PLAIN**

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1. PRELIMINARIES AND OBJECTIVES OF THE RESEARCH

Food industry is still a major sector of the Hungarian economy despite that its weight within the industry has gradually declined in the past decades. Based on its demand for agricultural products, its role in the domestic food supply and export or in employment, the strategic importance of the food industry is not debatable.

The timely and well-founded decisions made by executives can give their enterprises competitive advantage in a rapidly changing environment. The important criterion of the successful decision-making is that full scale of all the required data and information about the business should be available. Useful information helping decisions can be created with information systems which store huge amount of data and from sources of the outside world. Information systems can all contribute to well-founded decisions to some extent, no matter what their capabilities are.

The research was conducted in Hungary's Southern Great Plain Region among the food industry enterprises. The aim was to summarize and analyze the data obtained from the food industry executives of the Southern Great Plain Region to give knowledge to the executives and the developers of the information systems which can be used in practice and to give basis for further researches. The following examinations were performed:

1. Surveying information sources used by executives of the medium and large food industry enterprises located in the region: Which are the most common sources used by the executives and what sources are used the least. Since the data can mean information to the executives, using the terms "information" and "information source" during the research was more appropriate, than the terms "data" and "data source".

2. Surveying information systems. The type of the used information systems, the used services, the role of the systems in analyzing the present and making forecasts in food industry enterprises of the region.
3. Is there some link between the frequency of the use of the information sources and the characteristics of the firms, such as the legal status, the main activity, the annual income or the number of employees? Is there a significant connection between the information source and the firm properties?
4. Search for and form executive groups possessing similar attributes based on information sources used for decisions.

2. MATERIALS AND METHODS

The data processed in the dissertation was collected from three counties – Bács-Kiskun, Békés and Csongrád – of Hungary's Southern Great Plain Region. In order to substantiate the research, the potential primary and secondary information sources were explored. The methodology of preparing, assessing and analysing surveys was examined in this economic field. Food industry enterprises which can be rated as the major companies of the region based on the annual income and the number of employees were selected from the database created from the data of the registry court and the Central Statistical Office.

A questionnaire was compiled to acquire the primary information which was to be filled by the executives of the companies selected from the company database. The questionnaire covered the fields of decisions and their possible information sources and the enterprise information systems. The examined information source groups and information sources were:

- People: owners, executives, employees, suppliers, customers;
- Business environment: banks, competitors, other firms;
- Government organizations: country-wide, regional and local organizations;
- Civilian organizations: country-wide, regional and local organizations;
- Internal reporting systems: decision support systems, planning, finance and accounting, controlling, supply, salesmanship, production, quality assurance, inventory management, human resource management or other internal systems;
- Statistical organizations: annual publications, monthly publications, periodicals, methodological publications, analytical publications;

- Research institutes: the organizations of the Hungarian Academy of Sciences; higher education institutions, economic research institutes, own research, other research institutes.
- Professional communities: newsletters, forums or other professional communities.
- Media: television, radio, professional newspapers, non-professional newspapers, Internet;

The main areas of the enterprise operations are: finance, production and service, marketing and trade and the production factors. The decisions aim at some area of business, thus one can speak of market-economic, technical and organizational decisions. The frequency of the use of information sources in the above mentioned decision subjects and areas of operations were surveyed. It was also investigated whether the firms use a traditional or an integrated enterprise information system or a subsystem. The executives were asked what tasks are the used systems suitable for in the enterprise and did they have tools to analyze the current situation or make forecasts.

The majority of the interviews were performed by post and the Internet was also used experimentally: the company executives, who had Internet connection, could download and fill in the questionnaire by following the guide sent in a post letter. The executives of two major companies were personally contacted and the information necessary for the research were obtained with in-depth interviews.

Cronbach-alpha test was applied to determine whether the questionnaire responses of the executives were consistent. SPSS 17 statistical programme was used for the calculations.

It was determined how frequently the executives use the information sources and the source groups composed from the information sources in the differ-

ent area of operations and by the subject of decisions. Based on the frequency of usage, the most important information sources for the executives could be identified. Microsoft Excel 2007 spreadsheet programme was used for the calculations and to set up an order among the information sources.

Frequency calculations were performed on the data collected about the information systems with Microsoft Excel 2007.

Association tests, factor and cluster analysis were used to search for relationships. The aim of the association test was to determine whether there was a significant relationship between the frequency of the use of the information sources and information source groups and the form of operation, the main activity, the annual income and the number of employees. First, chi-square calculations were done and then the strength of the relationship was determined with Cramer's coefficient. Microsoft Excel 2007 spreadsheet programme was utilized for the calculations.

The method of factor analysis was applied to verify whether the listed information sources of the questionnaire could be reduced, based on the answers of the executives, to less factors. SPSS 17 statistical programme was used for this task.

On the basis of the answers, the executives were grouped into clusters showing similar information source usage, with cluster analysis. This task was accomplished with the help of Microsoft Excel 2007 spreadsheet programme with Microsoft SQL Server 2008 and Microsoft SQL Server 2008 Data Mining Add-ins for Microsoft Office 2007.

3. RESULTS

3.1 The analyzed sample, the details of the executives completing the questionnaire

Fifty-nine executives of twenty-seven food industry enterprises took part in the survey. Nearly half of them were senior-executives (47%) and the other half belonged to the middle management level (53%). The ratio of the executives from limited liability companies (47%) and share companies (51%) were also nearly the same. The rest of the filled questionnaires (3%) came back from executives of cooperatives. The distribution by the annual income was the following: 47% of the executives worked for companies with a 51-1000 million HUF annual income and 51% worked in firms with an annual income of more than 1 billion HUF. Most executives held positions in enterprises where the number of employees was 50-99 persons (29%), 100-149 persons (17%), 500-999 persons (12%) and 250-299 persons (10%). These executives were the two thirds of the participants. The ratio of the companies with more than a thousand employees was 7%. The answers came back from enterprises with thirteen types of main activities. Primarily executives from food industry enterprises involved in meat processing and conserving (19%), dairy product production (17%), bread and other bakery production (12%), poultry processing and conserving (10%) or manufacturing other food products not elsewhere classified (8%) showed willingness to fill the questionnaire: these executives filled in two thirds of the questionnaires.

3.2 Cronbach-alpha test

The responses of the executives are consistent in six of the seven cases; while in one case – the market and economic decisions – seem somewhat

contradictory by the test. (See table 1.)

Table 1. Cronbach-alpha values calculated from the answers of the questionnaire.

Area of operation	Cronbach-alfa
Finance	0,731
Production, services	0,859
Marketing, trade	0,864
Production factors	0,808
Subject of decision	Cronbach-alfa
Market-economic	0,598
Technical	0,910
Organizational	0,860

(Source: own construction)

3.3 The use of information sources and information source groups

3.3.1 Information sources by the area of operation and by the subject of decision

Area of finance

Forty-one executives filled in this part of the questionnaire. Sorted by frequency, from the first ten most used information sources, five are part of the internal reporting system, four are external sources and one is human source. In the area of finance, the executives use information sources of the planning, controlling, finance and accounting, as well as other executives inside the organization and the professional newspapers. The executives often turn to the internet and watch information from the banks when making decisions in this area.

Area of production and services

The questionnaire concerning decisions in the area of production and services were answered by thirty-three executives. Based on the frequency, from the ten most used sources, six are part of the internal reporting system,

one is external source and three belong to the human sources. The planning, the other executives of the organization, the salesmanship, the inventory management, the supply, the quality assurance and the suppliers of the company were also marked as important information sources by the executives.

Area of marketing and trade

Thirty executives reported about the used information sources in the area of marketing and trade. From the ten most used information sources one can find here five which are part of the internal reporting system, three are external and two are human sources. The sale was marked by the executives as the first and most used information source. Furthermore they also considered important the signs of the planning and the controlling, the data from the professional newspapers and the other executives of the firm, the information of the finance and accounting or the feedback of the customers. The executives often use the Internet, seek the opinion of the company owners, watch their competitors and pay attention to the inventory management as well.

Area of production factors

This part of the questionnaire was filled by thirty-seven executives. Seven internal reporting sources, one external source and two human sources belong to the ten most frequently used information sources in this area. According to the responses, the production is the most important information source. The other executives were to follow, then came the planning, the inventory management, the supply and the employees. The use of other information sources is much less common.

In summary:

From the fact that the chief executives gave the top ten sources a smaller

proportion from their total score on average, furthermore eighty per cent of the given score is split among more information sources in case of the chief executives than in case of the managers, it can be seen that the senior management gather information from a wider scope.

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The most information source is required by the financial and the marketing-commercial decisions, while making decisions on production and the production factors require much less sources of information.

Executives prefer to use fourteen sources of information in the area of finance. Eight of these are very frequently used and another six are frequently used information sources.

Marketing and trade decisions need almost as many information sources as decisions made in the area of finance. From the eleven source, seven belong to the very frequently and another four to the frequently used sources.

The chiefs of the food industry enterprises make their decisions relying on eight sources in the area of production and services and only four of these are part of the most frequently used information sources.

In the area of production factors, the decision makers who took part in the research used only six kinds of information sources of which only three could be classified as the most frequently used source.

Market-economic decisions

The market-economic part of the questionnaire was filled by forty-one executives. According to the answers, from the ten most frequently used in-

formation sources there are five which belong to the internal reporting system, three are external and two are human sources. Among these, the most important are the planning, the controlling, the finance and accounting. The other executives of the enterprise or the supply are also often used information sources. The company leaders use the professional newspapers and the Internet in many occasions as well.

Technical decisions

The questions in this scope were answered by twenty-one executives. Based on the responses, the following can be stated: Among the ten most important information sources there are five which are part of the internal reporting system, two are external and three are human information sources. Production is the primary source of technical decisions. The other executives of the firm, the employees, the planning and the quality assurance are also rated as often used sources.

Organizational decisions

This part of the questionnaire was filled by thirty-four chief-executives and middle managers. Seven internal and three human sources are in the first ten places in the order of the most frequently used sources. The most frequently used source proved to be the production and this was followed by the other executives and the employees. The usage of other information sources is much less common.

In summary:

When making market-economic decisions, the surveyed executives of the food industry enterprises mainly on fourteen information sources. Their distribution is fifty-fifty per cent in the group of the most frequently and the frequently used sources of information.

In the case of technical decisions, only five sources are commonly used of which no more than two were classified by the executives as the most frequently used information source.

When speaking of organizational decisions, there are seven information sources which the executives classified as commonly used sources, and the most frequently used sources of information are the same as in the case of the technical decisions.

So market-economic decisions require the most information sources and this statement is consistent with the survey in the area of operation, where the financial and the marketing-trade decisions demanded the information from the most sources. The technical and the organizational decisions need less information sources. This result is very similar to the findings of the survey in the area of the decisions made about production and production factors.

The information sources of the decisions in the areas of company operations and depending on the subject of the decisions

When totalling the answers of the questionnaires in the four areas of company operations, it can be seen that for the executives of the food industry enterprises the most commonly used information sources are the planning, the other executives and the production. The sources of the first three clusters based on the frequency of source usage can be seen in Table 2.

Table 2. The clusters of information sources based on the survey by the area of enterprise operation.

Cluster 1: very frequently used information sources	planning, executives, production
Cluster 2: frequently used information sources	controlling, salesmanship, supply, finance and accounting, Internet, professional newspapers, inventory management
Cluster 3: moderately used information sources	employees, quality assurance, versenytársak, competitors, customers, suppliers, newsletters, human resource management

(Source: own construction)

Totalling the data acquired with the questionnaires about the subject of decisions, the compiled list can be seen in table 3.

Table 3. The clusters of information sources based on the survey by the subject of decision.

Cluster 1: very frequently used information sources	executives, production, planning
Cluster 2: frequently used information sources	supply, finance and accounting, controlling, salesmanship, professional newspapers, employees, quality assurance, suppliers
Cluster 3: moderately used information sources	Internet, human resource management, inventory management, owners, customers, newsletters

(Source: own construction)

3.3.2 Information source groups by the area of operation and by the subject of the decision

The forty-eight information sources of the questionnaire belong to ten information source groups. Based on the scores belonging to different source groups, it could be determined what groups are considered to be the most frequently used ones by the executives, when making decisions in the different areas of operation and in case of decisions with different subjects.

Table 4 shows the order of the used information source groups in the different areas of company operation and table 5 shows the order of source groups used when making decisions on different subjects.

Table 4. The order of information source groups by the area of operation.

Description	Area of operation			
	Finance	Production factors	Production, services	Marketing, trade
People	2	2	1	1
Business environment	3	5	3	4
Government organizations	5	9	6	9
Civilian organizations	10	10	8	10
Internal reporting systems	1	1	2	2
Statistical sources	8	6	9	6
Research institutes	9	8	7	8
Databanks	7	7	10	7
Professional communities	6	4	4	5
Media	4	3	5	3

(Source: own construction)

Table 5. The order of information source groups by the subject of decision.

Description	Subject of decision		
	Market-economic	Technical	Organizational
People	2	1	2
Business environment	5	8	5
Government organizations	6	9	4
Civilian organizations	9	10	7
Internal reporting systems	1	2	1
Statistical sources	10	5	10
Research institutes	4	7	8
Databanks	8	6	9
Professional communities	7	4	6
Media	3	3	3

(Source: own construction)

Area of finance

Executives consider the internal reporting system, the people and the business environment the most important in the area of finance. The fourth source is the media. The use of the other information source groups is much less common. Executives making decisions in this area rely on research institutes and civilian organizations the least.

Area of production and services

When making decisions about production and services, the executives of the

food industry firms consider – like in the previous case, but in reverse order – the people and the internal reporting system the most often used sources of information. These are followed by the business environment, the professional communities, the media and the government organizations with significant difference. The research institutes, the civilian organizations, the data banks and the statistical sources are among the hardly used information source groups.

Area of marketing and trade

In the area of marketing and trade decisions, the internal reporting system and the people information source groups are in the first place, which is closely followed by the media and then a little behind comes the business environment source group. The other information source groups are hardly used, and the use of the group of civilian organizations as information source is not at all typical.

Area of production factors

In case of decisions about production factors, the food industry executives primarily rely on their internal reporting system and the people. It is also typical to take the information of media, the professional communities and the business environment into account as well, but to a lesser extent. The use of the other information source groups – the statistical sources, the data-banks, the research institutes, or the government and civilian organizations – cannot be said to be common.

Market-economic decisions

The usage of information source groups shows a relatively balanced picture when making market-economic decisions. After the internal reporting systems and the people, the important sources include the media and the re-

search institutes. Only after these come the business environment, the government organizations and the professional communities. The databanks, the civilian organizations and the statistical information sources are the least used groups.

Technical decisions

The executives use people as information source the most often when making technical decisions and this is followed by the internal reporting systems group. The next group includes the media and the professional communities, but these are much less widely used. In the case of the technical decisions, the use of any other information source group is very rare.

Organizational decisions

Based on their answers, food industry executives rely almost exclusively on the internal reporting systems and the people. The media stands in the third place, but other information source groups are virtually not used in organizational decisions.

The information source groups of the decisions in the areas of company operations and depending on the subject of the decisions

Figure 1 and figure 2 shows the order of the information source groups after totalling the data gathered from the areas of the company operations and the subject of the decisions. According to both types of survey, the internal reporting systems and the people are in the first place as the most frequently used information source groups. They are followed by the media in the third place. According to the totalled data concerning decisions in the area of company operations the business environment is in the fourth place, while according to the totalled data concerning decisions on different subjects the research institutes are the fourth.

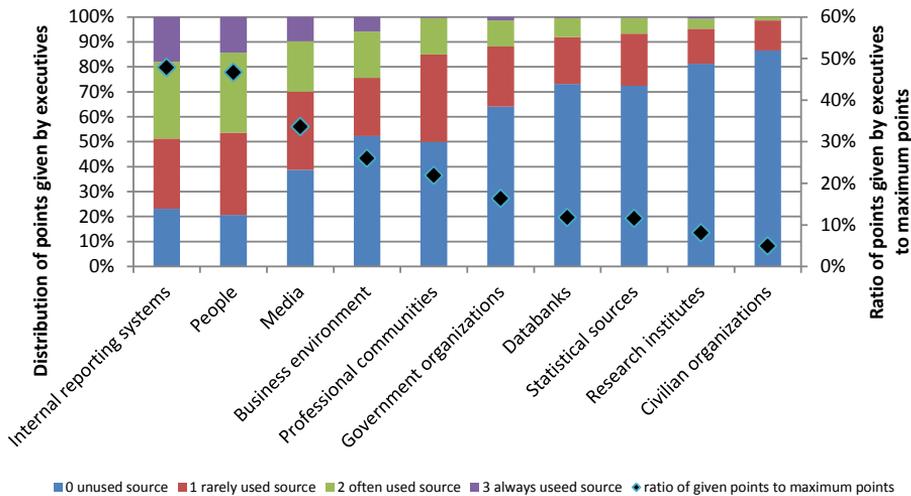


Figure 1. Information source groups (area of company operations).
(Source: own construction)

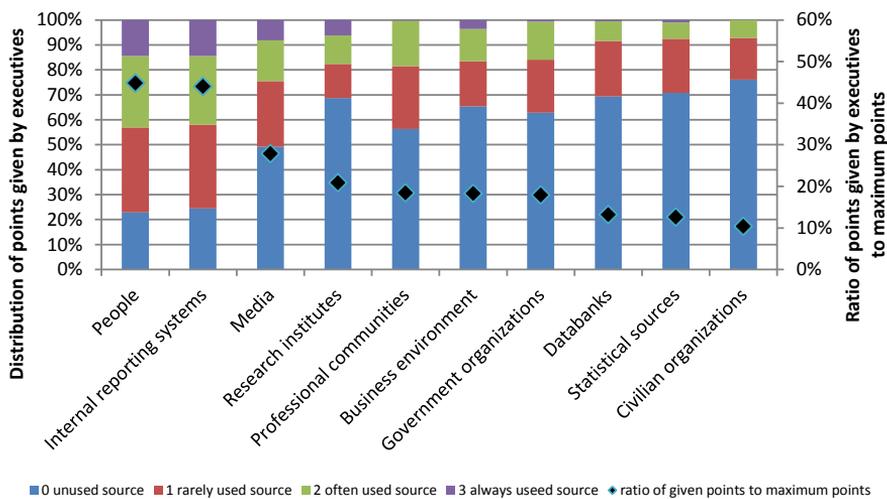


Figure 2. Information source groups (subjects of decision).
(Source: own construction)

The professional communities group is the fifth most used information source in both types of survey. The government organizations, the statistical sources and the databanks are the least used information source groups. The role of the research institutes is not obvious: while it is in the last but one

place according to the survey of the decisions in the area of company operations, it is in the fourth place according to the survey of decisions with different subjects. The executives of the food industry enterprises rely on civilian organizations the least according to both types of survey.

3.4 Information systems in the food industry enterprises

This section of the questionnaire was filled in by the decision makers of twenty-six food industry enterprises. According to the answers sixty-two percent use one or more modules of an integrated information system and forty-six percent use an integrated system which covers every area of the enterprise. Fifteen percent use different modules of more than one integrated information systems. In this case the executives could not unequivocally come to a decision whether there is data exchange between these different systems or not. Half of the interviewed companies use a standard system – which can be bought on the market – modified by their needs, forty-six percent use systems built by external experts and only fifteen percent of the firms use systems built by their own selves.

Figure 3 shows what the information systems are used for in the asked food industry enterprises.

Most of the food industry enterprises use their system for accounting (81%) and billing (77%). Office tasks and registering stocks, suppliers or customers are helped with computers in about seventy-three percent of the firms which took part in the survey. Computerized information system based logistics is supported in less than one third of the firms (19%). According to the executives, their information system is rarely used for resource planning, only fifteen percent answered that this service of their information system was used. All the executives of the enterprises agreed that their systems had the capability to analyze the current situation, but only one third of them thought that

these systems were able to make forecasts.

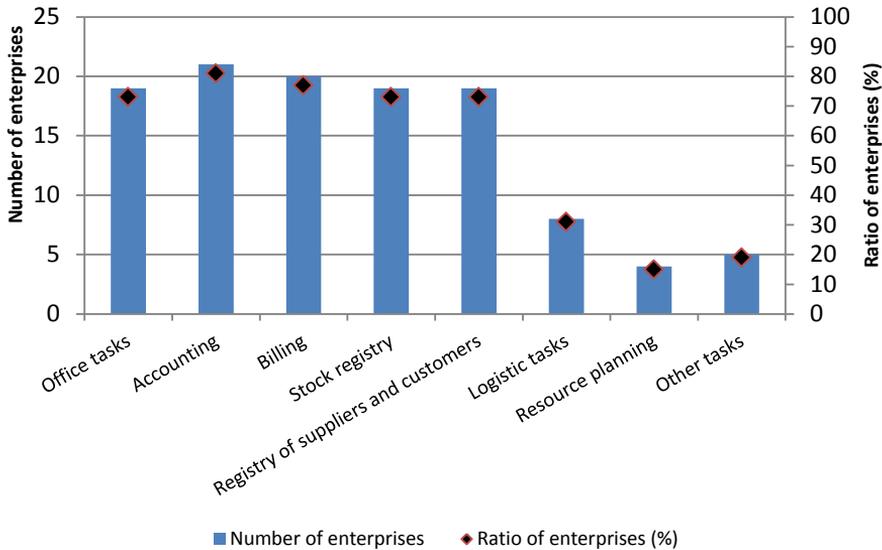


Figure 3. The tasks supported by the information systems.

(Source: own construction)

3.5 Relationship tests

3.5.1 Association tests

With the chi-square test it could be determined whether there is a significant connection between the 0, 1, 2 or 3 scores (the usage frequency of the information sources) given by the company executives to the information sources and the characteristics of the enterprises. In the cases where the trial showed a significant connection, the strength of the connection was calculated with Cramer's coefficient.

There was no significant connection detected between the number of employees and the information sources of decisions in the area of finance, between the annual income and the information sources of market-economic decisions, between the form of operation and the information sources of the

financial or the market-economic decisions and there was no significant connection detected between the main activity and the information sources of the financial or market-economic decisions. There is connection at 5% significance level in any other cases, so there is connection between the given scores (the usage frequency of the information sources) and the examined characteristics of the enterprises.

According to the data collected from the executives, the strongest connection is between the form of operation and the scores given to the information sources of the organizational decisions, there is moderately strong relationship. Calculations show moderate relationship between the information sources of the organizational decisions and the main activity, between the sources of organizational decisions and the number of employees or the annual income. There is also a moderate connection between the form of operation and the information sources of the technical decisions. The connection is moderately weak or weak in the other cases.

3.5.2 Factor analysis

In the examination by the area of operation the forty-eight information sources could be reduced to sixteen and in the examination by the subject of the decision the sources could be reduced to fifteen components. That many factors contain at least eighty percent of the variance or the eigenvalue is greater than one in these cases. A greater reduction would result in a significant loss of information.

Based on the number of the dimensions and the factor components, naming of the factors is not possible in a way which adequately reflects the components constituting the factors.

The examination was carried out separately on the internal and the external information sources, but results were similar: the high number of dimensions

and the difference of the factor components constituting the dimensions do not allow the unequivocal naming of the dimensions. The factor analysis did not lead to new results, but it can be considered successful and effective in the sense that based on the results, it is practical to keep the ten formerly created information source names and apply them.

3.5.3 Cluster analysis

Two executive groups were set up with cluster analysis from the calculated average points given by the executives to the usage frequency of information sources. In case of forming more clusters, the cluster criteria did not ensure the clear definition of the cluster characteristics. The clusters created based on the two types examinations (decisions in the area of operations and decisions with different subjects) show a lot of similarities. Table 6 shows the characteristics of the executives in the clusters.

Table 6. The characteristics of the clusters. (0: not used or rarely used sources, 1: more often used sources, 2: most often used information sources)

Description	Cluster 1	Cluster 2
Level of leadership	felső, közép	közép
Information source group		
People	2	1
Business environment	1	0-1
Government organizations	1	0
Civilian organizations	0-1	0
Internal reporting systems	1-2	1
Statistical sources	0-1	0
Research institutes	0-1	0
Databanks	0-1	0
Professional communities	1	0-1
Media	1	0-1

(Source: own construction)

The first cluster:

The executives in this cluster use people as their main information source.

They almost equally rely on the data of internal reporting systems in their decisions. From the viewpoint of usage frequency, the next area where they turn to information is the business environment, the government organizations, the professional communities and the media. The statistical sources, the data banks, the research institutes and the civilian organizations are the least used information sources in this cluster.

The second cluster:

The cluster members generally work with less information sources than the executives in the first cluster. The people and the internal reporting systems are the most commonly used sources of information; the executives rely almost exclusively on these two sources when making decisions. The information from the business environment, the professional communities and from the media is not used or hardly used by the executives in the cluster. The third range of information sources, including the government and civilian organizations, the statistical publications, the databanks and the research institutes are practically not used by the executives of the second cluster when making decisions in the enterprise.

4. CONCLUSIONS

The answers of the executives were consistent considering the source of information they use to make their decisions. Every executive filled only those parts of the questionnaire which applied to him or her. The responses revealed that the executives rely heavily on the internal reporting system which makes rational decisions possible and they also use information from the people which source is not free from emotional influence. The food industry executives of Hungary's Southern Great Plain Region are influenced – as everyone in general – by the huge amounts of data coming from the media, so the company decision makers consider the media the third most often used source. The remaining seven information source groups are considered only half as important or even less compared to the first three source groups, when making decisions.

The primacy of the internal reporting systems and the people as information sources is consistent with the expectation that the leaders of an economic organization have to make decisions mainly based on the information processed from fact data collected from the internal environment of the organization. The decisions, however, cannot be separated from the interpersonal relations. Human relations – especially within a workplace – can have a significant impact on the decision-maker and the decisions of the organization through the formal and informal communication.

The fact, that other information source groups are less frequently used by the executives, can have multiple causes:

- they trust the data of the internal reporting system supplemented with the information from the people, they consider it enough for making decisions;

- the firm's internal system, the people and the media provides enough information for the executives, they do not have time to use other information sources;
- it can happen that the use of other information source groups is less formal or is unclear, therefore it does not register;

Breaking down the information source groups to their constituents and examining the information sources of the decisions in view of possible areas of operation or the subject of decisions, the following statements can be made:

In the area of finance, the executives rely mainly on information sources of the planning, controlling, finance and accounting, as well as other executives inside the organization and the professional newspapers. The executives often turn to the Internet and watch information from the banks when making decisions in the area of finance. At the same time they consider the formal and informal conversations among executives important. They follow the information gained from professional papers and pay attention to the measures their competition takes. They maintain a close relationship with the banks as financial agents. They use new technologies to acquire data and this means mainly Internet services. Although decision support systems were thought to be important, they and the information provided by them are considered seldom used sources, according to the answers.

In the case of decisions related to production factors, the data from the internal reporting system which are logically connected to production are used by the executives, that is they consider the production as the main information source, but information from the planning, the inventory management, the supply, the salesmanship, the quality assurance often appear as well. Information exchange is frequent among the executives in this area, but employees are also rated as important information sources. Besides professional

papers, Internet is also an often used external source. Among the examined areas of operation, the use of a decision support system is most typical here, but it is only the twelfth in the order of the possible information sources.

The sources of the decisions made in the area of production have many similarities with the information sources of the decisions related to production factors. The used information is mainly from the production subsystem of the internal reporting system. The executives of this area rely most often on the information of the planning, the salesmanship, the inventory management, the supply and the quality assurance. The other executives and the employees are among the important, frequently used, first possible information sources, and the decision-makers also use external sources like the suppliers, the customers and the competitors. An information system supporting decisions is among the sources which are used moderately.

Most information of the executives working in the area of marketing and trade come from the salesmanship subsystem of the internal reporting system. The decision-makers use a lot of internal information, like the planning, controlling, finance and accounting or the inventory management. Executives are also frequently used information sources. This is the area, where information from the owners is taken into account by the decision-makers the most. External information sources, like the customers, the competitors and the internet are also frequently used sources. Some kind of decision supporting device is not typical according to the answers of the executives; the decision support systems are among the least used information sources.

The executives, who spoke about the information sources of market-economic decisions, set up an order of the most used sources which was very similar to the executives making decisions in the area of finance. The executives mainly rely on the planning, the controlling, the finance and accounting, the supply, the production and the salesmanship part of the internal re-

porting system. Other executives and the owners play an important role as well as information source of decisions. From the external information sources, the professional newspapers, the Internet, the economic research institutes and the banks can be considered as highly important sources. According to the executives, decision supporting systems do not play an important role in the case of market-economic decisions.

When making technical decisions, the executives most frequently use the information coming from the production, like in the case of the production decisions and production factor decisions. The information of the planning and the quality assurance are important. Besides the information from executives, information from employees is also often used in the case of technical decisions. The usage of external sources or the use of information from decision support systems is less typical.

For organizational decisions, the executives marked the information of the production as the most used, most important source. Communication with the executives and the employees and considering the data of the human resource management is typical in organizational decisions. Information from other sources determining production, like the supply, the planning and the inventory management, also contribute to the decision-making. Decision support systems are among the least used information sources in this area.

If we examine the information sources by the areas of operation or by the subject of the decision, it can be stated that since manufacturing enterprises are involved, the most important information sources are connected to the production part of the information system of the organization, or other parts that are tightly connected to the production part. These however, typically mean transaction processing systems and information acquired from these systems. The use of information systems which are made specially to sup-

port decisions is not typical in the food industry enterprises whose executives took part in the research. The possible reasons can be that the executives

- are not familiar with the capabilities of the systems capable of supporting decisions;
- do not trust these systems, especially in a rapidly changing economic and legal environment;
- see no point in investing in the system, they are afraid that there will be no return on investment;

According to the examination by the form of operation (limited company, joint-stock company, and cooperative), the annual income, the number of employees and the main activity, there is some measurable relationship between these criteria and the answers, but the strength of the connection cannot be determined unequivocally. Besides the association tests, the data-mining tools confirm the assumption that the frequency of the use of the information sources does not depend on the examined factors, namely the company groups created with data-mining cannot be characterized by the usage frequency of the information source or by other factors which are only typical for a given group. So we cannot state with high confidence that the usage frequency of a given information source in a food industry enterprise with a given type and annual income, employing a given number of employees and practicing a given food manufacturing activity is high or low.

The factor analysis – where the aim was to reduce the forty-eight information sources to fewer dimensions – did not result in a more manageable number of dimensions: fifteen variables instead of forty-eight, eleven variables created from the external information sources, nine variables created from the internal sources are also too much and their content is unmanage-

able; they are not suitable to replace the forty-eight information sources. The information sources created and named in the beginning of the research map well the executive information source needs.

With computer devices, Internet and information technology systems becoming affordable to the Hungarian enterprises, the use of information systems – having different knowledge – has become widespread among the medium and large food industry enterprises in Hungary's Southern Great Plain Region. The executives are aware of the importance of the use of the information systems. However the results of the research show that when making decisions that are long-term and have greater significance, information systems do not have an important role. The decision-makers use mainly the services of the subsystems which are for daily data collection. According to the executives these are systems which are capable of analyzing the current situation, however only executives in one third of the firms stated that their system is able to make forecasts as well. This might not be the case, since even a spreadsheet programme contains services to do this kind of task. Instead the case might be that the company executives are not familiar with the decision support capabilities of their system.

The results of the conducted research partly confirm and partly contradict previous research findings concerning the characteristics of the decision levels and their required information. The collected data support the claim that chief executives depend more on the information system than the middle managers. Chief executives use the internal reporting system (internal information) more often as the middle managers; in this respect my research did not confirm the results of other researches. On the other hand the chief executives require more external information than the middle management which is identical to the previously published results of other researches.

Two distinct groups can be observed in the range of executives of the food industry enterprises in Hungary's Southern Great Plain Region:

The first group shows the characteristics of the chief executives despite that nearly half of the group members are from the middle management. They get their information from a wider scope; they use not only internal, but external information sources as well. They are those who decide on non-structured or ill-structured problems or make long term strategic decisions. Since these types of tasks are not supported or partly supported by their information systems, they have to use sources outside the company to collect information.

The second cluster, made up mainly from middle managers, is largely satisfied with the internal information coming from the systems of the company and with the information from people. This cluster is the group of middle managers, although some of the chief executives are also included. Middle managers usually make decisions with such time scale and importance where the internal reporting systems supplemented with information from people provide enough information to make decisions.

5. NEW SCIENTIFIC RESULTS

1. The results of the research conducted among the food industry enterprises of the Southern Great Plain Region show that regardless of the type of the food industry enterprise controlled, the executives think the same way: most frequently they use the information of the internal reporting systems and information from the people in all decisions. Since manufacturing enterprises are involved, the most important information sources are connected to the production part of the information system of the organization, or other parts that are tightly connected to the production part. The research confirms the emergence of the media as an information source as well.
2. It has been determined that the executives of the food industry enterprises are aware of the importance and the benefits of the computer systems. The executives use the information originating from the transaction-processing system. According to my research, the usage of information systems supporting decision-making is not popular among the executives of the investigated area and occurs only rarely. The information systems of the enterprises are used to analyze the current situation, but examining future outcomes and making forecasts is not typical.
3. Based on the answers of the decision-makers two groups of executives were made up: The first group includes executives relying on a wider scope of information-base who also use external information during the decision-making. The other group of executives content themselves with the internal information of the enterprise complemented with information coming from people when making decisions in their controlled areas.

6. RECOMMENDATIONS

It is necessary to form a closer relationship between the food industry enterprises and the higher education institutions, particularly which train managers for this field. The region's food industry managers should be aware that the regular or institutionalized exchange of information with higher education institutions and research institutes can have positive impact on business survival and future development. Accordingly, through closer cooperation the research results can be utilized more efficiently.

A wider range of company executives should be surveyed, not only in the area of the food industry but in other areas as well. Further investigations can determine whether there is some kind of information usage speciality of the enterprises with different characteristics or the results obtained with this research is generally typical in all businesses. The information source names formed and used in the survey can be kept.

The disclosed habits of information source usage of the food industry executives, when making decisions in the different operation areas or about different subjects, may be useful for the designers and implementers of the information systems. These results of the information source usage customs can help system developers when creating company or executive information systems in the future.

All management levels use internal information to make decisions, while the use of information from external sources is typical for the chief executives. Further research is needed to establish how the media and the Internet from the external sources can be inserted into the information system with implementing an adequate filtering to ensure that the extra information does not result in flooding the executives with unnecessary data.

Finally, the executives should be introduced to the sciences and within this, the new tools provided by the information technology. Today variants of large systems are available for small and medium sized enterprises which offer help not only for the low level operational management, but chief executives can also use them to make decisions if they have the appropriate knowledge.

The realization of all these would significantly contribute to the competitiveness of the food industry enterprises operating in the region.

7. PUBLICATIONS ISSUED IN THE FIELD OF THE DISSERTATION

SCIENTIFIC PUBLICATIONS

Foreign language publications

1. Hampel György (2010): Some Thoughts About Data and Information. Review of Faculty of Engineering. Szegedi Tudományegyetem Mérnöki Kar. Szeged. pp. 35-41.
2. Hampel György (2008): Data Sources of Decision Support in Three Significant Food Industry Companies. Review of Faculty of Engineering. Szegedi Tudományegyetem. Szeged. pp. 45-50.
3. Hampel György (2007): Food Industry in Hungary's Southern Great Plain Region. Review of Faculty of Engineering. *Analecta Technica Szegediensia*. SZTE MK. Szeged. pp. 42-51.

Hungarian publications

1. Hampel György (2010): Információforrások használatának gyakorisága és információs rendszerek az élelmiszeripari társas vállalkozásban – felmérés a Dél-Alföld régió élelmiszeripari társas vállalkozásainak vezetői körében. *Agrárinformatikai Folyóirat*. Magyar Agrárinformatikai Szövetség. Debrecen. 1(1), pp. 30-39.
2. Hampel György, Fabulya Zoltán, Nagy Eleménné (2010): Adatbányászati technikák alkalmazása magyar vállalkozások adatait tartalmazó adatbázison Microsoft Excel 2007-ben. *Jelenkori társadalmi és gazdasági folyamatok*. Szegedi Tudományegyetem Mérnöki Kar. Szeged. 5(1-2), pp. 229-233.

3. Hampel György (2009): Élelmiszeripari társas vállalkozások vizsgálata a Dél-Alföld régióban. Agrár- és Vidékfejlesztési szemle. Hódmezővásárhely. 4(1), p. 84. (Complete publication published on CD.)
4. Hampel György (2009): A vezetői döntés értelmezése, a döntéshozatal szakaszai és támogatása. Jelenkori társadalmi és gazdasági folyamatok. Az Ökonómiai és Vidékfejlesztési Intézet 2009. évi tudományos évkönyve. Szegedi Tudományegyetem Mérnöki Kar. Szeged. 4(1), pp. 91-99.
5. Hampel György, Fabulya Zoltán (2008): Információs rendszerek a dél-alföldi élelmiszeripari társas vállalkozásokban. Jelenkori társadalmi és gazdasági folyamatok. Az Ökonómiai és Vidékfejlesztési Intézet 2008. évi tudományos évkönyve. Szegedi Tudományegyetem Mérnöki Kar. Szeged. 3(1), pp. 90-99.
6. Hampel György (2008): Vezetői döntéstámogatás a Dél-Alföld régió élelmiszeriparában. Agrár- és Vidékfejlesztési Szemle. Szegedi Tudományegyetem Mezőgazdasági Kar. 3(1), p. 75. (Complete publication published on CD.)
7. Hampel György (2006): Informatikai felmérés a Dél-Alföld régió élelmiszeripari vállalatainál. SZTE MK Ökonómiai és Vidékfejlesztési Intézet 2006. évi tudományos évkönyve. Szeged. pp. 108-114.
8. Hampel György (2003): Vezetői döntéstámogató rendszerek. Tudományos közlemények. Szegedi Tudományegyetem. Szeged. pp. 45-47.

CONFERENCE PUBLICATIONS

Foreign language publications

1. Hampel György, Nagy Elemérné (2010): Examining Characteristics of Food Industry Enterprises in Hungary's Southern Great Plain Region.

- Proceedings of the 12th Symposium of Mathematics and Its Applications. 2009. november 5-7. Temesvári Egyetem. Temesvár. pp. 361-366.
2. Hampel György (2006): Surveying information systems of food industry companies in Hungary's Southern Great Plain Region. Summer University on Information technology in Agriculture and Rural Development. Debrecen. pp. 139-145.
 3. Hampel György (2006): Searching for food industry data and databases on the Internet. VII. Nemzetközi élelmiszertudományi konferencia. 2006. április 20. Szegedi Tudományegyetem Szegedi Élelmiszeripari Főiskolai Kar. Szeged. p. 154.
 4. Hampel György, Nagy Eleméerné (2005): Preparing a survey of food industry companies in Hungary's Southern Great Plain Region. European Federation for Information Technology in Agriculture, Food and Environment – 3rd World Congress on Computers in Agriculture and Natural Resources. Vila Real, Portugália. pp. 518-523.
 5. Hampel György (2004): Data necessary for management decision-making – a survey of food industry companies in Hungary's Southern Great Plain Region. A gazdaságtudomány fiatal kutatóinak 3. nemzetközi konferenciája. Gödöllő. pp. 204-208.

Hungarian publications

1. Hampel György (2009): A vezetői döntések információforrásai. Agrárinformatika 2009. Információ technológia az agrárgazdaságban és a vidékfejlesztésben nyári egyetem. Debrecen. pp. 54-66.
2. Hampel György (2006): Élelmiszeripari adatok, adatbázisok keresése az interneten. Searching for food industry data and databases on the Inter-

- net. VII. Nemzetközi Élelmiszertudományi Konferencia. Szeged. pp. 153.
3. Nagy Elemérné, Hampel György (2005): Vezetői döntéstámogatás kutatása és oktatása a Szegedi Élelmiszeripari Főiskolai Karon. Fizika, matematika, számítástechnika főiskolai oktatók XXIX. konferenciája. 2005. augusztus 29-31. Szegedi Tudományegyetem Juhász Gyula Tanárképző Főiskolai Kar. Szeged. <http://www.jgypk.u-szeged.hu/kutatas/konf/>
 4. Hampel György, Nagy Elemérné (2005): Vállalati döntéshozatalhoz szükséges adatok, adatforrások felmérése. Informatika a felsőoktatásban 2005 konferencia. 2005. augusztus 24-26. Debreceni Egyetem Informatikai Kar. Debrecen. p. 77. (Complete publication published on CD.)
 5. Hampel György (2004): A környezetgazdálkodás és a döntéstámogatás kapcsolata. VI. Nemzetközi élelmiszertudományi konferencia. 2004. május 20-21. Szegedi Tudományegyetem Szegedi Élelmiszeripari Főiskolai Kar. Szeged. pp. 229-230. (Complete publication published on CD.)