

University doctoral (PhD) dissertation abstract

**THE ROLE OF TIME AS A FACTOR AFFECTING THE
EFFICIENCY OF THE ACTIVITIES OF BOTH EXECUTIVE
AND ORGANIZATION**

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1. INTRODUCTION, RESEARCH SCOPE

Managers are overburdened and exhausted due to their tight schedule of work. They suffer from a constant shortage of time, which may lead them to anxiety, deteriorating performance and manager diseases. This is due to the fact that in the middle of the 20th century people realised that the improvement of technics and technology will soon reach its limits, therefore increasing productivity and efficiency has to be approached from the human side. Improving company efficiency has become a demand towards managers, thus, in order to be successful; they overtake tasks beyond their abilities. At the same time, they search for ways of improving personal efficiency, as well. Related to this, the time paradox has come into the limelight, which is the fact that although the time available to us is limited, the possibilities of its utilisation are unlimited. This means that, on the one hand, efficient time management, and personal and company efficiency might be in relation, and on the other hand, managers can get rid of their anxiety caused by shortage of time, and their tiredness caused by their tight work schedule. Thus, efficient managers have to try to manage their own time and the time of the company well. This way they can discover hidden reserves and gain surplus resources, which may improve competitiveness and efficiency.

Nowadays companies try to maintain and increase their efficiency among environmental conditions which are constantly changing, often unstable and are difficult to predict. In the last few decades changes have dominated the operation of organisations. Earlier, boom periods could be predicted relatively well, whereas today dynamic improvement and uncertainty are more common. The pace of technological improvement and that of the process of product development has increased incredibly, while the life cycle of products and services has decreased. This means there are not only continuous changes in the environment of organisations but the pace of the changes themselves has also risen.

Organisations are forced to adapt to changes by this turbulent and unstable environment. The question how fast the company is able to adjust to its environment does not only determine its competitiveness but often its existence, too. Therefore, the reaction time of organisations – that is the time of adjustment to changes – may become a key factor.

These phenomena drew my attention to studying the personal time of managers and the reaction time of organisations. I chose organisations belonging to agriculture and related supplying, food processing and food trade branches as the target group of my study. One reason for this is that, due to agricultural processes being dependent on nature and production being seasonal, and due to the fact that the different processes are based on each other, the time factor has an outstanding significance in this branch. The other reason is that there have

been especially big transformations in agriculture since the change in the political system. The most significant one was the transformation in the owners' structure related to privatisation and compensation, which brought along a decrease of company size, a change of company structure, product structure and volume, and a fall in the number of employees. All these highlight the significance of reaction time related to the adjustment ability of organisations.

My research topic is integrated in the framework of the research program 'A Functional Study of Company Management in Agriculture' (Berde et al., 2009), elaborated in the Management and Work Science Department of the Agricultural Economy and Rural Development Faculty of the Centre of Agricultural and Technical Sciences, Debrecen University.

The main objectives of my thesis are the following. To create a complex picture of time according to literature, a theoretical approach and my own research; to explore the function of time in management work; and to prove that time as a resource can serve to improve the effectiveness of the management and the company. To make establishments and conclusions, on the basis of particular researches, which help the heads of organisations to make both their personal and their company's time management more effective.

In addition to the main objectives, the minor aims of my thesis are as follows.

- To prove that time belongs to resources and with proper time management the managing director and the organisation can gain an additional resource. To explore the opinions of managers on the time factor and on whether time effectiveness can be improved.
- Managers of organisations of different sizes (micro, small, medium and large) and forms (joint-stock company, ltd., shared joint-stock company, co-operative society, and other), and of organisations which have been transformed and which have not.
- To present time management practice in the managing activities of managers of different ages, sexes, qualifications, positions and working hours.
- To reveal, according to the managers' valuation, what managing tasks are emphasised and which are the ones that remain in the background, i.e. what rearrangements take place in managing activities nowadays.
- To present what managing tasks are considered significant by managers related to the changes.
- To establish what factors support and what factors hinder the immediate reaction of organisations.

The starting points of my research were the following assumptions:

- ◆ Time has its place among resources, as the result of production is also influenced by the period of time spent on production, besides other resources. The operation of organisations and economic systems is a process in time, and their status examined at a certain point of time is always interpreted depending on time. During production time consumption appears as a special expenditure.
- ◆ The time management of managers is characterised by the amount of time they spend performing the different managing activities. The time spent on the different managing tasks indicates the importance of the managing functions.
- ◆ The time factor is an important element of changes. The faster the organisation reacts and the shorter the reaction time is, the more advantage the organisation can gain in competition.
- ◆ Managers can increase their personal efficiency by rationalising their time management, and through that they can contribute to increasing company efficiency, as well.

2. PREMISES AND APPLIED METHODOLOGIES

My research area was identifying the role of the time factor in management work, and exploring how time as a resource can serve to improve the effectiveness of the management and the company. This topic is integrated in the research program (Berde et al., 2009) elaborated in the Management and Work Science Department of the Agricultural Economy and Rural Development Faculty of the Centre of Agricultural and Technical Sciences, Debrecen University.

The aim of the research program, as its name shows, is 'A Functional Study of Company Management'. The structure of the program is characterised by a modular construction. This means that the research covers three main areas related to one another, each of which consists of sub-topics. With this structure it is possible to do more thorough and detailed research, and the results can continuously be integrated in the study of the main areas, as well. Thus, the topics and sub-topics of the research program can constantly be restricted both horizontally and vertically. Due to the modular structure, establishments can be made according to chronological order, and the observations of the same topic made in different periods of time can ensure chronological continuity, too. This study method can be regarded as functional because the main objectives of the research are to determine the tasks of the manager and to analyse the factors influencing these tasks. Through the questionnaires applied during the collection of data, the basis of the establishments was constituted by the opinion, experience, value judgement and preferences of the interviewed managers. Due to this fact, the research method is not only functional but also empirical. My research topic is related to the main area of process management and, within that, to the sub-topic of time management.

My study consisted of interviews in the form of questionnaires, and company data collection. I had constructed the questionnaires with regard to the recommendations of specialized literature, and first I tested it by personal trial interviews with 50, randomly chosen managers. According to the experience that I gained, I finalised my questions and elaborated the method applied during the research with the help of a case study.

The finalised questionnaires were taken to the organisations involved in the study by inquirers. Collecting data by inquirers is considered to be one of the most reliable methods (Babbie et al., 1999), which ensures relevant answers and the proper level of completing the questionnaires.

The character of my study determined the target group of the questionnaires. I asked the employees of the particular companies in top positions to answer my questions.

The questionnaire can be divided into three parts:

- The first part is the 'General data form', which contains the organisational parameters of the person's workplace.
- The second part consists of 'The interviewed person's (personal) identification data'.
- The third part, which contains the main information, is the 'Management interview'. It is made up of 14 questions. In the first eleven questions I gave 7-8 factors, which the interviewed persons had to grade on a scale of one to five. The influencing effects of the 9 factors given in the last three questions had to be graded as neutral, positive or negative. With the data collected in the management interview, I accomplished effect studies concerning resource, management tasks (functions), change, reaction time and time factor.

Applied statistical methods

Considering the type of collected data, I applied several kinds of applied statistical methods in accordance with the objectives of the study. I started the evaluation of the questionnaires with a descriptive statistical analysis, then I made a hypothesis analysis, an analysis of the main components, and a variance analysis.

Descriptive statistical analysis

The data originating from the general data sheet of the questionnaire are of nominal and ordinal measurement level. With these measurement levels a frequency analysis can be made. In my analysis I created grouping lines. The grouping lines contain all the data of the statistical multitude in a list of the variances of group-forming conditions, thus partial multitudes are created according to the variances of the group-forming conditions, the sum of which equals that of the main multitude.

Considering the features of the organisations and of the managers, I created the following variables:

- I divided the organisations, according to branches, into these groups: agricultural, food industrial, service, trade and other activity groups.
- I grouped the organisations, according to operational form, into: joint-stock companies, limited liability companies, limited partnerships, co-operatives and other forms.

- As for size, I distinguished the following groups of companies, according to the recommendation of KSH: micro companies employing 1-9 persons, small companies employing 10-49 people, medium-size companies with 50-249 persons, and large companies having more than 250 employees.
- I divided the organisations into two groups, according to the fact whether they have gone through a significant transformation recently or not.
- The interviewed managers were divided, according to their sex, into men and women.
- As for age, the interviewed persons belong to five different generations: 20-29, 30-39, 40-49, 50-59 years of age, and people above 60.
- I also created groups on the basis of the highest qualification of the interviewed people: those of technical school, secondary school, college and university qualification.
- According to position, among the subjects of the interview there were unskilled workers, semi-skilled workers, skilled workers, lower managers, medium managers, and top managers.
- On the basis of work experience, I distinguished people having 0-10, 11-20, 21-30, and more than 30 years of experience.
- The managers were divided into three groups according to the number of their subordinates: those having fewer than 10, those with 11-50, and those working with more than 51 subordinates.
- I created groups of managers according to the time they spend at work, too: those working fewer than 8 hours, people working 8-10, 11-12, and more than 12 hours.

I analysed the collected data by applying quantity and quality lines. The quantity lines show the division of multitude according to the group-forming conditions that can be represented by numbers, whereas the quality lines show its structure according to main multitude – partial multitude.

Most frequently, statistics examine the structuring and the composition of statistical lines that contain grouping with the help of divisional relation numbers. These numbers represent the proportion of the different parts of the statistical multitude, compared to the whole of the multitude (Gábielné et al., 2002).

Models with a large number of elements can be characterised most concisely with one of their mean values or dispersion indexes. For this purpose, descriptive statistics applies mathematical mean and variance most frequently (Hunyadi and colleague et al., 2001).

When examining resources, managing tasks, change and reaction time, I compared the factors belonging to the different quality condition-groups by comparing their mathematical means. To avoid the possible distorting effects of mathematical means, I analysed the dispersion of the factors, and the frequency of the different condition-variants. I also analysed the division and the order of the point values of the factors.

Hypothesis analysis

In the examinations of resources, managing tasks, change and reaction time I analysed if there is a difference between the groups of organisations involved in the research – and formed according to activity, operational form, size and transformation – in judging the time factor, time efficiency and immediate reaction. I also examined whether the managers' opinions show a significant difference according to their sex, age, highest qualification, position, work experience, number of employees, and working hours. I made a hypothesis analysis of the averages of the groups belonging to the same condition, for which I applied the Program Package SPSS-13.

In an analysis when the aim is to compare a parameter of two multitudes, that is to establish whether, statistically proved, the examined parameters can be regarded identical or they differ, a hypothesis analysis can be made. During this it can be decided if a preliminary statement – a hypothesis – can be considered to be true or not, at the given reliability level. To verify the hypothesis, you need models taken from the basic multitude randomly, from which you can make conclusions according to statistical indexes. The statistical indexes calculated from the models taken randomly differ randomly, which means that they are probability variables. The statistics calculated with probability variables are also probability variables; therefore the conclusions made with them are only true at a certain probability level (Tóthné et al., 2002).

The methodology process of verifying the hypothesis is the statistical trial. This consists of the comparison of two values, the value of the trial statistics and the critical (table) value. The value of the trial statistics can be gained by substituting in the formula of the statistical indexes gained from the model. Its numerical value depends on the validity of the zero-hypothesis. Generally, the more it differs from zero, the smaller the probability is that the zero hypothesis is true. The table value shows a limit, and if the trial statistics has a value bigger

than the limit, the zero hypothesis has to be refused. The critical value depends on the reliability level. The probability of the rightness of the statistical decision regarding the acceptance of hypothesis H_0 is represented by the reliability level $(1-\alpha)$. It is true that hypothesis H_0 will be accepted with a probability of $(1-\alpha)\%$, and the decision will be wrong at a percentage of $\alpha\%$. The probability of the wrong decision is the significance level (α) .

In my analysis, in the framework of a hypothesis analysis, I made a non-parameter trial concerning division. The independence analysis of the multitude was made with an X^2 test. By grouping the basis multitude according to two conditions, you get an „s x t” contingency table. With this it can be examined whether the division according to one condition is independent of the other condition. The critical value is near the liberty degree $szf = (s-1) \cdot (t-1)$. If $X_{emp}^2 < X_{krit}^2$, then H_0 is accepted, that is the two conditions are independent of each other. If $X_{emp}^2 > X_{krit}^2$, then H_0 is refused, that is the two conditions are not independent of each other (Tóthné et al., 2002).

I also applied a rank correlation to analyse the relation between the variables measured on an ordinal scale. In this case, the concrete values of the given variables are unknown, only their order according to a certain condition (Korpásné et al., 2002). If the group-forming condition has two variables, I use a Mann-Whitney, if more, I apply a Kruskal-Wallis trial, which, after the rank transformation, informs me about the acceptance or refusal of hypothesis H_0 with the averages of the ranks.

Main component analysis

In the examinations of resources, managing tasks, change and reaction time I made a main component analysis to simplify the research, and to be able to make structural comparisons to judge the examined issues.

Exploring a problem, when you have to take into account the relation between several variables not independent of each other at the same time, you have to apply the method of main component analysis. The objective of this method is to transform the variable set, with linear transformation, into a new, smaller variable set than the original one, with the help of which you can explain most of the original variables more, and you can explore the relations between the variables (Székelyi - Barna et al., 2002). With the main component analysis, you create main components which are in close correlation with the original variables, almost independent of each other and their number, compared to the tested model, is minimal. One of the important steps of the main component analysis is that it estimates main component

weights, according to the observed values of the original variables. The main component weights show to what extent each main component influences the same variable. The main component weights are given in a matrix. It is general that the variables having a factor weight of an absolute value of ± 0.70 or more are considered to belong to the factor, and the variables having a factor weight of an absolute value of less than 0.70 are not identified with the examined factor (Szűcs et al., 2002). In some technical literature, however, even variables having a factor weight of a value of more than 0.4 – 0.5 belong to the factor (Naresh - Malhotra et al., 2001). During a main component analysis often rotation is used, which means the rotation of the coordination system. The aim of the rotation is that in the new coordination system the main components should be interpreted better, that is one variable should belong to one component only. While making the main component analysis I used the Spearman rank correlation matrix in the SPSS 13 program to create the main components. As soon as we have had the main component weight matrix calculated, we can give a meaning to the different main components, according to the variables determining it. The KMO index and the Bartlett test assess the acceptability of the analysis. The value of the KMO index is minimum 0.5 (Székelyi - Barna et al., 2002(2)). The KMO index measures whether the variable relations in each pair are not too strong. Too strong relations are not favourable for using the method, as in that case it is the relations in the pairs that determine the set of data, and not the effects behind them. The Bartlett test measures whether the variables in each pair are independent. A significance below the value of 0.05 shows that the variables in the pairs are not independent, therefore it makes sense to search for latent variables. The KMO test, the value of which exceeded 0.5 significantly in the case of each run, means that the data are suitable for the given analysis. The significance levels behind the Bartlett test smaller than 0.05 also showed that our measured variables meet the minimal requirements.

I made a data reduction regarding the 88 variables in the questionnaire. During the data reduction the number of the variables decreased to 36, thus the further analyses became clearer. We managed to preserve 70.13% of the information on average, which can be considered to be fairly good. The successfulness of the data reduction was shown by the KMO and the Bartlett test, as well. As for the former, all the main components had a value far more than 0.5 (0.7-0.8) and the Bartlett test was also significant. During the data reduction the main component weights that could properly be interpreted evolved by applying Varomax rotation.

I formed the main components for the questions measured on an ordinal scale in the analysis of resource, managing tasks, change and reaction time as separate groups of questions.

Considering the small proportion of missing data (1.9 %), I did not apply a substitution of the missing data with averages when creating the main components. In the analysis 6 main components were created in each group of questions, 36 altogether.

Variance analysis (ANOVA)

I made a variance analysis on the created main components in order to prove statistically, in their case, the influencing effect of the group-forming conditions on giving answers.

The variance analysis is a parameter process, i.e. the dependent variable involved in the analysis has to be normal. With its help we try to find an answer to the question whether there is a remarkable difference between the sub-models grouped according to the different conditions as independent variables (e.g. sex, age) in the value of the dependent variables (the main components created in the efficiency test of the time factor). Also, to the question if the dispersion of the values within each group and the dispersion of the groups differ or not. A further condition of its application is the independence of the sub-models, and the dispersion of the dependent variables also has to be the same in the different sub-models. In order to test this, we apply the Levene statistics. The model is characterised with the help of two types of variance, the inner and the outer variance. If the outer variance exceeds the inner variance significantly, then the differences are in the divergence of the groups.

To numeralise the divergence of the variances, we make a comparison of the quotient of the variances and the appropriate value of the F-distribution, i.e. the F-trial. If the significance is below 0.05, then we reject the zero hypothesis, according to which there is no difference between the different groups in the value of the dependent variable.

I made a variance analysis on the main components created by the groups of questions according to the group-forming conditions. The different analyses were made according to the main group-forming conditions found in Table 1. The table also contains the percentage of the missing data concerning the different conditions. In the case of missing data the given interviewed person, according to the given aspect of research, was left out of the analysis, that is I did not substitute the missing data with averages, as it may have distorted the result. In addition, a model having a sufficient number of elements does not make it necessary to do such correction.

Table 1

Group-forming conditions for analysing the main components

<i>Group-forming conditions</i>	<i>Actual</i>	<i>Missing</i>	<i>%</i>
Number of employees	582	43	6.88
Sex	622	3	0.48
Age	613	12	1.92
Qualification	618	7	1.12
Position	587	38	6.08
Working hours	619	6	0.96

Source: own research

I also examined the relation between the main components, with correlation analysis. I could do that because I created the main components by question groups. This made it possible that the main components created from the resource analysis could be related to other components. Of course, the components created within a question group are independent, which derives from the methodology.

Chi-square analysis

For examining the relation between the effect study questions of low measuring levels and the group-forming conditions, I applied a Chi-square analysis. In the case of the questions of the effect study the proportion of the missing data was 1.64%, and I did not apply a correction with the average.

We generally apply non-parameter statistical trials in experimental statistics when the tested variables do not comply with the conditions of the parameter trials. This mainly means a distribution very different from the normal one. With them you can make fitting, homogeneity and independence analysis. Test χ^2 is one of the basic tests in statistics. It is usually used when we examine a divergence from an expected value on grouped data (cross tables). One of its great advantages is that it is suitable for analysing both discreet and continuous variables. However, the continuous variables have to be divided into classes, as the test analyses the probability of relative class frequencies. The conditions of its application are that the class frequency should be minimum two, and there can be fewer than five data only in 20% of the classes. With test χ^2 you can also evaluate ordinal and nominal data classified in categories. Test χ^2 is most frequently used for testing hypotheses concerning proportions, and analysing relations (e.g. if there is a difference in judging the role of the time factor regarding managing

tasks, according to sexes). This means comparing the observed and the theoretical (expected) frequencies in a cross table.

Cluster analysis

In the last phase of my research I made a cluster analysis to establish what groups the managers can be divided into according to their answers.

The method is one of the most well-known processes of the multi-variable statistical analyses, which is suitable for grouping. We would like to group the observations relying on the variables related to the observation units. We want to create clusters the elements of which are connected to each other as tightly as possible, and relatively differ more from the elements of the other clusters (Kovács-Balogh et al., 2007). The cluster analysis does not make a difference between dependent and independent variables, but it examines the mutual relations within a set of variables. With its help you can not only group the observation entities but it is also possible to create variable groups. The two most important points of the analysis process are choosing the distance measurements and the clustering method. In the case of the scale-type data, the most significant distance measurements are: Euclides-distance (it can be quadratic, too), Manhattan, Csebisev, and Pearson-type. When reducing two elements a cluster is created according to the distance between them. In case of reducing two clusters you have to define the interpretation of the distance of the two clusters. There are different methods for that. In my study I used the most widespread one, the Ward-type method, as it is the method that particularly intends to perform group forming with a minimal loss of information. By loss of information we mean the square sum of the divergences of the elements from their group average, i.e. the variance within the group. The variance of the whole model can be divided into the sum of the variance within the groups and that of the variance between the groups. The aim is to create a grouping in which the sum of the variances within the groups is minimal. To validate the cluster analysis I ran the method for several kinds of distance measurements, and following that, I compared the results received in that way.

Reliability analyses

I tested the reliability of the set of data with a reliability analysis. The analysis creates a Chronbach alpha index, which determines reliability. The values of this index in the different question groups are shown in Table 2. It can be seen that the values (except for two question groups) are far higher than the specified value of 0.7 (Barrett et al., 2001). Therefore, I

considered the data suitable for further research. I also performed the analysis that indicates which questions should be cancelled from the questionnaire if we want to improve reliability. I found no such questions in any of the question groups.

Table 2: Reliability coefficient by questionnaires

Question group	Chronbach Alpha value
1.	0.7406
2.	0.8101
3.	0.7545
4.	0.7478
5.	0.8126
6.	0.8199
7-16/1	0.8172
7-16/2	0.6855
7-16/3	0.6844
7-16/4	0.8639

Source: own research

Summary of the statistical methods applied in the analysis:

- In the groups formed by the personal features of the interviewed managers and by the parameters of the organisations, I evaluated the data with statistical methods.
- I accomplished the studies of resource, management tasks, change and reaction time following the same analysis structure.
- To compare factors belonging to different quality model groups created according to the personal characteristics of the interviewed managers and the parameters of the organisations, I compared their mathematical averages.
- To avoid the possible distorting effects of mathematical averages, I examined the dispersion of the factors, and the frequency of the versions of the different group-forming conditions. I also examined the distribution and priority of the point values of the factors.
- With all the question groups I analysed if there is a difference between the different groups of organisations involved in the study, which were formed by activity, operation form, size and transformation, in judging the time factor, time efficiency and immediate reaction.
- I also examined whether there is a significant difference between the managers' opinions according to their sex, age, highest qualification, position, work experience

and the number of their working hours and employees. I performed a hypothesis study of the averages of the groups belonging to the same aspects.

- For the questions measured on an ordinal scale, I created main components by question groups. During the analysis six main components evolved in each question group, i.e. 36 main components altogether.
- I performed a variance analysis on the main components according to the group-forming conditions, and I examined the relations between the main components with correlation analysis.
- For examining the relation between the questions of low measuring levels and the group-forming conditions, I applied a Chi-square analysis.
- I tested the reliability of the set of data with a reliability analysis. The analysis creates a Chronbach alpha index, which determines reliability. According to this index, I considered the data suitable for further investigations. I also analysed whether any of the questions should be cancelled in the questionnaire if I wanted to improve reliability. I did not find such questions in any of the question groups.

3. MAIN FINDINGS OF THE DISSERTATION

Presenting the research model

I analysed 625 managers' interviews in my study, for which I collected data with the help of inquirers.

In the case of missing data the given person was left out of the analysis according to the given study aspect. The proportion of missing data for the whole model was 1.83%.

The activities of all the organisations are related to agribusiness. Half of the companies specialise in agricultural activities, and a further 5.4% of them in food industry. The research model mainly consists of medium sized, limited liability companies. More than 40% of these companies have gone through remarkable transformations in the last few years.

Most of the interviewed persons are men with higher level qualifications, and with positions mainly in medium and lower management. Among them you can find men in their thirties, forties and fifties, approximately in the same proportion, but there are a significant number of persons in their twenties, as well. 60% of them keep to the legal eight-hour working day, but 40% of them spend more time at work.

Resource studies

Resources are all the material and immaterial goods and services that companies use in order to realise their launches. According to their functions in the production process, natural resources (soil, raw materials, etc.), human resources, capital, and business abilities are traditionally regarded as production factors. In the 20th century a new type of resource joined these traditional resources, and that was information. Time also possesses features of resources: with its utilisation it is possible to gain profit, while it appears as a special expenditure, it has value and price, there is shortage of it, it can be replaced and completed by other resources, and, in a way, it can be mobilised.

The time factor plays an important role in organisational processes and in management activities. Thus it can be established that, from the organisational and managing viewpoint, time is an objectively existing, well-definable economic factor which can be regarded as a resource, as well. Its effect has two directions: it may serve as limit and advantage at the same time. According to all that, in my studies I regarded time as a resource. This did not cause any problems to the interviewed managers, they were able to handle and evaluate time as a resource. My aim with the resource studies was to determine the place of time as a resource among the other resources.

In these studies I analysed the time factor from two aspects. On the one hand, I wanted to know what role time has in managers' opinions in increasing company efficiency and performance. On the other hand, I asked them how much they consider this resource to be expandable. As from the answers you can find out about the classification of the other resources too, it is possible to draw further conclusions from their rankings.

First I tried to find an answer to the question where the place of time as a resource is determined by managers with regard to ranking resources in increasing company efficiency and performance. I represented the ranks with mean values. When analysing the averages, as Figure 1 shows, the following ranking evolved: financial resource, material and technical resource, human resource, market, information, connection, and time.

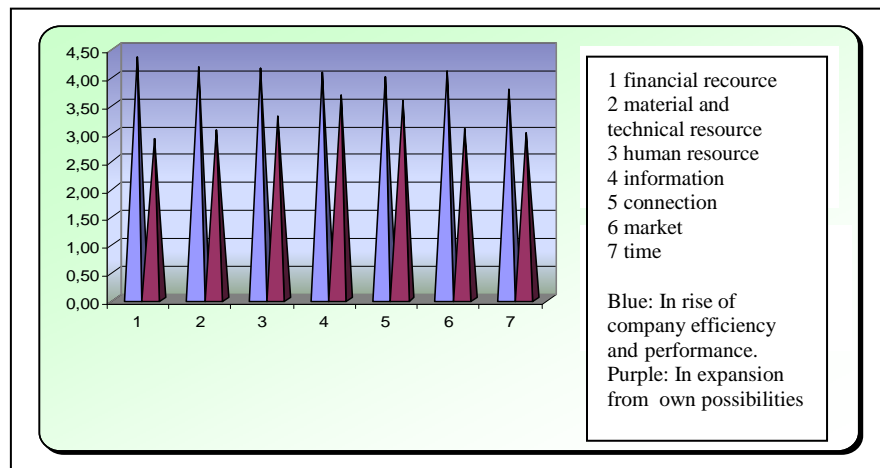


Figure 1: Study of the significance of resources

Source: own research

The interviewed managers placed all the resources before time. Thus, it can be established that managers do not value the role of the time factor as required. A company may possess sufficient financial, material, technical and human resources, and it may have market connections and information about its constantly changing economic environment, but if it does not react to these changes in time, it possesses its resources unnecessarily as it cannot utilise them efficiently. This highlights the fact that it is necessary to explore the features of the time factor, and to confront managers with the results of the research.

An interesting feature of the model is that the bigger the company size is, the more important managers consider the time factor. Another is that young managers regard time as important more than elder ones. They probably believe in time management techniques, i.e. in the fact that they may be able to use their time more intensively. Whereas elder managers carry out

most of their tasks as routine jobs, they have completed the rationalisation of their time management, and they believe they cannot increase the efficient utilisation of their time any more.

In the second part of the resource studies I analysed how much managers of the organisations involved in the research consider the different resources to be expandable from their own possibilities. In this question managers' opinions were the same, regardless to sex, age and qualification. From this aspect time only precedes one resource, which means that managers consider time rather as a limit. It is true that time is a limited resource, but in the case of the other production factors it is limitation that is the motivation of business.

In the analysis of the main components the role of resources in increasing efficiency and performance is the following: time behaves the same way as market and connections (Table 3). Concerning importance, these resources follow material, technical, and financial resources, and precede human resources and information. The correlation between the elements of the factor can be explained by the fact that these resources are independent of the aims and inner conditions of the organisation; they are 'outer environmental factors'. Thus, it seems they cannot be influenced by the company, as opposed to the other resources which depend on inner conditions, and can be formed according to the company's own objectives and abilities, therefore their role in influencing productivity and efficiency may be greater, as well.

Table 3: Main components created by the importance of resources

<i>Resources</i>	<i>Main components</i>		
	<i>I.1a</i>	<i>I.1b</i>	<i>I.1c</i>
Material and technical resources	0,835		
Financial resources	0,809		
Connections		0,769	
Market		0,709	
Time		0,571	
Human resources			0,808
Information			0,708

KMO = 0,739; explained variance proportion = 67%

Source: own research

In the study how much they can be expanded, market and time represented a main component. These two resources are completely independent of the company's objectives; they are outer environmental factors, which cannot be expanded from inner sources.

Study of management tasks

In the study of management activity I analysed management tasks dividing them into two groups. One of the groups contains classical management tasks, which show the logically built order of management work. Thus, this group consists of obtaining information – communication – planning – decision making – commanding – organising – checking, named as functions related to organisational processes ('process tasks' in short). I examined separately the tasks that cannot definitely be placed in this logical process, and which can be related to several elements and functions. Therefore, the other group is made up of motivation management, forming organisational culture, change management, quality management, organisation improvement, human resources management and forming organisational behaviour. As they are related to management work due to their content, I named them as content managing tasks. This division follows the Berde et al.,2003 classification of management tasks.

My aim with both groups was to find out in which management tasks time is considered significant, and in which tasks managers believe that time efficiency can be improved.

In the **process task** tests my objective was to explore how important managers consider the time factor and how much they suppose time efficiency can be increased in the case of obtaining information – communication – planning – decision making – commanding – organising – checking. The time factor classification of the interviewed managers is illustrated by the following numbers:

1. Organising 3,981
2. Decision making 3,978
3. Planning 3,932
4. Obtaining outer information 3,912
5. Checking 3,902
6. Communication 3,897
7. Obtaining inner information 3,876
8. Commanding 3,574.

The high values show that the interviewed persons regard the time factor to be remarkable in the management tasks related to organisational processes.

Among the process tasks, only commanding has a slightly lower ranking compared to the other ones. In contrast, agricultural organisations ranked commanding as having the highest value (Table 4).

Table 4: Time factor in process tasks according to branches

Branch/ Task	Obt. inner infor- mation	Com- muni- cation	Decision making	Comman ding	Organi- sing	Checking
Agriculture	3,9502	3,8689	4,1180	3,7294	4,0492	3,9967
Food industry	3,9000	3,7576	3,7576	3,2333	3,8788	3,5000
Industry	3,9667	4,0333	4,1525	3,6102	4,1017	4,0172
Services	4,0000	4,1852	3,8375	3,5185	4,1235	3,9506
Trade	3,4651	3,6047	3,7209	3,4884	3,5814	3,7442
Other	3,7241	3,8488	3,7471	3,3103	3,8161	3,6744
TOTAL	3,8887	3,8997	3,9835	3,5871	3,9885	3,9022

Source: Own research

Commanding means interpreting the company's objectives to employees in a way that makes them committed to them, and that motivates them to perform at a high standard. This might be problematic indeed in agriculture, as continuous employment is difficult there due to agricultural work processes being seasonal, and work load being constantly changing and unbalanced. A number of employees can only be employed as occasional or seasonal workers. Occasional or seasonal workers are less committed, and there are fewer tools available for managers to encourage them to perform at a high level.

According to the main component analysis, managers – especially those of larger companies – thought that the time factor has the greatest significance in exploring problems. Within the organisation efficient communication and quick inner information flow are of vital importance, thus the proper operation of the organisation can be provided, and this is manifested in results as well. In addition, obtaining outer information in due time and planning provide an advantage in the market competition. Besides, time efficiency can be

improved the most in the functions of preparing the task, in decision making, planning and commanding.

The different **content management tasks** have very different averages as values. As it can be seen in Figure 2, according to the managers of the organisations involved in the research, among the content functions time has the greatest significance in quality management, organisation improvement and human resources management. These are represented by the averages of 3.7 – 3.8. Motivation management, change management and influencing company behaviour have medium rankings with values around 3.5. The last place is taken by forming company culture, with an average of 3.38.

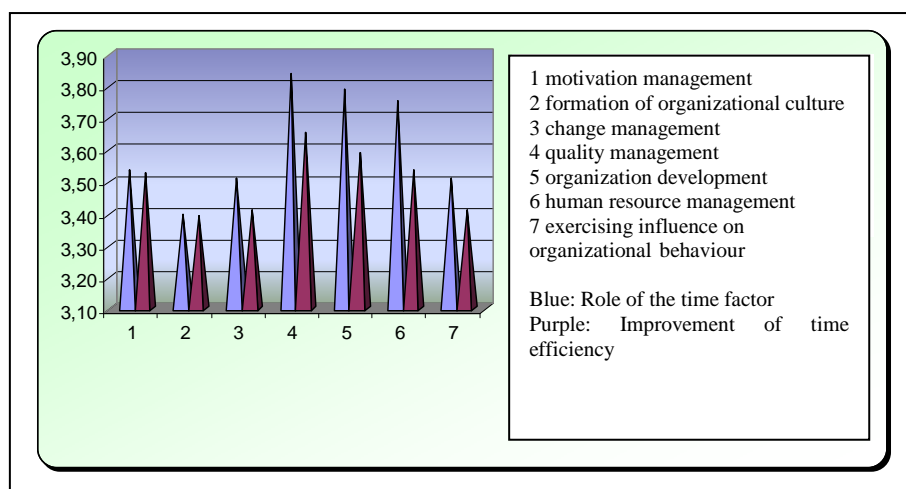


Figure 2: The role of the time factor in content management tasks

Source: own research

The aim of quality management is quality control, creating and operating quality control systems. The attitude to quality has changed significantly in the last ten years. From quality control based on standards, which was based on checking the parameters of the final product and measuring product quality (Rácz et al., 1997), it went through process regulation to process control. According to today's attitude, quality is not only related to the final product. It is not only influenced by the product-making activity, but also human factors like company culture, management and marketing. Successful quality improvement requires the absolute commitment of the management, the active involvement of all the employees, and extensive training (Berde et al., 2003). This explains why quality management, organisation improvement and HR management are connected in the issue that I studied.

The highest level of quality is satisfying the customer's hidden needs. It is easy to understand that the company that realises this sooner can gain an advantage in the competition and more

income. Therefore, in the tested model it is the time factor that has the highest value concerning quality management.

It reflects branch peculiarities that in motivation management it is the service branch, and in quality management it is industry and food industry that gave the highest ranks to time. In the case of production branches, the chances of organisations in market competition are greatly influenced by the question what quality products they are able to release, how much these products meet consumers' needs, how balanced the quality of product release is, and how much companies are able to strengthen their market positions by improving the quality of their products (Varga and colleagues et al., 1997). In the last few decades the level of customers' quality requirements has especially grown in food industry. Thus, industrial and food industrial companies can only maintain, or increase, their market potentials if they launch products of the highest quality in the market.

According to the main component analysis of content tasks, the time factor has the most significant role in the case of forming company culture, motivation management and influencing company behaviour, which provide 'inertia'. This is acceptable, as all the three functions have effects for a long time. The longer period of time means more time expenditure. However, it is refunded as on a long term basis stable companies are characterised by efficiency.

I also created main components for describing the connection between the improvability of time efficiency and content management tasks. The structure that evolved is almost the same as the previous one, concerning the role of the time factor. The further improvement of time efficiency is the most possible in forming motivation management, company culture, and influencing company behaviour. These functions are determined by the company objective. The main objective of a company at all times is effective operation. It is encouraging that the interviewed managers believe the efficient utilisation of time can be most improved in this aspect.

Studies of change

The interest of company managers is to maintain the level of performance they have achieved, and to be able to improve it continuously. That is one of the conditions of the company's survival, capability of living and growing on a long term basis. At the same time, however, there are constant changes in the outer environment of most companies, and these companies are forced to adjust to their outer environment. That is why companies can only ensure their existence and survival by constant, smaller or bigger modifications and changes. In this

respect companies can be regarded as dynamic organisations. It is a rather difficult task, and a constant activity at the same time, for companies and their managers to create a dynamic balance between permanence and change, or in other words, between stability and flexibility. This especially causes problems when there are such enormous changes in the outer environment of companies as, for instance, the ones that have occurred in our region in the past few years (Dobák et al., 2007). It might be decisive for organisations how fast and how effectively they can adjust to the outer environment. This encouraged me to study the role of the time factor in the change processes, and the improvability of time efficiency.

I started the analysis of change processes with studying the averages. Figure 3 shows the classification of the time factor and the improvability of time efficiency in the case of organisational, technological, culture, market, management, profile and regulation changes. As it can be seen in the figure, the interviewed managers regarded the time factor as the most remarkable in market and technological changes. They considered it to be of medium importance in the case of organisational, management, regulation and profile changes. In this study time has the smallest significance in culture change.

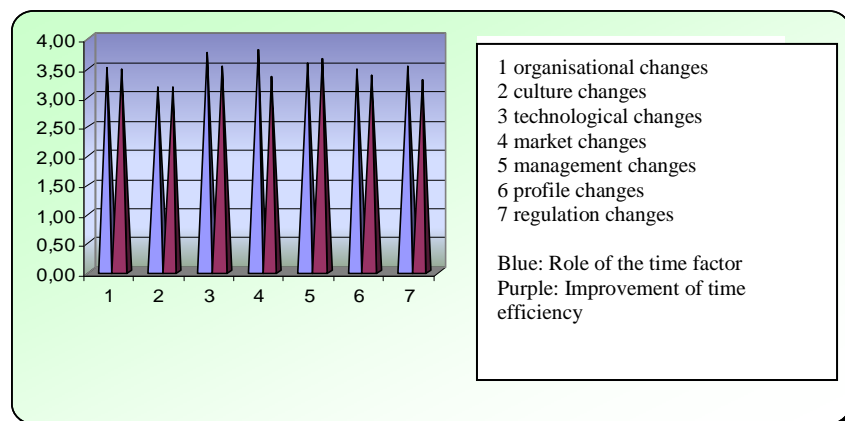


Figure 3: Analysis of change processes

Source: own research

I found significant differences in opinions examining them according to branches, as well. In technological, market and profile changes it is industrial companies, and in management changes it is agricultural companies that classified time as having the highest value. The managers of industrial companies wish to follow, if needed, the tactics of ‘reducing cost and increasing income’ (Varga and his colleagues et al., 1997), which is part of the basic recipe of crisis management. In order to achieve that, they are ready to accomplish profile clearance, cost rationalisation, product and market development in the shortest possible time. Compared to the other branches, agriculture is more sensitive to management changes. That may result from the fact that, following the change in the political system, this branch went through

company and management structure changes together with the change of the owners' structure, related to privatisation and compensation. Agricultural companies realised that immediate reaction is important in the case of the changes mentioned above, too. As for market and technological changes, time is classified with high values by the managers of industrial, limited liability companies, who work long hours.

Studies of reaction time

The success and efficiency of companies greatly depend on how fast they can react to environmental changes. Changes serve the long-term maintenance and improvement of company performance, which is only possible through constant renewal more and more. Ideas and decisions of change can only come true if there are suitable resources available as support. Successful changes can only be accomplished with sufficient time, material and human expenditure (Dobák et al., 2007).

The study of reaction time is examining time expenditure related to changes. Smaller time expenditure means more effective and more economical resource utilisation. On the basis of this, I tried to find the factors which influence reaction time the most, and to what extent reaction time can be reduced with management tools.

The average of the complex evaluation of the whole study model is shown by Figure 4, in which the classifications of the studied factors can be compared, and their rankings can be established.

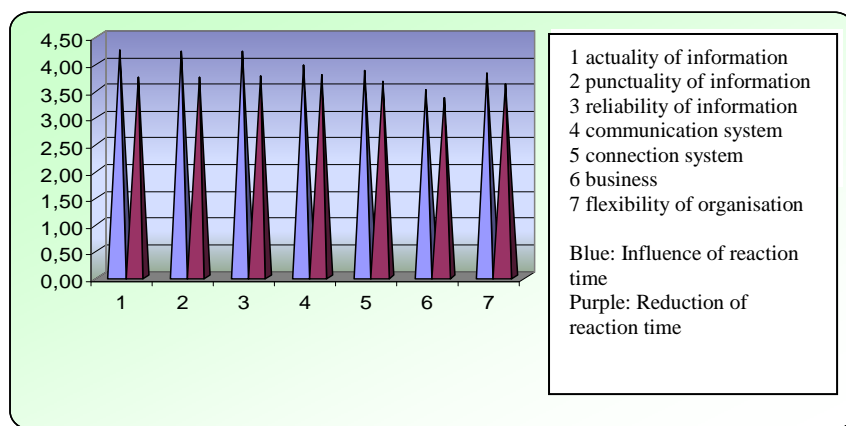


Figure 4: Study of reaction time

Source: own research

According to the interviewed managers, the speed of reaction is the most promoted by information and communication, and the most hindered by human factors and company structure. They believe that immediate reaction is ensured if the motivated, performance

oriented members of the organisation having sufficient information communicate well. In fact, if the members of the organisation are not committed to the success of the company, and if they do not possess up-to-date information, or do not communicate adequately, the adjustment ability of the company will be damaged, and it will lose its ability to adapt to changes immediately. Thus it will take a rather disadvantageous position in the competition.

Correlations between the main components

I made the resource, managing tasks, change and reaction time analyses by following the same analysis structure. In all the cases I also applied a main component analysis to simplify the examinations. During this 6 main components evolved in each question group, 36 altogether. I explored the relations between the evolved main components with a correlation analysis. My objective was to establish whether there is a relation between the factors. On the one hand, the relations between the main components may provide feedback on the content rightness of the analyses, and on the other hand, they might help to make conclusions of a summarising kind, going beyond the given analyses.

The correlations between the main components indicate that my analyses relate to each other from the viewpoint of content, and the interviewed managers judged the examined factors consistently. Among the factors having correlation with each other, information, communication and human factors were the most frequent ones. Since communication is an exchange of information between persons with communication tools, the relation of these elements can be well explained. It can be established that from the aspect of time, too, information, communication, human resource and its management are the most significant, as they are connected with the time factor the most closely.

Effect studies

The effect studies consist of three parts. First I examined how time as a limited resource influences management tasks. In the second part I tried to find an answer to the question how time would affect management tasks if it was unlimited. In the third part I assessed the amount of time – whether it grew, decreased or remained the same – available for the different management tasks in the last few years.

As Table 5 shows, if time is limited, it has a positive effect on motivation, commanding, change and decision making, whereas in the case of the other tasks its effect is rather negative. Of course, if time was unlimited, it would have a positive effect on all management tasks.

Table 5: The effect of limited and ‘unlimited’ time on management tasks

<i>Management task</i>	<i>Time</i>	
	<i>limited</i>	<i>unlimited</i>
Information	2,32	1,84
Communication	2,19	1,78
Planning	2,33	1,93
Decision making	2,09	1,84
Motivation	1,70	1,72
Change	2,07	1,87
Commanding	1,83	1,67
Organising	2,29	1,94
Checking	2,30	1,92

1: neutral, 2: positive, 3: negative

Source: own research

Among the managers’ personal features it is their working hours, and from the organisational features it is the analyses made according to company size that showed significant differences of opinion.

It is people working 8 hours that feel the most negative about the fact that the amount of time spent on communication is limited. In the case of decision and organising, the limitation of time annoys the managers working less than 10 hours most. The interviewed managers’ opinions differed most in the case of checking, but overall, they consider it negative that the time available for checking is limited. The managers working less than 10 hours emphasised that if time was available for them unlimited, it would have the most remarkable effect on planning, among managing tasks.

The analyses made according to company size show that the managers of companies employing more than 50 persons consider it negative that they can spend only a limited amount of time organising and checking. In the case of large companies having more than 250 employees, managers would like to spend more time on communication. Managers of organisations with a staff number bigger than 10 believe it would be useful if the amount of time available for information and checking was unlimited.

In the past few years, for most managers the amount of time spent performing the different tasks has not changed. According to Table 6, in the case of checking most managers have experienced a decrease, and a slight increase in organising. A significant change is that almost one third of the managers has found more time to deal with information and communication, and has spent less time planning and making decisions. On the basis of these changes in time expenditure it can be established that among the tasks organising, information and communication have come into the limelight, while checking, planning and decision making are, to some extent, remain in the background in management work these days.

Table 6: Study of time expenditure in management tasks

Management task	Remained the same		Increased		Decreased	
	Db	%	db	%	db	%
Information	251	40,6	200	32,4	167	27,0
Communication	228	36,9	212	34,3	178	28,8
Planning	242	39,3	170	27,6	204	33,1
Decision making	286	46,7	121	19,7	206	33,6
Motivation	348	56,4	145	23,5	124	20,1
Change	284	46,0	162	26,3	171	27,7
Commanding	352	57,1	103	16,7	161	26,1
Organising	210	33,9	212	34,2	197	31,8
Checking	203	33,0	182	29,5	231	37,5

Source: own research

Cluster analysis

I performed the cluster analysis with the help of the values of the created main components, thus it was the elements of the time factor analysis that served as the basis of group forming, except for three questions of the effect study, as they were not five category variables. According to the basis of group forming, four groups could be created concerning the opinions of the interviewed managers. There were persons who attributed great importance to everything, people who gave a negative answer to all the questions, and two mixed groups also evolved.

It became clear from the analysis that the managers find human resource, and time expenditure connected with human factors and motivation the most determining among the examined factors. They also qualified as important the role of obtaining inner and outer information and communication in increasing time efficiency. Opinions greatly differed in judging which analysed factor has the smallest significance.

4. NEW, OR RATHER, NOVEL FINDINGS PRESENTED IN THE DISSERTATION

☉ I analysed 625 questionnaires containing management preference examinations, investigating time factor and time efficiency with regard to resources, management tasks and changes, with scientifically established statistical methods. According to the available national and international technical literature, it can be stated that this kind of approach and research of the time factor is unique.

☉ During my literary and theoretical investigation I established that even time possesses features characterising resources:

- with its utilisation it is possible to gain profit,
- it appears as a special expenditure,
- it has value and price,
- there is shortage of it, you have to manage it well,
- it can be replaced and completed by other resources,
- it can be mobilised, in the sense that it can be freed.

Unique characteristic features of time are that it is limited, irreversible, it cannot be stored, and it is available for everyone. Time is an abstract notion, and is difficult to handle among physical possessions. On the one hand, it is an objective, outer natural necessity, but on the other hand, its utilisation depends on human will.

☉ Change directs attention on the time factor from the point of view of the organisation, and management does the same from that of the person. Thus it can be established that from the organisational and managing viewpoint time is an objectively existing, well-defined economic factor which can be regarded as a resource, as well. Its effect has two directions: limit and advantage at the same time. After I had created the definition of time as a resource, I mentioned it as one in my investigations. For the managers questioned it was acceptable, they interpreted it well and handled it together with other resources.

☉ During the examination of managing activities, I divided managing tasks into two groups. In one of them there are the classical management tasks, which I named as process tasks in short. I examined separately the tasks that cannot definitely be placed in this logical process, and which can be related to several elements and functions. They are the content tasks.

Among the process tasks the role of the time factor was considered by the managers questioned as the most important in organising and decision making. They were followed by

planning, obtaining outer information, checking, communication and obtaining inner information. Time has the least significance in commanding.

According to the managers of the organisations involved in the research, among the content functions time has the greatest significance in quality management, organisation improvement and human resources management. Successful quality improvement requires total commitment of the management, active involvement of all the employees and extensive training. This explains why quality management, organisation improvement and HR management are handled together in the question I examined.

According to the studies of change, it can be established that the time factor has the greatest importance, in the interviewed managers' opinions, in the case of industrial and technological changes. As they see it, reaction time is mostly influenced by the punctuality, up-to-dateness and reliability of information.

On the basis of the change in time expenditure, it can be pointed out that among tasks organising, information and communication have come into the limelight, while checking, planning and decision making are, to some extent, remain in the background in management work nowadays.

☺ I proved that the correlation of time and the capital of knowledge exists.

☺ I proved that in the time factor the improvement of information technologies is present as a joint effect, and this manifests itself in communication, as well.

5. CONCERNING THE POSSIBILITY OF USE IN PRACTICE OF THE RESULTS

As a summary of my research on the time factor, I give the following recommendations to managers:

- ☉ Managers do not value the role of the time factor properly. We must confront them with the fact, on the one hand, that in today's diversified, often instable and unpredictable environment the efficiency of organisations, or even their existence, may depend on whether they are able to react to changes in time. On the other hand, they must also face the fact that they can increase their personal efficiency by rationalising their personal time management. This may result in getting rid of their anxiety caused by shortage of time, and their tiredness resulting from working too hard, and they may gain a surplus resource which they can use for a more creative achievement of organisational targets.

- ☉ My recommendation is that managers should improve their personal time management with time management methods applying the most modern techniques and 'new generation' tools.

- ☉ According to my research, it can be established that the time factor is basically influenced by the improvement of information technologies. I consider it important that future managers should have proper knowledge of these, which means that training and self-training related to this field are indispensable demands from them.

- ☉ In addition to information, the time utilisation of managers can be increased by improving the following activities: communication, human resource and its management. If managers want to rationalise their time management, the supervision of the fields mentioned above is recommended.

- ☉ I draw future managers' attention to studying organising skills thoroughly, as on the one hand, it is the most significant managing task according to their experienced colleagues, and on the other hand, the time expenditure that can be spent on this activity is decreasing nowadays.

- ☉ Time has an important role in quality management, organisational development, and human resource management, as well. In connection with these tasks, I recommend the active involvement and the training of all the workers.

- ☉ According to my results, the time factor has the greatest significance in the case of market and technology changes. Therefore, I suggest that managers should follow market and technology changes continuously, by utilising the most modern informatics facilities, of course.

6. SUBJECT AREA OF MY PUBLICATIONS AND DISSERTATION

1. **Bácsné Bába É.**(2005): Időgazdálkodás (4. fejezet). In: Menedzsment nem csak vezetőknek. (Szerk.: Bácsné Bába Éva – Dajnoki Krisztina) Szaktudás Kiadó Ház, Budapest, 67-85.p., ISBN: 963 9553 62 X (**KPÉ: szerk.: 0,15 + 0,25**)
2. **Bácsné Bába É.**(2007): Az idő szerepe a vezetésben (14. fejezet). In: Humán Erőforrás Gazdálkodás és Vezetés. (Szerk.: Dajnoki K. – Berde Cs.), Szaktudás Kiadó Ház, Budapest, 2007., 199-209. p. ISSN 1789-3542, ISBN: 978-963-9736-34-4 (**KPÉ: 0,15**)
3. **Bácsné Bába É.**(2005): Módszertani eljárások az időtényező vezetési szervezeti folyamatokban betöltött szerepének vizsgálatához. In.: Agrártudományi Közlemények 2006/20. Különszám (Szerk.: Jávor András) 24-32. p. (**KPÉ: 0,2**)
4. **Bácsné Bába É.**(2009): Az idő, mint a vezetői tevékenység erőforrása. In.: Agrártudományi Közlemények (Megjelenés alatt) (**KPÉ: 0,2**)
5. **Bácsné Bába É.**(2009): The role of the time factor in the manager functions. In: Applied Studies in Agribusiness and Commerce Vol. 3. Numbers 5-6. 2009. pp. 101-108. (**KPÉ: 0,4**)
6. **Bácsné Bába É.**(2008): Methods for the examination of the role of the time factor in managerial and organizational processes. Prague Agrarian Perspectives XVII., Challenges for The 21 st Century, Collection of Papers of International Scientific Conference, Volume I. 193-196 p., Praha, 16-17. 09. 2008. ISBN: 978-80-213-1813-7. (**KPÉ: 0,3**)
7. **Bácsné Bába É.**(2008): Modeling of studying of manager work on the basis of case study. International Conference, Applied Economics, Kastoria, Greece, 2008. (CD anyag 6 oldal) (**KPÉ:0,3**)
8. **Bácsné Bába É.**- Dajnoki K. - Szabados Gy. (2009): The function of time in management. 44th Croatian and 4th International Symposium on Agriculture, Opatija, Croatia 2009, Proceedings: pp. 129-133. (**KPÉ:0,1**)
9. **Bácsné Bába É.**(2007): The Rationalization of Leadership Time Management. Agrárgazdaság, Vidékfejlesztés, Agrárinformatika (AVA 3) Nemzetközi Konferencia. (Szerk.: Nábrádi András – Lazányi János – Herdon Miklós) 2007. március 20-21. (CD anyag 6 oldal) (**KPÉ:0,15**)
10. **Bácsné Bába É.**(2009): The connection between the time factor and the manager functions. AVA IV International Congress on the Aspect and Visions of Applied Economics and Informatics (AVA IV) 26-27. March 2009, Debrecen, pp. 682-688. (**KPÉ:0,15**)
11. **Bácsné Bába É.**(2005): A vezetői munka tanulmányozásának módszertani kérdései. Erdei Ferenc III. Tudományos Konferencia 1. kötet. (Szerk.: Nagyné Fehér Irén) Kecskeméti Főiskola, Kertészeti Főiskolai Kar, 2005. augusztus 23-24. 275-279. p., (**KPÉ:0,1**)

12. **Bácsné Bába É.**(2005): Az időtényező és a szervezeti, vezetői hatékonyság. Agrárgazdaság, Vidékfejlesztés, Agrárinformatika (AVA 2) Nemzetközi Konferencia. (Szerk.: Nábrádi András – Lazányi János) DE ATC Agrárgazdasági és Vidékfejlesztési Kar, 2005. április 7-8. (CD anyag 8 oldal) **(KPÉ:0,1)**
13. **Bácsné Bába É.**(2005): Módszertani eljárások az időtényező vezetési szervezeti folyamatokban betöltött szerepének vizsgálatához. A vidék tudósai, a vidék jövője – doktoranduszok konferenciája. DE ATC, 2005. november 18. **(KPÉ:0,1)**
14. **Bácsné Bába É.**(2006): A vezetői időgazdálkodás racionalizálása. IX. Nemzetközi Agrárökonómiai Tudományos Napok. (Szerk.: Magda Sándor) Károly Róbert Főiskola, Gyöngyös, 2006. március 30-31. 144. (CD anyag 5 oldal) **(KPÉ:0,1)**
15. **Bácsné Bába É.**(2008): Az időgazdálkodás a menedzseri hatékonyság növelésének szolgálatában. XI. Nemzetközi Tudományos Napok. (Szerk.: Magda Sándor – Dinya László) Károly Róbert Főiskola, Gyöngyös, 2008. március 27-28. 6-11p. **(KPÉ:0,1)**
16. **Bácsné Bába É.**(2008): Időgazdálkodási modellek és módszerek. Hagyományok és új kihívások a menedzsmentben; 140 éves a vezetés és szervezés oktatása a debreceni gazdasági felsőoktatásban, Debrecen, 113-118 p. **(KPÉ:0,1)**