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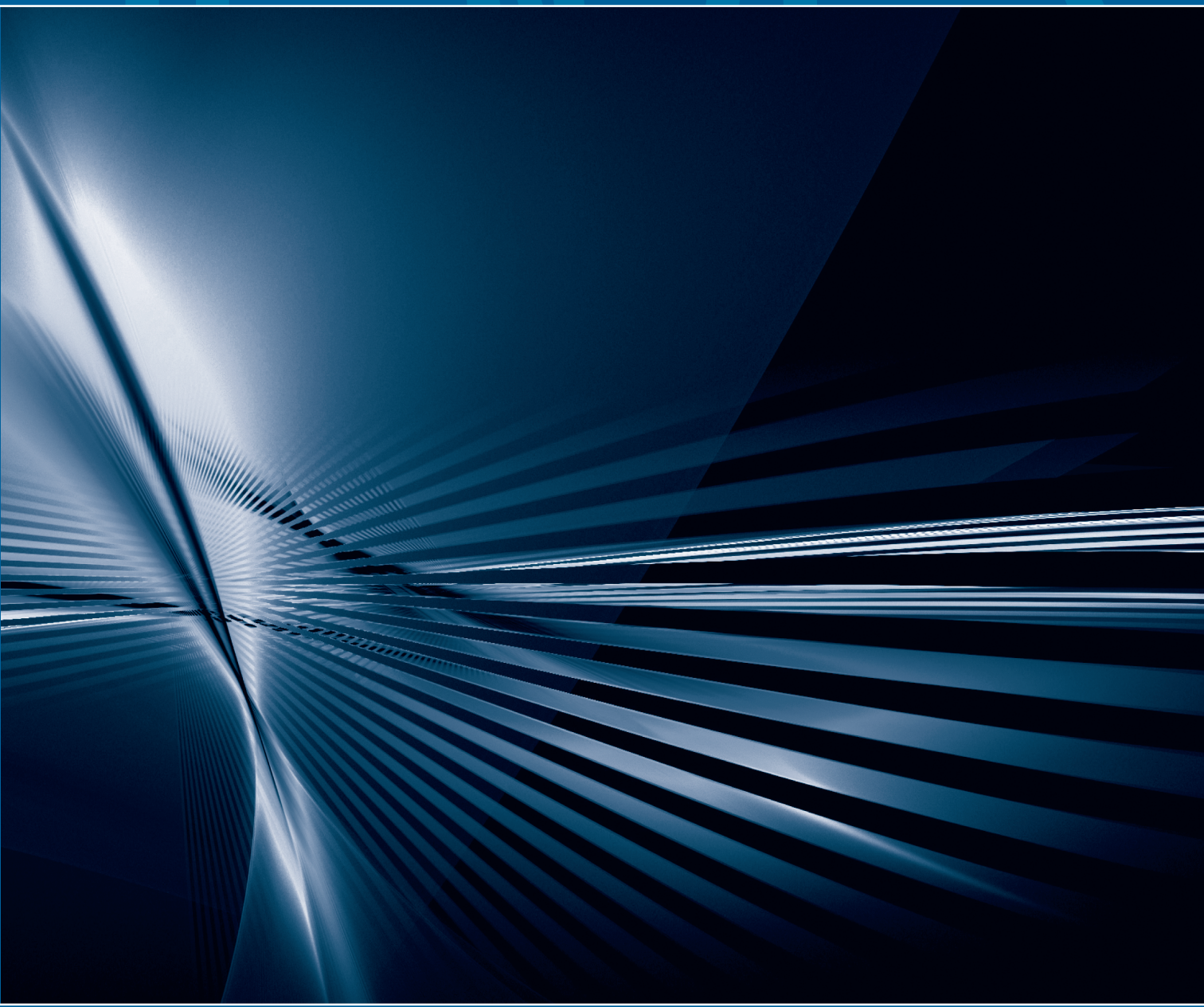

Revija za management, informatiko in kadre

ORGANIZACIJA

Organizacija is an interdisciplinary peer reviewed journal that seeks both theoretically and practically oriented research papers from the area of organizational science, business information systems and human resources management. Topics will be drawn from, but are not limited to, the following areas:

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- interorganizational systems, electronic commerce;
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Markov Analysis of Students' Performance and Academic Progress in Higher Education

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Background: The students' progression towards completing their higher education degrees possesses stochastic characteristics, and can therefore be modelled as an absorbing Markov chain. Such application would have a high practical value and offer great opportunities for implementation in practice.
Objectives: The aim of the paper is to develop a stochastic model for estimation and continuous monitoring of various quality and effectiveness indicators of a given higher education study programme.
Method: The study programme is modelled by a finite Markov chain with five transient and two absorbing states. The probability transition matrix is constructed. The quantitative characteristics of the absorbing Markov chain, like the expected time until absorption and the probabilities of absorption, are used to determine chosen indicators of the programme.
Results: The model is applied to investigate the pattern of students' enrolment and their academic performance in a Slovenian higher education institution. Based on the students' intake records, the transition matrix was developed considering eight consecutive academic seasons from 2008/09 until 2016/17. The students' progression towards the next stage of the study programme was estimated. The expected time that a student spends at a particular stage as well as the expected duration of the study is determined. The graduation and withdrawal probabilities were obtained. Besides, a prediction on the students' enrolment for the next three academic years was made. The results were interpreted and discussed.
Conclusion: The analysis presented is applicable for all higher education stakeholders. It is especially useful for a higher education institution's managers seeing that it provides useful information to plan improvements regarding the quality and effectiveness of their study programmes to achieve better position in the educational market.

Keywords: *higher education; study programme; effectiveness indicators; enrolment prediction; Markov analyses; absorbing Markov chain*

1 Introduction

Evaluation of students' progress is an essential part of any educational system. Every higher education institution can be considered as a hierarchical organization in which a student stays in a given study stage for one academic year, and then moves to the next stage or leaves the system as a graduate or dropped out. Due to continuous changing and the increasing amount of data the problem of understanding and assessing the students' progress through the educational system is very important (Mashat, Ragab & Khedra, 2012). It can help the managers of the education institution to establish an optimal educational policy, which ensures better position in the educational market. Based on the estimation of 30% drop out of first-year students and high costs of this phenomena, an attempt was made to find the strongest individual predictions of attrition (Aulck, Ve-

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lagapudi, Blumenstock & West, 2016).

Results of prior studies indicate that the students' progression towards completing their higher education degrees possess all the pertinent stochastic characteristics, and can therefore be modelled as a Markov chain (see e.g., Crippa, Mazzoleni & Zenga, 2016; Mashat et al., 2012; Rahim, Ibrahim, Kasim & Adnan, 2013; Symeonaki & Kalamatianou, 2011). Markov chains are an important family of stochastic processes, defined as a random sequence in which the dependency of the successive events goes back only one unit of time. In other words, as defined by Tijms (2003), the future probability behaviour of the process depends only on the present state of the process and is not influenced by its past history. This is called the Markovian property. Despite a very simple structure, Markov chains are extremely useful in a wide variety of practical probability problems (Tijms, 2003). The application of Markov chains can be found in various branches of natural sciences, engineering, and medical sciences (see e.g. Beichelt, 2006).

In the literature, there are many attempts to apply the Markov chain to analyse the higher education study process. For instance, Moody & DuClouy (2014) have applied the Markov chain to analyse and predict the mathematical achievement gap between African American and white American students. Furthermore, Hlavatý & Dömeová (2014) have presented the Markov chain model of students' progress throughout the particular course. To finish the course successfully, each student has to go throughout various stages of the course requirements where his success depends on the completion of the previous duties. Another approach is proposed by Symeonaki & Kalamatianou (2011) who used the theory of Non-Homogeneous Markov Systems (NHMS) with fuzzy states for describing students' educational progress in Greek Universities. Very interesting and useful are the studies which modelled the students' progression and their performance during higher education study using an absorbing Markov chain (see e.g., Adam, 2015; Adeleke, Oguntuase & Ogunsakin, 2014; Al-Awadhi & Ahmed, 2002; Al-Awadhi & Konsowa, 2010; Al-Awadhi & Konsowa, 2007; Auwalu, Mohammed & Saliu, 2013; Mashat et al., 2012; Shah & Burke, 1999). Such application provides a means for projecting the number of students' graduation and withdrawing by age, gender, and by study programme, and provides estimates of the average time a student stays in the system, the probability of completion as well as the average time to complete the study (Adeleke et al., 2014). Since the theory of the absorbing Markov chain is relatively simple, such applications indicate high practical value and therefore offer great opportunities for implementation in practice.

The aim of the paper is to develop an absorbing Markov chain model, which can be used for analysing the students' performance and their academic progress in Slovenian higher education environment. The present work represents continuation of our previous study published by Brezavšček & Baggia (2015). Comparing to the previous research, this paper adds several improvements. The time horizon used for estimating the Markov chain transition probabilities is extended from six to eight academic years that ensures a better accuracy of the obtained results. Furthermore, additional quality and effectiveness indicators of a given study programme are taking into account. Thus, the extended model enables estimation and continuous monitoring of the following indicators:

- The fraction of students that have successfully progressed toward different stages of the study programme;
- The expected time a student spends at a particular stage of a study programme and the expected duration of the study;
- The fraction of students who have finished the study successfully with graduation as well the fraction of students who have withdrawn from the study.

In addition, the model enables the prediction of future enrolment of students in a given study programme.

The paper is organized as follows: after the introduction section, we provide fundamental theoretical properties of absorbing Markov chains. Central part of the paper is dedicated to the model development. To illustrate its usefulness the model is applied to the bachelor's degree professional study programmes at the University of Maribor, Faculty of Organizational Sciences. The results obtained are interpreted and discussed. Finally, we summarize our ascertainment and open some opportunities for further research.

2 Computational background

The model for analysis of students' performance and academic progression is based on theory of *absorbing Markov chain*. This is a special Markov chain with the finite states. Since the basics of Markov chain theory are a well-known topic, they will not be described here in detail. To find more about its fundamentals see for example Beichelt (2006), Hudoklin Božič (2003) or Tijms (2003).

The general form of the probability transition matrix of an absorbing Markov chain with r absorbing and t transient states is

$$\mathbf{P} = \begin{pmatrix} \mathbf{Q} & \mathbf{R} \\ \mathbf{0} & \mathbf{I} \end{pmatrix} \qquad (1)$$

The meaning of symbols in (1) is as follows:

- **Q** - $t \times t$ matrix expressing transitions between the transient states
- **R** - $t \times r$ matrix expressing transitions from the transient states to the absorbing states
- **0** - $r \times t$ zero matrix
- **I** - $r \times r$ identity matrix

Useful characteristics of an absorbing Markov chain are *the expected time until absorption* and *the probabilities of absorption*. In order to determine these values, we need the *fundamental matrix* **N** which can be calculated as:

$$\mathbf{N} = \left(\mathbf{I} - \mathbf{Q}\right)^{-1} \tag{2}$$

where **I** denotes the identity matrix of size $t \times t$ (unlike the size of **I** in (1) which is $r \times r$). Elements n_{ij} of the matrix **N** express how many times (in average) a Markov chain reaches the transient state j when it started in the transient state i.

The expected time until absorption, μ_i, represents the expected number of steps before a Markov chain is absorbed into one of the absorbing states when it started in the transient state i. It can be obtained from the column vector **μ** calculated from the equation:

$$\boldsymbol{\mu} = \mathbf{N1} \tag{3}$$

where **N** is the fundamental matrix and **1** is the column identity vector. The value μ_i, is the i-th component of the column vector **μ**.

The probability of absorption f_{ij}can be obtained from the matrix **f**, which is calculated from the equation:

$$\mathbf{f} = \mathbf{NR} \tag{4}$$

where **N** is the fundamental matrix and **R** is the sub-matrix from the transition matrix (1). The value f_{ij} represents the probability that a Markov chain will be absorbed into an absorbing state j when it started in the transient state i.

The distribution over states in a given time n can be written as a stochastic row vector

$$\mathbf{p}^{(n)} = \mathbf{p}^{(0)} \cdot \mathbf{P}^n \tag{5}$$

where the symbol $p^{(0)}$ represents an initial vector (or initial probability distribution). The elements $p_i^{(n)}$ of $p^{(n)}$ mean the probabilities that a Markov chain is in the state i in time n.

3 The model

Generally, the duration of bachelor's degree within Slovenian higher education system is three years. After finishing the third year, a student can enrol into the so-called candidate year. During this year, the student needs to write a thesis but is not obliged to attend the lectures. Therefore, to model the student academic progress we will define the following states:

- 1 – the student is enrolled into the first year of the study programme
- 2 – the student is enrolled into the second year of the study programme
- 3 – the student is enrolled into the third year of the study programme
- *C* – the student is enrolled into the candidate year
- *I* – the student is currently inactive
- *G* – the student has graduated and successfully finished the study programme
- *W* – the student has withdrawn from the study programme

In developing the model, the following assumptions are considered:

- The student who is currently enrolled into the first or second year of the study programme can, in the following year, either progress to a higher stage or repeat a year and stay at the same stage.
- The student who is currently enrolled into the third year of the study programme can, in the following year, be either enrolled into the candidate year, or can graduate and finish the study.
- Irrespective of the stage of the study, after the end of each year, some students can become inactive.
- The student who is inactive for more than one year is classified as having withdrawn from the study programme.
- The student who has withdrawn will never finish this study programme. We have not noted whether he/she has been transferred to another study programme.
- The student who has graduated and successfully finished the study will never apply for the same study programme again. We have not noted whether he/she has applied for another study programme or continued the education at postgraduate level.

The state transition diagram for the students' progression is illustrated in Figure 1.

3.1 Construction of probability transition matrix

Considering the state transition diagram from Figure 1 the probability transition matrix can be written as follows:

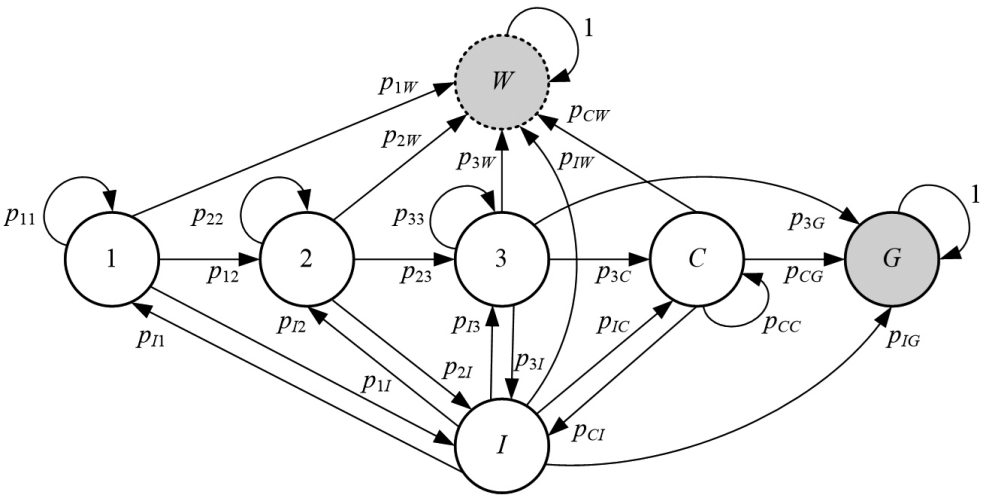

Figure 1: State transition diagram for students' academic progression

$$\mathbf{P} = \begin{array}{c} \\ 1 \\ 2 \\ 3 \\ C \\ I \\ G \\ W \end{array} \begin{array}{c} \begin{array}{ccccccc} 1 & 2 & 3 & C & I & G & W \end{array} \\ \left[\begin{array}{ccccccc} p_{11} & p_{12} & 0 & 0 & p_{1I} & 0 & p_{1W} \\ 0 & p_{22} & p_{23} & 0 & p_{2I} & 0 & p_{2W} \\ 0 & 0 & p_{33} & p_{3C} & p_{3I} & p_{3G} & p_{3W} \\ 0 & 0 & 0 & p_{CC} & p_{CI} & p_{CG} & p_{CW} \\ p_{I1} & p_{I2} & p_{I3} & p_{IC} & 0 & p_{IG} & p_{IW} \\ 0 & 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 1 \end{array}\right] \end{array} \quad \begin{array}{l} \mathbf{Q} \\ \\ \\ \\ \\ \\ \\ \mathbf{R} \end{array} \tag{6}$$

It is evident from Figure 1 and from the transition probability matrix (6) that the states $\{G,W\}$ are absorbing while the states {1,2,3,C,I} are transient. In the transition matrix **P** also the sub-matrices **Q** and **R** are marked.

The transitions probabilities *pij* in (6) can be gathered from the students' intake records. Directly from the historical data the frequency matrix can be obtained containing the absolute numbers of students' academic progress. The frequency matrix should than be transformed to the probability transition matrix, which can be done easily by normalizing each row of the frequency matrix.

3.2 Estimating students' progression between different stages

The sub-matrix **Q** contains the probabilities of students' progression from one specific stage to another during one academic year. To understand the meaning of the probability transition matrix **P**, let us consider a randomly selected student who happens to be in the inactive state at present. The probability that the student will return to active mode next year and continue the study in the second year can be gathered directly from the transition matrix **P** and is equal to p_{I2}. Similarly, the other elements of **P** can be explained.

One of the quality indicators of student performance, frequently used in evaluating study programmes, is the fraction of students who succeed to progress to a higher stage of the study programme during one academic year. The fractions of students who succeed to progress from the first, second or third year to the next stage of the study programme can be obtained directly from the transition matrix **P** as follows: p_{12}, p_{23} and p_{3c}.

3.3 The expected time a student spends at a particular stage and the expected duration of the study

The expected lifetime that a student spends at a particular stage of the study programme can be gathered from the fundamental matrix **N,** which can be calculated according to (2) using the sub-matrix **Q** from (6). We obtain the fundamental matrix in the following form:

$$\mathbf{N} = \begin{array}{c} \\ 1 \\ 2 \\ 3 \\ C \\ I \end{array} \begin{array}{c} \begin{array}{ccccc} 1 & 2 & 3 & C & I \end{array} \\ \left[\begin{array}{ccccc} n_{11} & n_{12} & n_{13} & n_{1C} & n_{1I} \\ n_{21} & n_{22} & n_{23} & n_{2C} & n_{2I} \\ n_{31} & n_{32} & n_{33} & n_{3C} & n_{3I} \\ n_{C1} & n_{C2} & n_{C3} & n_{CC} & n_{CI} \\ n_{I1} & n_{I2} & n_{I3} & n_{IC} & n_{II} \end{array}\right] \end{array} \tag{7}$$

The elements n_{ij} in **N** represent the expected time a student spends for the *j*-th study stage when he started at the *i*-th study stage.

To estimate the expected duration of the study we need to calculate the expected time until absorption according to (3). The result is the column vector **μ**:

$$\boldsymbol{\mu} = \begin{matrix} 1 \\ 2 \\ 3 \\ C \\ I \end{matrix} \begin{bmatrix} \mu_1 \\ \mu_2 \\ \mu_3 \\ \mu_C \\ \mu_I \end{bmatrix} \qquad (8)$$

The particular value μ_i in (8) can be interpreted as the expected duration of the study (until graduation or withdrawal) of a randomly selected student who is currently at the *i*-th stage of the study programme.

In students' performance analysis it is very useful to estimate the expected time (in academic years) a student enrolled in the first year of the study programme can expect to spend before graduating. This indicator can be calculated as the sum of the entries in the diagonal of the fundamental matrix (7):

$$E_{1G} = n_{11} + n_{22} + n_{33} + n_{CC} + n_{II} \qquad (9)$$

3.4 The graduation - withdrawal probability

The graduation or withdrawal probability can be obtained using the probability of absorption, which is calculated according to (4) using the fundamental matrix (7) and the matrix **R** from (6). The result is the matrix **f**:

$$\mathbf{f} = \begin{matrix} & G & W \\ 1 \\ 2 \\ 3 \\ C \\ I \end{matrix} \begin{bmatrix} f_{1G} & f_{1W} \\ f_{2G} & f_{2W} \\ f_{3G} & f_{3W} \\ f_{CG} & f_{CW} \\ f_{IG} & f_{IW} \end{bmatrix} \qquad (10)$$

The values p_{iG} in the first column of (10) represent the fraction of students, currently at the *i*-th study stage, who will successfully finish the study and graduate. However, the values in the second column of (10), p_{iW}, represent the fraction of students who will withdraw from the study programme and will never finish it.

3.5 Predicting the future enrolment of students

The future enrolment of the students can be predicted using the vector $\mathbf{p}^{(n)}$, which can be calculated according to (5). The elements of the initial vector $\mathbf{p}^{(0)}$ can be estimated from the frequency data. The elements of $\mathbf{p}^{(n)}$ represent the fraction of students being at given study stage in *n*-th academic year. The probabilities $p_i^{(n)}$ from $\mathbf{p}^{(n)}$ can be than transformed into the absolute number of students at a particular stage at the beginning of the *n*-th academic year. In assessing the total enrolment of students at the beginning of the *n*-th academic year, the new enrolled students should be taken into account (Adeleke et al., 2014).

4 Numerical example

To apply the model, data were collected from the students' intake records at the University of Maribor, Faculty of Organizational Sciences. In our analysis, only the full time students of the professional study programmes were included. The frequency data during eight consecutive academic years from 2008/09 to 2016/17 are listed in Table 1.

4.1 Construction of probability transition matrix

The frequency data from Table 1 were used to estimate the transition probabilities of the transition matrix. First, we calculated "partial" transition probability matrices for a particular academic year separately. Since in Table 1 there are no data available for the state *C* in the first two years, we calculated the transition matrices for the last six academic years, e.g. from 2010/11 → 2011/12 and later. We obtained: **(next page)**

The probability transition matrix P_3 corresponds the third year (2010/11 → 2011/12), while the matrices P_4, P_5, P_6, P_7 and P_8 describe the fourth, the fifth, the sixth, the seventh and the eighth year, respectively (i.e., from 2011/12 → 2012/13 until 2015/16 → 2016/17).

We also calculated the "expected" probability transition matrix P where the expected transition probabilities were calculated as the average values considering all the eight academic years. In calculating the expected transition probabilities, we took into consideration only these entries from Table 1 where the frequency data are actually available. We obtained: **(next page)**

4.2 Estimating students' progression between different stages

The probabilities of yearly progression between successive stages of the study programme can be directly obtained from the probability transition matrices. Especially useful are probabilities of passing from the first to the second year, from the second to the third year as well as from the third year to the higher stage (the candidate year or graduation) during one academic year are. These probabilities represent the fraction of students who progressed successfully during one academic year. The results of our analysis are presented in Table 2 and Figure 2. Progres-

$$\mathbf{P}_3 = \begin{array}{c} \\ 1 \\ 2 \\ 3 \\ C \\ I \\ G \\ W \end{array} \begin{array}{c} \begin{array}{ccccccc} 1 & 2 & 3 & C & I & G & W \end{array} \\ \begin{bmatrix} 0.072 & 0.38 & 0 & 0 & 0.549 & 0 & 0 \\ 0 & 0.331 & 0.521 & 0 & 0.149 & 0 & 0 \\ 0 & 0 & 0 & 0.868 & 0 & 0.132 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0.022 & 0.978 \\ 0 & 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 1 \end{bmatrix} \end{array} \quad \mathbf{P}_4 = \begin{array}{c} \\ 1 \\ 2 \\ 3 \\ C \\ I \\ G \\ W \end{array} \begin{array}{c} \begin{array}{ccccccc} 1 & 2 & 3 & C & I & G & W \end{array} \\ \begin{bmatrix} 0.05 & 0.314 & 0 & 0 & 0.636 & 0 & 0 \\ 0 & 0.192 & 0.485 & 0 & 0.323 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0.034 & 0.966 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 1 \\ 0 & 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 1 \end{bmatrix} \end{array}$$

$$\mathbf{P}_5 = \begin{array}{c} \\ 1 \\ 2 \\ 3 \\ C \\ I \\ G \\ W \end{array} \begin{array}{c} \begin{array}{ccccccc} 1 & 2 & 3 & C & I & G & W \end{array} \\ \begin{bmatrix} 0.045 & 0.263 & 0 & 0 & 0.692 & 0 & 0 \\ 0 & 0.18 & 0.4 & 0 & 0.42 & 0 & 0 \\ 0 & 0 & 0 & 0.683 & 0 & 0.317 & 0 \\ 0 & 0 & 0 & 0.079 & 0.175 & 0.429 & 0.317 \\ 0 & 0.026 & 0 & 0 & 0 & 0 & 0.974 \\ 0 & 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 1 \end{bmatrix} \end{array} \quad \mathbf{P}_6 = \begin{array}{c} \\ 1 \\ 2 \\ 3 \\ C \\ I \\ G \\ W \end{array} \begin{array}{c} \begin{array}{ccccccc} 1 & 2 & 3 & C & I & G & W \end{array} \\ \begin{bmatrix} 0.023 & 0.227 & 0 & 0 & 0.75 & 0 & 0 \\ 0 & 0.195 & 0.341 & 0 & 0.463 & 0 & 0 \\ 0 & 0 & 0 & 0.875 & 0 & 0.125 & 0 \\ 0 & 0 & 0 & 0 & 0.354 & 0.646 & 0 \\ 0.01 & 0.01 & 0.096 & 0 & 0 & 0 & 0.885 \\ 0 & 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 1 \end{bmatrix} \end{array}$$

$$\mathbf{P}_7 = \begin{array}{c} \\ 1 \\ 2 \\ 3 \\ C \\ I \\ G \\ W \end{array} \begin{array}{c} \begin{array}{ccccccc} 1 & 2 & 3 & C & I & G & W \end{array} \\ \begin{bmatrix} 0.029 & 0.318 & 0 & 0 & 0.653 & 0 & 0 \\ 0 & 0.103 & 0.569 & 0 & 0.328 & 0 & 0 \\ 0 & 0 & 0.042 & 0.396 & 0 & 0.563 & 0 \\ 0 & 0 & 0 & 0.114 & 0 & 0.886 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 1 \\ 0 & 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 1 \end{bmatrix} \end{array} \quad \mathbf{P}_8 = \begin{array}{c} \\ 1 \\ 2 \\ 3 \\ C \\ I \\ G \\ W \end{array} \begin{array}{c} \begin{array}{ccccccc} 1 & 2 & 3 & C & I & G & W \end{array} \\ \begin{bmatrix} 0.032 & 0.323 & 0 & 0 & 0.645 & 0 & 0 \\ 0 & 0.18 & 0.574 & 0 & 0.246 & 0 & 0 \\ 0 & 0 & 0.057 & 0.229 & 0 & 0.714 & 0 \\ 0 & 0 & 0 & 0.043 & 0 & 0.957 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 1 \\ 0 & 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 1 \end{bmatrix} \end{array}$$

$$\mathbf{P} = \begin{array}{c} \\ 1 \\ 2 \\ 3 \\ C \\ I \\ G \\ W \end{array} \begin{array}{c} \begin{array}{ccccccc} 1 & 2 & 3 & C & I & G & W \end{array} \\ \begin{bmatrix} 0.057 & 0.31 & 0 & 0 & 0.603 & 0 & 0.03 \\ 0 & 0.187 & 0.528 & 0 & 0.285 & 0 & 0 \\ 0 & 0 & 0.012 & 0.563 & 0.097 & 0.328 & 0 \\ 0 & 0 & 0 & 0.039 & 0.094 & 0.814 & 0.053 \\ 0.001 & 0.036 & 0.02 & 0 & 0 & 0.003 & 0.94 \\ 0 & 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 1 \end{bmatrix} \end{array}$$

sion probabilities were calculated from the year when the first generation of students finished this study programme (2010/11). In the last column of Table 2, we merged the students who decide to graduate immediately after the third year of study, and the students who decide to take the candidate year after the third year of study. The dashed line in Figure 2 represents the eight-year expected probability of students' progression to the next stage, which is obtained directly from **P**.

4.3 The expected time a student spends at a particular level and the expected duration of the study

Using the sub-matrices Q_3-Q_8 from the probability transitions matrices P_3-P_8 the fundamental matrices N_3-N_8 are calculated: **(page 90)**

Besides, the fundamental matrix N that correspond the expected probability transitions matrix P is obtained: **(next page)**

The elements of the fundamental matrices represent the expected number of academic years when the student is enrolled in a particular stage of the study. For example, let we assume an average student who is currently enrolled in the first year. During his enrolment in the study programme, it is expected that he will spend 1.061 academic years for the first year, 0.44 academic year for the second year, 0.252 academic year for the third year, 0.147 academic year for the candidate year, while 0.804 academic year he will be inactive. The row sum of the fundamental matrix's entries represents the expected time until absorption from a given transient state, and can be interpreted as the expected duration of the study starting at a specific study stage (i.e., the expected enrolment in the study programme until graduation or withdrawal) (see Table 3).

The sum of the diagonal elements of the fundamental matrix gives us the expected duration of the study from the first year until graduation. The results are shown in Table 4.

Table 1: Frequency matrix on students' progression through years from 2008/09 to 2016/17

2008/09 → 2009/10									**2009/10 → 2010/11**								
	1	**2**	**3**	**C**	**I**	**G**	**W**	**Σ 2008/09**		**1**	**2**	**3**	**C**	**I**	**G**	**W**	**Σ 2009/10**
1	19	60	0	0	93	0	44	**216**	**1**	27	88	0	0	109	0	8	**232**
2	0	20	78	0	16	0	0	**114**	**2**	0	14	64	0	21	0	0	**99**
3	0	0	0	0	44	21	0	**65**	**3**	0	0	0	38	8	38	0	**84**
C	-	-	-	-	-	-	-	**-**	**C**	-	-	-	-	-	-	-	**-**
I	0	19	6	0	0	0	121	**146**	**I**	0	19	4	0	0	0	130	**153**
New	213								New	210							
Σ 2009/10	**232**	**99**	**84**	**0**	**153**	**21**	**165**		**Σ 2010/11**	**237**	**121**	**68**	**38**	**138**	**38**	**138**	
2010/11 → 2011/12									**2011/12 → 2012/13**								
	1	**2**	**3**	**C**	**I**	**G**	**W**	**Σ 2010/11**		**1**	**2**	**3**	**C**	**I**	**G**	**W**	**Σ 2011/12**
1	17	90	0	0	130	0	0	**237**	**1**	12	75	0	0	152	0	0	**239**
2	0	40	63	0	18	0	0	**121**	**2**	0	25	63	0	42	0	0	**130**
3	0	0	0	59	0	9	0	**68**	**3**	0	0	0	63	0	0	0	**63**
C	0	0	0	0	0	38	0	**38**	**C**	0	0	0	0	2	57	0	**59**
I	0	0	0	0	0	3	135	**138**	**I**	0	0	0	0	0	0	148	**148**
New	222								New	212							
Σ 2011/12	**239**	**130**	**63**	**59**	**148**	**50**	**135**		**Σ 2012/13**	**224**	**100**	**63**	**63**	**196**	**57**	**148**	
2012/13 → 2013/14									**2013/14 → 2014/15**								
	1	**2**	**3**	**C**	**I**	**G**	**W**	**Σ 2012/13**		**1**	**2**	**3**	**C**	**I**	**G**	**W**	**Σ 2013/14**
1	10	59	0	0	155	0	0	**224**	**1**	4	40	0	0	132	0	0	**176**
2	0	18	40	0	42	0	0	**100**	**2**	0	16	28	0	38	0	0	**82**
3	0	0	0	43	0	20	0	**63**	**3**	0	0	0	35	0	5	0	**40**
C	0	0	0	5	11	27	20	**63**	**C**	0	0	0	0	17	31	0	**48**
I	0	5	0	0	0	0	191	**196**	**I**	2	2	20	0	0	0	184	**208**
New	166								New	167							
Σ 2013/14	**176**	**82**	**40**	**48**	**208**	**47**	**211**		**Σ 2014/15**	**173**	**58**	**48**	**35**	**187**	**36**	**184**	
2014/15 → 2015/16									**2015/16 → 2016/17**								
	1	**2**	**3**	**C**	**I**	**G**	**W**	**Σ 2014/15**		**1**	**2**	**3**	**C**	**I**	**G**	**W**	**Σ 2015/16**
1	5	55	0	0	113	0	0	**173**	**1**	5	50	0	0	100	0	0	**155**
2	0	6	33	0	19	0	0	**58**	**2**	0	11	35	0	15	0	0	**61**
3	0	0	2	19	0	27	0	**48**	**3**	0	0	2	8	0	25	0	**35**
C	0	0	0	4	0	31	0	**35**	**C**	0	0	0	1	0	22	0	**23**
I	0	0	0	0	0	0	187	**187**	**I**	0	0	0	0	0	0	132	**132**
New	150								New	117							
Σ 2015/16	**155**	**61**	**35**	**23**	**132**	**58**	**187**	**155**	**Σ 2016/17**	**122**	**61**	**37**	**9**	**115**	**47**	**132**	

$$\mathbf{N}_3 = \begin{array}{c} \\ 1 \\ 2 \\ 3 \\ C \\ I \end{array} \begin{array}{c} \begin{array}{ccccc} 1 & 2 & 3 & C & I \end{array} \\ \begin{bmatrix} 1.078 & 0.612 & 0.319 & 0.277 & 0.683 \\ 0 & 1.495 & 0.779 & 0.676 & 0.223 \\ 0 & 0 & 1 & 0.868 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix} \end{array} \quad \mathbf{N}_4 = \begin{array}{c} \\ 1 \\ 2 \\ 3 \\ C \\ I \end{array} \begin{array}{c} \begin{array}{ccccc} 1 & 2 & 3 & C & I \end{array} \\ \begin{bmatrix} 1.053 & 0.409 & 0.198 & 0.198 & 0.808 \\ 0 & 1.238 & 0.6 & 0.6 & 0.42 \\ 0 & 0 & 1 & 1 & 0.034 \\ 0 & 0 & 0 & 1 & 0.034 \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix} \end{array}$$

$$\mathbf{N}_5 = \begin{array}{c} \\ 1 \\ 2 \\ 3 \\ C \\ I \end{array} \begin{array}{c} \begin{array}{ccccc} 1 & 2 & 3 & C & I \end{array} \\ \begin{bmatrix} 1.047 & 0.364 & 0.146 & 0.108 & 0.897 \\ 0 & 1.238 & 0.495 & 0.367 & 0.584 \\ 0 & 0.004 & 1.002 & 0.743 & 0.132 \\ 0 & 0.006 & 0.002 & 1.088 & 0.193 \\ 0 & 0.032 & 0.013 & 0.01 & 1.015 \end{bmatrix} \end{array} \quad \mathbf{N}_6 = \begin{array}{c} \\ 1 \\ 2 \\ 3 \\ C \\ I \end{array} \begin{array}{c} \begin{array}{ccccc} 1 & 2 & 3 & C & I \end{array} \\ \begin{bmatrix} 1.034 & 0.304 & 0.197 & 0.173 & 0.977 \\ 0.008 & 1.254 & 0.499 & 0.436 & 0.741 \\ 0.003 & 0.005 & 1.033 & 0.904 & 0.325 \\ 0.004 & 0.006 & 0.038 & 1.033 & 0.371 \\ 0.011 & 0.016 & 0.106 & 0.093 & 1.048 \end{bmatrix} \end{array}$$

$$\mathbf{N}_7 = \begin{array}{c} \\ 1 \\ 2 \\ 3 \\ C \\ I \end{array} \begin{array}{c} \begin{array}{ccccc} 1 & 2 & 3 & C & I \end{array} \\ \begin{bmatrix} 1.03 & 0.365 & 0.217 & 0.097 & 0.792 \\ 0 & 1.115 & 0.662 & 0.296 & 0.366 \\ 0 & 0 & 1.044 & 0.467 & 0 \\ 0 & 0 & 0 & 1.129 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix} \end{array} \quad \mathbf{N}_8 = \begin{array}{c} \\ 1 \\ 2 \\ 3 \\ C \\ I \end{array} \begin{array}{c} \begin{array}{ccccc} 1 & 2 & 3 & C & I \end{array} \\ \begin{bmatrix} 1.033 & 0.407 & 0.248 & 0.059 & 0.766 \\ 0 & 1.22 & 0.742 & 0.178 & 0.3 \\ 0 & 0 & 1.06 & 0.254 & 0 \\ 0 & 0 & 0 & 1.045 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix} \end{array}$$

$$\mathbf{N} = \begin{array}{c} \\ 1 \\ 2 \\ 3 \\ C \\ I \end{array} \begin{array}{c} \begin{array}{ccccc} 1 & 2 & 3 & C & I \end{array} \\ \begin{bmatrix} 1.061 & 0.44 & 0.252 & 0.147 & 0.804 \\ 0 & 1.251 & 0.678 & 0.397 & 0.46 \\ 0 & 0.007 & 1.019 & 0.597 & 0.157 \\ 0 & 0.004 & 0.004 & 1.043 & 0.1 \\ 0.001 & 0.046 & 0.045 & 0.026 & 1.02 \end{bmatrix} \end{array}$$

4.4 The graduation - withdrawal probability

The graduation – withdrawal probabilities are calculated as the absorption probabilities from a given transient state. For this purpose the fundamental matrices as well as sub-matrices R gathered from the probability transition matrices were used. The results are presented in Table 5.

In Figure 3, the graduation and withdrawal probabilities considering the students in the first year of the study programme are shown. The dashed line represents the expected graduation/withdrawal probability during the last eight academic years.

4.5 Predicting the future enrolment of students

Let we assume the initial state in the academic year 2016/17. Using the frequency data from Table 1 the initial vector $\mathbf{p}^{(0)}$ is estimated:

$$\mathbf{p}^{(0)} = [{}^{122}/_{523} \; {}^{61}/_{523} \; {}^{37}/_{523} \; {}^{9}/_{523} \; {}^{115}/_{523} \; {}^{47}/_{523} \; {}^{132}/_{523}] = [0.233 \;\; 0.117 \;\; 0.071 \;\; 0.017 \;\; 0.22 \;\; 0.09 \;\; 0.252]$$

We want to predict the enrolment of students for the following three academic years. We calculated the vectors $\mathbf{p}^{(1)}$, $\mathbf{p}^{(2)}$ and $\mathbf{p}^{(3)}$ according to (5) using the expected probability transition matrix P. Calculated probabilities are than transformed into the absolute number of students. In calculations, we assumed that every academic year 120 new students are entered to the study programme. The results are given in Table 6.

Results in Table 6 show that, we can expect a quite constant number of the students in a specific stage, whereas the number of inactive students' increases.

5 Discussion

From a theoretical perspective, our study underscores the importance of using an absorbing Markov chain theory to study the pattern of students' enrolment and their academic performance within a Slovenian higher education environment. As for the study programme under consid-

Table 2: Probability of the students' progression to the next study stage during one academic year

	FRACTION OF STUDENTS WHO SUCCESSFULLY PROGRESS FROM THE FIRST TO THE SECOND YEAR p_{12}	FRACTION OF STUDENTS WHO SUCCESSFULLY PROGRESS FROM THE SECOND TO THE THIRD YEAR p_{23}	FRACTION OF STUDENTS WHO SUCCESSFULLY PROGRESS FROM THE THIRD TO THE CANDIDATE YEAR OR TO GRADUATION $p_{3C} + p_{3G}$
2010/11 → 2011/12	0.38	0.521	0.868+0.132=1
2011/12 → 2012/13	0.314	0.485	1+0=1
2012/13 → 2013/14	0.263	0.4	0.683+0.317=1
2013/14 → 2014/15	0.227	0.341	0.875+0.125=1
2014/15 → 2015/16	0.318	0.569	0.396+0.563=0.959
2015/16 → 2016/17	0.323	0.574	0.229+0.714=0.943
EXPECTED IN LAST 8 YEARS	**0.31**	**0.528**	**0.563+0.328=0.891**

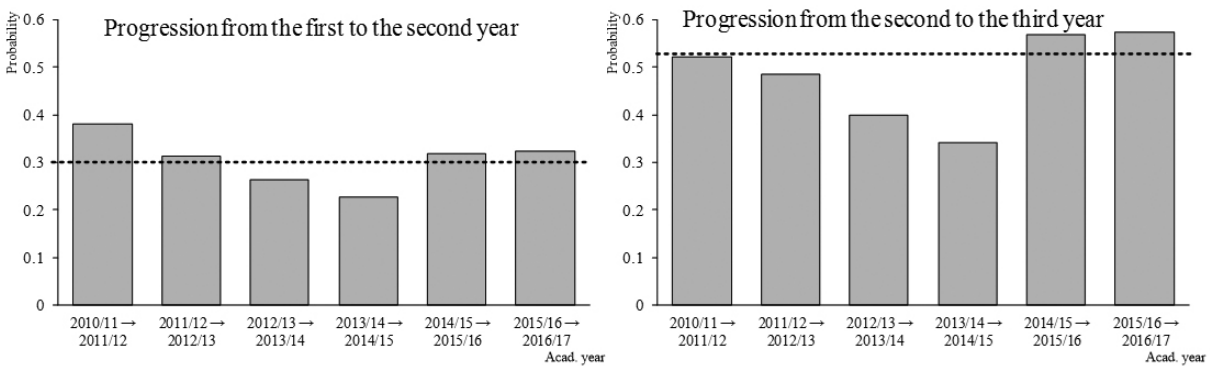

Figure 2: Probability of the students' progression to the next study level during one academic year

Table 3: The expected enrolment in the study programme (to graduation or withdrawal) from a particular study stage

STUDY STAGE	μ_3 2010/11→ 2011/12	μ_4 2011/12→ 2012/13	μ_5 2012/13→ 2013/14	μ_6 2013/14→ 2014/15	μ_7 2014/15→ 2015/16	μ_8 2015/16→ 2016/17	μ EXPECTED IN LAST 8 YEARS
1	2.97	2.67	2.56	2.68	2.5	2.51	**2.7**
2	3.17	2.86	2.68	2.94	2.44	2.44	**2.79**
3	1.87	2.03	1.88	2.27	1.51	1.31	**1.78**
C	1	1.03	1.29	1.45	1.13	1.04	**1.15**
I	1	1	1.07	1.27	1	1	**1.14**

Table 4: The expected duration of the study from the first year to graduation

	E_{1G}
2010/11→2011/12	5.572
2011/12→2012/13	5.29
2012/13→2013/14	5.39
2013/14→2014/15	5.401
2014/15→2015/16	5.317
2015/16→2016/17	5.358
EXPECTED IN LAST 8 YEARS	**5.395**

Table 5: The graduation – withdrawal probabilities from a particular study stage

t	f_3 2010/11→ 2011/12		f_4 2011/12→ 2012/13		f_5 2012/13→ 2013/14		f_6 2013/14→ 2014/15		f_7 2014/15→ 2015/16		f_8 2015/16→ 2016/17		f EXPECTED IN LAST 8 YEARS	
	G	*W*	*G*	*W*	*G*	*W*	*G*	*W*	*G*	*W*	*G*	*W*	*G*	*W*
1	0.33	0.67	0.19	0.81	0.09	0.91	0.14	0.86	0.21	0.79	0.23	0.77	**0.2**	**0.8**
2	0.78	0.22	0.58	0.42	0.31	0.69	0.34	0.66	0.63	0.37	0.7	0.3	**0.55**	**0.45**
3	1	0	0.97	0.03	0.64	0.36	0.71	0.29	1	0	1	0	**0.82**	**0.18**
C	1	0	0.97	0.03	0.47	0.53	0.67	0.33	1	0	1	0	**0.85**	**0.15**
I	0.02	0.98	0	1	0.01	0.99	0.07	0.93	0	1	0	1	**0.04**	**0.96**

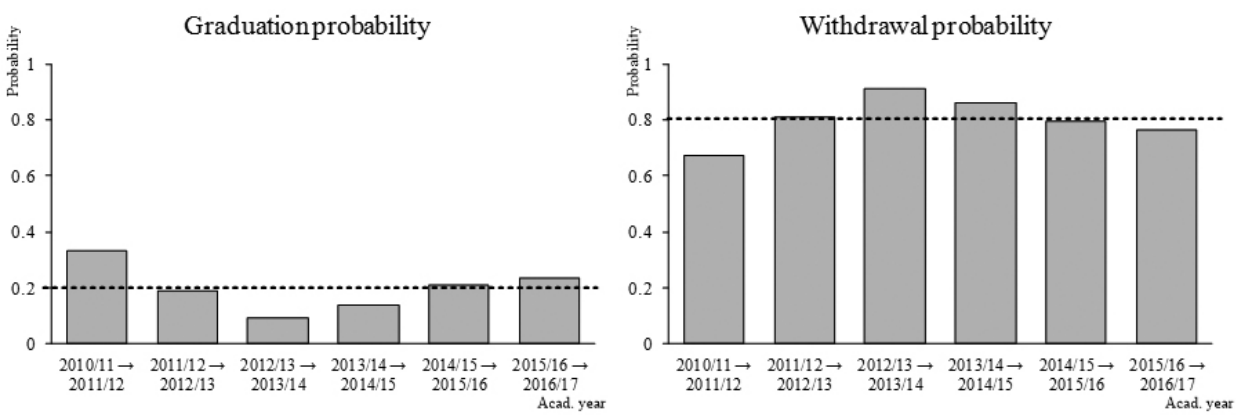

Figure 3: Graduation and withdrawal probabilities considering the students in the first year of the study programme

eration, the quantitative indicators calculated in section 4 provide some useful information the programme manager. Results in Table 2 showed that in the first four years of our analyses the fraction of students, who decide to graduate immediately after the third study year, was relatively low in comparison to the fraction of students who decided to take the candidate year. In the last two years, the situation is surprisingly opposite. This can be explained by the change of Slovenian higher education regulation in 2012, which has prevented the students who have already repeated a year or changed the study field, to take the candidate year. Nevertheless, this could also indicate that more students become mature (Borgen & Borgen, 2016) and decide to graduate as soon as possible with the intention to continue the study on the second degree study programme. In general, there were recently also positive changes in the job market (Menéndez-Valdés, 2016), which could also indicate that the students already have an opportunity for the

Table 6: Prediction of the future enrolment in the study programme

		1	2	3	*C*	*I*	*G*	*W*	Σ
2017/18	$P^{(1)}$	0.014	0.102	0.067	0.041	0.182	0.128	0.467	1
	NO. OF STUDENTS	7+120	53	35	21	95	67	244	643
2018/19	$P^{(2)}$	0.011	0.082	0.047	0.032	0.151	0.149	0.527	1
	NO. OF STUDENTS	7+120	53	31	21	97	96	339	763
2019/20	$P^{(3)}$	0.01	0.069	0.04	0.024	0.127	0.161	0.57	1
	NO. OF STUDENTS	7+120	53	30	18	97	123	435	883

employment, and were therefore keen to finish their study as soon as possible.

Furthermore, the findings of this study (as demonstrated in Table 2) indicate that the probability of progression from the first to the second year is always lower than the probability of progression from the second to the third year. This is quite an expected result since the experiences from the class show that the students become more serious and ambitious during their progression in the study. Figure 2 shows a negative trend of both indicators from Table 2 in first four years of our analyses. Fortunately, the negative trend has changed in the last two years, when the progression probabilities exceed the eight-year expected values. This turn can be explained by several measures, which were taken at the faculty in recent years to improve the students' progression. The first measure has been introduced in 2011 when the third application period for the faculty was abolished due to the previous analysis showing the unresponsiveness of students applying in the third period. Although the trend of progression only changed in later years, we can assume that this measure had an influence on the progression from the first to the second year of study. Furthermore, in 2015 the Ministry of Higher Education, Science and Technology has successfully finished the project of information system for evidence and analyses on higher education in Slovenia. One of the advantages of the new system (the beta version has been in use since 2012) is the prevention of duplicate applications to faculties, which further results in more responsive first year students and higher level of their progression to the second year of study. In addition, to mitigate the students' progression problem, various measures have been implemented at the faculty during recent years (e.g. performance of the courses and unification of the course materials). These measures have assumingly lead to a better performance of students.

We can see from Table 3 that a student, who is currently enrolled in the first year, needs on average 2.7 years to finish the study (graduation or withdrawal). Unfortunately, the results in Table 5 show that only 20% of these students will actually graduate, while the withdrawal probability is very high (80%). The ratio of withdrawal is even higher than a constant failure rate of 60% in the first year enrolment observed in universities across OECD countries (Arias Ortiz & Dehon, 2013). One plausible explanation is that most of the first year students are rather confused due to change of educational environment and their inability to understand the tenets of academic work. According to Petty (2014), universities should escalate the process of creating a smoother transition from secondary education to the higher education. Results in Table 5 also indicate that the majority of inactive students (96%) will never graduate. On average, they leave the programme after 1.14 years (Table 3), while the expected duration of the study from the first year until graduation is 5.395 years (Table 4). Results in Table 4 also showed that the expected time to graduation is a rather constant and the values do not differ substantially during the years analysed. Nevertheless, the numbers are quite high, considering the fact that the study programme lasts three years.

However, we can see from Table 5 that the probability of graduation increases with student's progression over the study stages, and analogous, the probability of withdrawal decreases. Such result was quite expected. It may indicate that when getting older, the students become more aware of their responsibilities and therefore become more successful with their study. We can see from Figure 3 that during last three years of analyses the probability of graduation increases, while the probability of withdrawal decreases. This may indicate a positive trend, and can again be explained as a positive effect of different measures, mentioned before, that have been undertaken during past years.

Although the progression probability increased during the last two years, the relatively long expected time to graduation and increasing number of inactive students (Table 6) indicate that the study programme management would need to find some additional measures to improve these indicators. Some effort should be oriented towards increase of the graduation probability from the first study year. According to the research presented by Rodríguez-Gómez, Meneses, Gairín, Feixas & Muñoz (2016), many of students change to a different area of knowledge,

showing the inefficient guidance systems and university entrance. Some successful attempts to increase the first year success are presented in the literature (Boath et al., 2016; Watterson, Browne & Carnegie, 2013; Wood, Gray-Ganter & Bailey, 2016). The increase of first year retention will result in decreasing number of inactive students and consequently in lower costs of the study.

6 Conclusion

In this paper, we have developed a Markov chain model to examine the flow of undergraduate students through the higher education system in Slovenia. The model enables estimation and continuous monitoring of different quality and effectiveness indicators of a given study programme. By introducing some additional indicators (e.g., probability of students' progression between different stages, expected time spend at a particular stage, expected duration of the study), this study represents an upgrade of the model presented in Brezavšček & Baggia (2015).

To illustrate the usefulness of the model, the model was applied to the professional study programmes at the University of Maribor, Faculty of Organizational Sciences. The results obtained proved that our research has substantial practical implications. The analysis performed provide a useful information which are valuable for managers of the educational institution to improve their processes, as well for the policy makers at government agencies (e.g., state level, competent ministry, etc.) to supervise the effectiveness of existing educational policies. Having estimated the future minimum enrolment, the school management will be able to adjust the policy when necessary (Adeleke et al., 2014). Such information are also worthwhile for students, education planners, employers and other actors in the labour market to help them make informed decisions on investment in education (Shah & Burke, 1999).

The main limitation of our study is the assumption that our Markov chain model is time-homogeneous. In other words, we have assumed temporal stability in the estimated transition probabilities. Over short to medium term this is not an unreasonable assumption because student behaviour is unlikely to change dramatically over such time span (Shah & Burke, 1999). However, when the conditions on the higher educational market would due to any reason change dramatically from year to year an inhomogeneous Markov chain should be applied. Although quite a large number of students are captured in this research, another limitation is that the research is bounded to only one educational institution.

Further analysis and research of the students' behaviour could include the simulation of students' flow in case of a successful implementation of diverse measures which the university can make to improve the success of students (Clarke, Nelson & Stoodley, 2013; Clouder, Broughan, Jewell & Steventon, 2013). Recent studies also demonstrate, that low student retention can be explained by mistaken choices (Borgen & Borgen, 2016). Therefore, Slovenian higher education system as a whole could also be investigated to establish the flow of students after their return back to the university system after their dropout.

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Markovska analiza uspešnosti in akademskega napredka na visokošolskem študiju

Izhodišča: Proces napredovanja študentov do zaključka visokošolskega študija kaže stohastične značilnosti, zato ga lahko popišemo z Markovsko verigo. Taka aplikacija ima veliko praktično vrednost, saj zaradi enostavnosti teoretičnega modela nudi številne priložnosti za implementacijo v praksi.
Namen: Namen prispevka je razviti stohastični model za ocenjevanje in spremljanje različnih kvantitativnih indikatorjev kakovosti in učinkovitosti izbranega visokošolskega študijskega programa.
Metodologija: Študijski program modeliramo s končno Markovsko verigo s petimi prehodnimi stanji in dvema ponornima stanjema. Predstavljena je prehodna matrika, ki podaja verjetnosti prehodov med posameznimi stanji. Za izračun izbranih indikatorjev študijskega programa uporabimo kvantitativne karakteristike razcepne Markovske verige, kot sta povprečni čas do absorpcije in verjetnost za absorpcijo.
Rezultati: Model smo aplicirali na izbrani študijski program slovenske visokošolske institucije. Na osnovi vpisnih podatkov smo oblikovali prehodno matriko, pri čemer smo upoštevali osem zaporednih študijskih let, od vpisnega leta 2008/09 do 2016/17. Ocenili smo delež študentov, ki redno napreduje v naslednji letnik (nivo) študijskega programa. Določili smo povprečni čas zadrževanja študenta na posameznem nivoju študija ter povprečno trajanje študija. Izračunali smo verjetnost, da bo študent uspešno zaključil študij (diplomiral) ali opustil študij. Poleg tega smo napovedali število študentov na posameznem nivoju študijskega programa, ki jih v danih razmerah lahko pričakujemo v naslednjih treh študijskih letih. Prikazane rezultate smo komentirali in diskutirali o možnostih nadaljnjih raziskav.
Zaključek: Predstavljena analiza je uporabna za vse deležnike, ki krojijo politiko visokošolskega izobraževanja. Predvsem je uporabna za vodstvo obravnavane visokošolske ustanove, saj nudi pomembne in koristne informacije za načrtovanje izboljšav glede kakovosti in učinkovitosti študijskega programa s ciljem zasesti čim boljšo pozicijo na tržišču visokošolskih izobraževalnih ustanov.

Ključne besede: *visoko šolstvo; študijski program; kazalci učikovitosti; napoved vpisa; markovska analiza; absorbcijska markovska veriga*

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Can Social Media Content Increase Financial Market Returns? Survey Results from Poland

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Background and Purpose: In recent years classic financial market theory based on decision makers' rationality has been challenged by repeated anomalies that became a 'new normal'. As a result, what we witness today is a considerable turn to behavioral concepts that can shed a new light on choices made by market participants. The astonishing development of social media accelerated scientific validation of such concepts, since the media opened new and capacious 'laboratory space' for testing behavioral hypotheses. The main purpose of the article is to examine whether financial market professionals believe that social media content can be useful in achieving additional financial market returns and to investigate the factors behind this belief.
Design/Methodology/Approach: We surveyed a sample of over 400 financial market professionals at institutions operating in Poland, and analyzed the results using logit regression models.
Results: We established that almost 60% of the surveyed finance professionals recognized the potential of social media for achieving additional returns. We also found out that the differences in respondents' perception of this potential could be explained mainly by heterogeneity of their job experience and, to a lesser degree, by their job position. Interestingly, more experienced individuals were less likely to recognize this potential. Firm-specific factors did not have a significant effect on the dependent variable.
Conclusion: The opinions of financial market professionals regarding the link between social media and additional returns are mixed, which is consistent with the current body of evidence brought by sentiment-based research. Our findings confirm the key role of previous experience in explaining attitudes towards novelties and innovations (such as social media), a phenomenon known from other fields and everyday experience.

Keywords: *social media; sentiment; behavioral finance; financial market professionals; financial market returns*

1 Introduction

Decisions must be informed. This is true also about investment decisions in financial assets. Traditional financial market theory, based on the efficient market hypothesis (hereafter EMH), assumes that stock prices reflect all publicly available information. Consequently, according to the most broadly accepted semi-strong form of EMH, market prices of securities fluctuate randomly as they are driven by unpredictable news releases that are instantly discounted in the prices (Fama, 1970; Fama, 1991). As a result, one cannot outperform the market relying on widely known information. Moreover, in the light of the classic theory, accurate prediction of stock market movement and future stock returns is questionable. Interestingly, there is empirical evidence that contradicts such a view (Kahneman and Tversky, 1979; De Bondt, 2003). Gathered particularly during the time of market excesses (such as the Internet bubble or the recent sub-prime crisis), it refers to phenomena commonly known as anomalies. This mismatch of theoretical predictions and empirical observations still poses a challenge both for academics and practitioners.

The debate over this disparity concentrates on controversies around the rationality of investors' behavior EMH

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is built on. It assumes that market participants' decisions are aimed at own utility maximization and fact-anchored. What is behind them is just reasoning. There is no room for feelings, and, more broadly, for psychological decision-making drivers, as the human individual is considered *homo oeconomicus* – an unemotional agent.

The advent of social media about a decade ago turned out to be a vital factor for the intellectual dispute concerning the issue. Although the existing literature defines social media in various ways, all definitions point out the fact that it can be useful as a supplementary source of information for business participants. Generally, this media can be perceived as Web 2.0-based services allowing for content sharing. Some previous studies proved that social networks can be an additional source of unofficial, yet useful and value-relevant information. For example, social media facilitate the exchange of private and informal earnings forecasts among traders, a phenomenon pointed out by Bagnoli et al. (1999) even before the age of social media. Moreover, user-generated content is primarily textual, which means that it is more qualitative than quantitative by nature, and some studies proved that such content may not be fully and immediately incorporated into the market pricing mechanism (Tetlock et al., 2008). Additionally, and possibly more importantly, the proliferation of social media gave boost to behavioral finance with its broad arsenal of new, potentially value-relevant factors not included in classic financial market theory.

By referring to the achievements of psychology, financial behaviorists hypothesized that in order to fully explain the forces underlying investment decisions, hence price movements, and – ultimately – to predict future financial market returns, one must break away from the rationality assumption. This claim was supported by rich empirical psychological evidence, readily cited in economic and financial literature (e.g. Okada and Yamasaki, 2014). Consequently, behavioral finance enabled the inclusion of market participants' sentiment – an obviously irrational, emotion-driven factor – in the framework in which investors' decisions are considered. Since sentiment is not directly observable or easily measurable, it must be extracted from textual content. This can justify relatively short history of empirical research in this field, as they started in the late 1980s and early 1990s. Currently, the progress of computational intelligence, which accompanied the emergence and rapid growth of social media space in the Internet, enables incomparably more effective analyses of a high volume of user-generated content. Thus, the incorporation of sentiment and other measures of social media user activity into models explaining and predicting financial market returns, made possible as a result of big data mining technology, can significantly contribute to outstanding performance in this domain. Despite the above mentioned short history of empirical research, the body of evidence in this field is vast, yet inconclusive. However, Baker and Wurgler (2007, p. 130) aptly observe that '[n]ow, the question is no longer, as it was a few decades ago, whether investor sentiment affects stock prices, but rather how to measure investor sentiment and quantify its effects'. Some latest studies even suggest that social media can outperform other sources of signals potentially useful for investors in predicting financial market returns (e.g. Hu and Tripathi, 2016).

Motivated by such findings, we decided to check the extent to which financial market professionals in Poland perceive social media content as useful, mainly in terms of opportunities to earn additional returns on financial assets (hereafter, in short, additional returns). Drawing on the sentiment analysis literature, we hypothesized that their interest in social media is significant and so is their use of this media for information provision purposes, and hence for achieving additional returns. To verify this, we surveyed a sample of 415 financial market professionals working in Poland and analyzed their responses using logit regression models to gain an insight into the significance of social media for earning additional returns. Specifically, we designed our study to acquire a better understanding of the issues underlying the following questions: (1) does financial community perceive the potential hidden in social media for earning additional returns, and (2) what is the community's demand for business intelligence platforms powered by social media content and fueled by big data technology?

Our findings can have sound positive as well as normative implications. Positive, because they picture contemporary situation in terms of information feed of financial market professionals. Normative, since they can serve as a basis for various recommendations concerning potentially beneficial enhancements in the market for such information, including placement of new products on the market. Finally, they can shed additional light on the possibilities of strengthening the efficiency of financial markets. As this is the first study of financial market professionals in terms of their openness to social media content in Poland and, to the best of our knowledge, in the entire region of Central and Eastern Europe, it can significantly contribute to the existing body of evidence concerning the information needs of financial institutions.

The next section of the paper provides a review of the literature devoted to information requirements of financial market professionals, with the focus on

the role of Internet sources in general, and social media in particular. In this part, we confront two issues that are pivotal for the formulation of valid concluding remarks: the way financial market professionals perceive social media as an information source as reflected in its prevalence in the industry, and the potential hidden in this media as reflected in its power to explain and predict financial market returns. This is followed by the methodological part, in which we provide details regarding the survey and applied models. We proceed to demonstrate and discuss the empirical results of the study, and to sum up the key points of the paper.

2 Literature review

2.1 The prevalence of social media in professional investment community

The significance of traditional information sources, such as all forms of company disclosures (including financial statements, management commentaries and company website news), press and other traditional media releases, or professional publications (surveys, reports, analyses, recommendations, etc.), is well-documented in the existing literature. Over the last decade, they were gradually supplemented with social media represented by various types of Internet platforms (social networks, blogs and microblogs, discussion forums, wikis, video-sharing portals, etc.). Interestingly, according to GNIP (2014) – a leading global provider of social data – the embrace of social media data by financial industry is delayed approximately three years compared to pioneering brand industry; the current use of social media by finance professionals approaches the inflection point of an S-shaped curve that is typical for innovations, and we will soon observe its acceleration. However, this delay can be easily explained by regulatory concerns and should not be perceived negatively (Chanda and Zaorski, 2013). Business usage of social media content by financial market professionals manifests itself primarily in its adoption as a communication channel, and – what is critical for the objectives of our article – as an alternative source of data, information, and even knowledge.

GNIP white paper on social media in financial markets (2014) maintains that 2013 will be remembered as a breakthrough for the industry, at least in the United States. On the one hand, the US Securities and Exchange Commission ultimately approved the use of social media by companies to publicize information important for market participants. On the other, social media for the first time proved their power in forcing the market to massive movements (e.g. the Hash Crash following a message from the hacked Associated Press's Twitter account in April 2013, and tweets of the renowned investor Carl Icahn concerning the value of Apple). Since the beginning of the current decade, the published results of several surveys shed a light on the role of social media in supplying financial market professionals with the information that is relevant to investment decisions (Bowles, 2010; DVFA – IR Club, 2015; Greenwich Associates, 2015). These early studies seem to confirm that what we witness today is just a dawn of social media activation in the financial services sector.

In the presentation for City Week in September 2010, Thomson Reuters demonstrated key findings of some recent research in the field (Bowles, 2010). They were as follows: 89% of financial market professionals admitted that they were social media users (59% on at least a weekly basis), also for reasons related to their occupation. However, only 10% stated that they used social media mostly for professional purposes, and merely 1% – solely for such purposes. Intriguingly, although networks, wikis and video-sharing were found to be the most popular in the entire sample of social media users, it was blog (including microblog) that was the most frequently selected social media by those who consumed its content primarily or exclusively for professional reasons.

In the summer of 2013, the Society of Investment Professionals in Germany (DVFA) and the Investor Relations Community (IR Club) surveyed 121 European representatives of investment professionals, mainly from Germany (DVFA – IR Club, 2015). The researchers found out that interest in social media as a means of meeting information needs was at best moderate. 50% of the respondents rated social media at least partly important, yet all other possible sources offered for selection were reported more important compared to social media. Not surprisingly, the issuer of a security was considered the most valuable source of information, an observation confirmed by many other studies, concerning also retail (individual) investors (e.g. SII, 2015 in Poland). What is important, for 28% of the respondents social media gained in significance over previous years. However, the gain of other information sources was even greater.

At the end of 2014 Greenwich Associates (2015) surveyed 256 institutional investors from Europe, Asia Pacific region and the USA to establish the role of social media in their daily business. According to the study, in almost all included firms (97%) digital media were used for investment decision-making purposes, while 79% of respondents reported that they used social media in this field (these two categories of media were separated in the questionnaire). The survey also revealed that social media content has a behavioral impact on financial market professionals in the sense that it serves as a trigger for various actions and initiatives. A remarkable proportion of respondents (48%) admitted carrying out further research motivated by what they had found in social media. 37% of the entire sample shared such information with the decision makers in their

institutions, while 31% had been prompted by the information to make an investment decision or recommendation. About 55% of respondents thought that the usage of social networks would stay the same over the next year, while approximately 40% believed it would rise.

To recapitulate, although evidence shows that social media are already monitored by financial market professionals for informational purposes and induce some corporate actions, the attitude of financial industry towards social media is one of caution and wariness, as reflected not only in their prevalence, but also intensity of usage.

2.2 Sentiment analysis literature

The business potential of social media has been quickly recognized by the corporate sector, as it creates an unprecedented opportunity to learn and track opinions of a vast number of people on products, brands, corporate actions, etc. at a reasonable cost and on a real-time basis. Such knowledge can obviously help to outpace the competition. Sentiment that can be learnt from social media seems to be particularly significant for financial and, even more so, stock market professionals, since the market is outstandingly prone to the impact of 'animal spirit'. The key findings – both theoretical and practical – in the field of market sentiment and stock pricing before the age of social networks were comprehensively reviewed by Baker and Wurgler (2007), hence we focus here on the rapidly growing body of works that emerged since their paper was published. In fact, this evidence is of pivotal significance as it builds on the examination of the most prominent and revolutionary social networking platforms that had been launched just before Baker and Wurgler's article (LinkedIn – 2003, Facebook – 2004, Twitter – 2006). Nonetheless, we begin with a brief outline of the achievements of those researchers who extracted sentiment from traditional (media news, including online, and newswires) or hybrid media (message boards). This is followed by a presentation of the latest studies focused on social media, particularly Twitter.

The literature on the role of market sentiment in explaining stock returns is quite varied in many respects. Firstly, some researchers have tried to find associations between these two variables, while others strived to confirm the predictive power of sentiment for stock market phenomena, particularly returns. Secondly, in their search for irrefutable empirical evidence, they have tested various variables: not only sentiment, but also message volume and disagreement among posted messages as the key social media characteristics on the one hand, and returns, trade volume and volatility as prime stock market parameters on the other. Thirdly, their studies have applied a variety of measures to gauge sentiment (generally, they can be divided into ones relying on traditional, i.e. dictionary-based approaches and those using natural language processing (hereafter NLP) / machine learning approaches derived from computer science). Fourthly, the studies have been based on different methodological assumptions (models used, individual vs. aggregate data, etc.). Finally, they have investigated a broad range of media, from newspaper coverage through microblogs.

Rigorous and theoretically well-grounded studies of market sentiment as a potential driver of stock returns go back to Cutler et al. (1989), who extracted sentiment from news stories (*The Wall Street Journal*). This strand of empirical literature revolving around the content of newspaper stories is represented by later groundbreaking works by Tetlock (2007) and Tetlock et al. (2008). Some authors of this stream look for research material in the distant past. For example, Campbell et al. (2012) investigate the role of news media in stock prices during the British railway mania of 1840. In Japan, Okada and Yamasaki (2014) demonstrate that mid-year stock market return seasonality as reflected in the saying 'sell in May and go away' is almost perfectly associated with the sentiment proxy they adapted and extracted from Japanese media news. The most recent studies mine not only online newspapers columns, but also the most influential newswires such as Dow Jones, Thomson Reuters, and Google Finance (Heston and Sinha, 2014, Chouliaras, 2015, Hu and Tripathi, 2016).

Another stream of research investigates online message boards created for stock market participants (Yahoo!Finance and Raging Bull were the most often scrutinized). It is represented by such authors as Wysocki (1998), Tumarkin and Whitelaw (2001), and Dewally (2003) who studied easily measurable characteristics of message boards, such as message volume and user ratings, as well as by those conducting sentiment-based analyses: Antweiler and Frank (2004), Bissattini and Christodouolu (2013), Kim and Kim (2014). Although their findings are inconclusive, they are promising in terms of the association between market sentiment and key stock market parameters.

The advent of social networking platforms in the first decade of the twenty-first century created another, potentially fruitful avenue for researchers testing the relevance of market sentiment in explaining stock returns. This resulted in a series of papers aiming to ascertain whether the content of Twitter – the most relevant social network for such studies – can move the stock market. This stream of research is represented by such works as Sprenger and Wulpe (2010), Ruiz et al. (2012), and Zheludev et al. (2014). Bollen et al. (2010) point out the fact that sentiment has many dimensions and only some of them have predictive power for stock returns. Yang et al. (2014) demonstrate that filtering out the finance community from Twitter community as a whole is of key importance for successful Twitter-based sentiment analysis. They prove that the sentiment extracted from posts attached to critical nodes of the 'finance community' network is more closely associated with stock returns and volatility than the one ex-

tracted from 'entire community' posts. Additionally, some researchers test, with promising results, the effectiveness of social media-based trading strategies or platforms capturing sentiment-driven investment opportunities (e.g. Davda and Mittal, 2008; Ruiz et al., 2012).

In the light of the diversity of methodological frameworks, it is not surprising that the current body of evidence in the field of social media sentiment effect on stock market movements is far from consensus. For example, Sprenger and Wulpe (2010), Chen et al. (2013), and Heston and Sinha (2014) prove that social media-extracted sentiment matters for stock prices. By contrast, Antweiler and Frank (2004) and Kim and Kim (2012) find no support for the hypothesis that the sentiment of social media messages contains financially relevant information in terms of its association with stock returns. Interestingly, Hu and Tripathi (2016) obtain results that lend support for the value relevance of sentiment extracted from stock forums, as opposed to media news platforms. The study is revealing as its findings implicate the presumable superiority of social media over other types of media, including online, in conveying sentiment signals potentially leading to additional market returns. The authors convincingly argue that this can be explained mainly by faster diffusion of opinions through social media compared to traditional media outlets. Moreover, they established that the two proxies of sentiment – extracted from the examined Internet forum (HotCopper) and media news platform (Google Finance) – are not correlated, which implies that both include unique content.

To sum up, the empirical literature devoted to the relationship between user sentiment as reflected in the postings on social media and stock market performance is abundant, basically inconclusive, and only partly supports the behavioral finance hypothesis according to which the sentiment can not only explain but also predict stock returns, at least to a degree (i.e. in relation to some asset classes, time windows, and social media users' messages).

3 Methodology

3.1 Survey design

Our research consisted of two parts: a survey study and regression analysis. In the first step, we designed a questionnaire (see Appendix for details) consisting of two broad parts: eleven questions concerning the informational needs of respondents (the main part) and seven questions to determine the respondents' particulars. All questions were semi-closed, i.e. the respondents were provided with a range of answers they could select, but they could also add their own options to the list. In a sense, the main part of the questionnaire had a dual structure since the questions from 1 through 3 concerned informational needs in general, while the remaining ones focused on social media. Since our aim was to achieve a number of research objectives in one survey, we refer here only to those questions that served the purposes of the present article.

We surveyed financial market professionals to gain knowledge on the following issues:

1. their opinions as to the usefulness of social media in achieving additional returns (Q6: 'Do you think that monitoring social media content can result in additional returns?'),
2. required signals conveyed in social media content (Q7: 'What would you like to extract from social media content for your job purposes?'),
3. interest in an IT solution helping to use social media content to earn additional returns (Q8: 'Would you like to have software allowing for real-time monitoring of internet media, including social media, and converting its content into numbers, such as a proxy of market sentiment?').

The premise behind the question concerning the perceived usefulness of social media (Q6) was empirical evidence established by some sentiment analysis-oriented researchers suggesting that social media monitoring can pay off (Chen et al., 2013; Heston and Sinha, 2014). We decided to complement it with queries regarding the exact content of social media financial professionals would be interested in (Q7) and their interest in acquiring social media-fitted software allowing for the extraction of such content (Q8), as these issues were not covered by prior surveys (Bowles, 2010; Greenwich Associates, 2015; DVFA – IR Club, 2015).

We fielded the questionnaire-based survey between April 25 and June 6, 2016. The data was collected using the Computer-Assisted Telephone Interview (CATI) technique among a sample of 415 financial market professionals working in financial market institutions in Poland. We partnered with a professional market research institute to conduct the survey. The sampling process used Standard Industrial Classification (SIC) codes and the Financial Supervision Authority classification to obtain data on the financial institutions active in Poland. This approach was selected because of the inability to run a random sampling procedure (it is very difficult to gather comprehensive data on finance-related firms in Poland as many of them are small businesses with highly diversified services). Sentiment analysis literature suggests that social media content can be particularly interesting for those who invest in financial assets or recommend investment choices. As a result, we decided to remove the institutions not engaged in investment decisions from our database used in further analyses.

The distribution of the respondents' characteristics shows that our sample was skewed to universal banks (with a capital market department within their structure),

which had a 25% share in the total sample. This is consistent with the prevalence of commercial banks (including their branches) in the entire number of financial institutions active in Poland. According to job position, the largest group included directors and managers (36%), followed by executives (17%) and owners (16%). This means that our sample was dominated by decision makers, who collectively amounted to almost 70%. We found a contrast regarding the respondents' period of experience in asset management or business analytics: for 42% of the sample it was at most 1 year, whereas for 26% it exceeded 10 years. What is also important is that about half of the respondents refused to indicate the value of assets managed by the entity for which they worked (a notable proportion – 25% – reported no managed assets due to the specific nature of the line of business they represented).

3.2 Regression analysis design

We used the following models to explain the variance of replies to the question whether the information published in social media may be a source of additional rate of return (Y_i), which take the following values for an *i*-th respondent:

$$Y_i = \begin{cases} 1 & \text{if a respondent perceives the information published in social media as a source of additional rate of return} \\ 0 & \text{otherwise} \end{cases}$$

Since the variables are nominal, logit models were used. A binary choice logit model takes the following form (Greene, 2002, p. 667):

$$\mathrm{P}(Y_i = 1|\boldsymbol{m}) = \Lambda(\boldsymbol{m}'\boldsymbol{\alpha}) = \frac{\exp(\boldsymbol{m}'\boldsymbol{\alpha})}{1+\exp(\boldsymbol{m}'\boldsymbol{\alpha})} \qquad (1)$$

where is a logistic cumulative distribution function, is a vector of explanatory variables, is a vector of parameters, and surveyed individuals. Vector contains the basic characteristics of surveyed professionals and institutions they represent (respondent-specific and firm-specific variables), as well as additional variables that will describe possible spatial patterns and the respondents' perception of 'information'.

To test for the statistical significance of the whole set of variables, we used a likelihood ratio (LR) test which has a distribution with degrees of freedom, where is the number of explanatory variables. We calculated the variance inflation factor (VIF) for each variable. We eliminated (imperfectly) collinear variables, most often selecting them as benchmarks. The results confirm that there was no significant correlation between the explanatory variables.

For analytical clarity, we distinguished the following groups of independent variables: (1) respondent-specific variables (e.g. job position and experience), (2) firm-specific variables, i.e. factors characterizing the institutions represented by the respondents (e.g. firm type and the value of assets under the firm's management), and (3) other variables, i.e. the replies to two initial queries of the questionnaire (Q1 and Q2). The applied respondent-specific variables included: (1a) general experience in stock exchange analysis / asset management (variable denoted as exp_general), (1b) job position (a set of variables denoted as follows: occup_analyst – analysts; occup_executive – executives; occup_specialist – specialists; occup_broker – brokers; occup_findir – CFO; occup_owner – owners; occup_other – other job positions), and (1c) practice in the current job position (variable denoted as exp_occup). We adapted the following firm-specific variables: (2a) firm type (a set of variables denoted as: firm_fund – various types of funds; firm_house – brokerage houses; firm_insurer – insurance firms; firm_advisory – advisory firms; firm_ubank – universal banks (with capital market departments); firm_broker – other brokerage activity; firm_otherfin – other financial institutions; firm_other – other firms, not classified elsewhere), (2b) the value of assets managed by the firm (variable denoted as asset_value), (2c) diversification of the assets (variable denoted as asset_number), (2d) risk of the assets (variable denoted as asset_hrisk), (2e) types of the assets (a set of variables denoted as asset_pfixed – Polish fixed income assets; asset_ffixed – foreign fixed income assets; asset_pstock – Polish stock; asset_fstock – foreign stock; asset_estate – real-estate assets), and (2f) geographical location of the firm (16 administrative regions).

As mentioned, we also employed the responses to the first and second questionnaire queries (Q1 and Q2) as additional explanatory variables. Q1 was formulated as follows: 'To what extent are your information needs satisfied by the sources you use in your job?' We used a Likert scale to collect the replies to the question (very high; high; moderate; low; very low). We were interested whether the extent to which the surveyed institutions are satisfied with the data and information sources they have at hand explains the differences in the belief that social media can be useful in chasing additional returns. In Q2 we asked the respondents to 'Indicate the statements they identify themselves with as to their job'. We designed the question as a vehicle allowing us to gain an additional insight into the forces behind the observed selection patterns. We expected that the responses 'We need different data and information from what we needed couple of years ago' (variable denoted as info_change) and 'The advantage is hidden in the analyses of massive amounts of non-homogenous data and information' (variable denoted as info_large) would be more frequently selected by those who believe that monitoring social media content can be rewarded with additional returns. Other suggested replies available for selection at this point were as follows: 'The magnitude of data and information is so big that it is hard to work the way through it' (variable denoted as info_much), 'The visualization of data and information gains in the value' (variable denoted

as info_visual), and 'Despite progress, we lack an all-encompassing database for financial market professionals' (variable denoted as info_one).

In total, we applied four models (hereafter marked from 1 through 4), which were gradually (incrementally) supplemented with additional independent variables. Therefore, Model 4 was the most exhaustive. On the other hand, Model 1 was unique in the sense that it was the only model that included, except respondent-specific characteristics, asset value as the explanatory variable. The variable was excluded from other models to maintain comparability of results across the entire sample, since (as mentioned above) only about half of the respondents revealed the asset value in the survey. Finally, in all models the rationale behind the selection of benchmarks was the highest VIF value / p-value.

4 Results

Of special concern to us was the question through which we gathered opinions as to whether social media content can help in earning additional returns (Q6). 57% of the respondents stated that such content can be a lever of financial market returns, while about a quarter stated the opposite (details are given in Table 1).

We were also interested in what type of social media content is valuable for the surveyed individuals. Following the existing literature, in the range of options for selection we suggested as follows: sentiment, emotions (assuming that both optimism and pessimism can be expressed with different strength or intensity driven by emotions), message volume, and polarization of opinions. We obtained extraordinarily even distribution of answers in which every suggested option was indicated by about 40-50% of the respondents.

The regression models, designed to examine the drivers behind the belief that monitoring social media can result in additional returns, brought some additional interesting outcomes. Firstly, the respondents' experience variables (exp_general and exp_occup) turned out to be statistically significant. We discovered that more experienced financial market professionals were less likely to report that monitoring social media content can lead to additional returns. We also noticed some interesting phenomena as to the explanatory power of job position. What we found out suggests that the respondents whose duties are closely (i.e. more directly) associated with making investment decisions or recommendations are less likely to believe that social media content can yield additional returns

Table 1: Distribution of survey responses
** The respondents were permitted to select any number of answers.*

QUESTION	%	N
Q6: Do you think that monitoring social media content can result in additional returns?		
Yes	56.6	235
No	25.3	105
It's difficult to say	18.1	75
Total	100	415
Q7: What would you like to extract from social media content for your job purposes?*		
Sentiment	54.5	226
Emotions	42.4	176
Message volume	47.7	198
Polarization of opinions	48.9	203
Other (indicate)	21.4	89
Q8: Would you like to have software allowing for real-time monitoring of internet media, including social media, and converting its content into numbers, such as a proxy of market sentiment?		
Yes	25.3	105
No	47.5	197
It's difficult to say	27.2	113
Total	100	415

as compared to those who are loosely linked to making decisions of this kind. Strikingly, our study proved that the likelihood is the lowest among analysts (the only group for which the regression results were statistically significant) and the highest among 'other' employees of the surveyed financial institutions, such as spokesmen (with key decision makers – i.e. executives and owners – placed between these two groups holding opposite perspectives). However, the opinions of 'other' employees were characterized by a high standard error.

Looking at firm-specific characteristics, the relationship between firm type and the explained variable was statistically significant only for universal banks, insurance firms, and other financial institutions (these firms reported that monitoring social media content cannot lead to additional returns). However, neither asset type nor asset value exhibited statistical significance as explanatory variables. Also, there was no spatial pattern in the distribution of answers concerning the relevance of social media content for financial market returns.

The inclusion of the responses to the first and second questionnaire queries, as additional explanatory variables, in regression modelling (Model 4) shed additional light on the issue under investigation. Having imposed some zero restrictions on the parameters of the model that were close to zero, we obtained statistically significant results for some of the newly introduced variables. This pertains to how satisfaction with data and information sources that are used (variable coded as info_satisfact) is associated with the opinion regarding the benefits of social media monitoring in terms of additional returns (the more satisfied respondent, the greater likelihood to affirm the belief in such returns).

5 Discussion

Despite the differences in opinions regarding the usefulness of social media in earning additional returns, the respondents were confident when formulating their opinions: they had a clear and in most cases positive view of the issue (i.e. they believed that social media could support them in hunting investment opportunities). Only 18% replied that it was difficult to say whether social media can help in achieving additional returns. It is hard to assess the distribution of responses to the question, as – to the best of our knowledge – this is the first study examining the issue. Hence, there is no benchmark which would enable a comparative discussion. However, such results seem to be consistent with what is known from sentiment analysis literature. As mentioned above, empirical findings in this field did not bring unambiguous evidence that could encourage financial community to turn to social media in order to look for more opportunities to earn additional returns, or discourage them from this idea.

Not surprisingly, only sentiment was pointed by the majority of respondents (almost 55%) as a variable they would like to extract from social media. This may stem from greater popularity of this variable in professional analyses compared to other variables which we suggested. As a result, the term 'sentiment' can be more widespread in the financial community. We also scrutinized the comments and remarks made when the option 'Other' was selected (which in fact was quite often, slightly over 21% of the sample). Most of them were focused on client data and information: customer experience, their preferences, the extent to which the firm's offer is customized to their needs, opinions concerning the firm's products, etc. Some comments revealed, however, a lack of understanding as to the essence of the issue under scrutiny. For example, some respondents stated that they consulted social media for stock quotations and investment returns data. Hence, the body of evidence we gathered can prove some shortcomings of surveyed individuals in their knowledge or understanding of some key concepts and terms that were examined (e.g. social media boundaries, the meaning of decisions prompted by emotions rather than reason and the way they can be anticipated by the signals extracted from social media content, such as the tone of the text or buzz around a security).

This is visible in contradictory answers that become apparent in the analyses confronting responses to at least two questions at the same time. In the light of the prevailing opinion that social media can convey signals relevant for investing in such assets as shares, it is striking that about half of the respondents stated that they would not be interested in software allowing them for real-time monitoring of Internet media, including social ones, and converting its content into numbers, such as a proxy of market sentiment. We expected that these two – the opinions concerning the relevance of social media in terms of its effect on financial market returns, and the need for a computer science-based infrastructure that facilitates unlocking the potential of such media – would go together. Certainly, what we found out was a puzzling result. We take two possible explanations into consideration. First, answering this question the surveyed individuals treated us as salesmen and informed us about their lack of interest to avoid insistence in the future. Second, the negation can mask real interest in such software and some efforts made to develop it within the institution, but kept secret from market competitors.

One of our key findings concerns the relationship between respondent-specific characteristics (experience and job position) and the likelihood of declaring that social media can be useful in looking for additional financial market returns. Assuming that 'more experienced' means also 'older', the skepticism of more experienced respondents detected in our study can result either from their reluctance to social media (as younger people are more enthusiastic about them), or from the fact that their rich experience

Table 2: Regression analysis results
*Standard errors in parentheses, p-values in square brackets. * means significant at 0.1, ** means significant at 0.05, *** means significant at 0.01. Constants were included in the models, but omitted in the table. In the case of each variable VIF < 3.*

Variable	Model 1		Model 2		Model 3		Model 4	
exp_occup	−0.215	(0.126)*	−0.289	(0.101)***	−0.312	(0.106)***	−0.236	(0.099)**
exp_general	−0.142	(0.099)	−0.189	(0.084)**	−0.181	(0.088)**	−0.137	(0.087)
asset_value	0.099	(0.123)						
asset_number	−0.029	(0.182)						
firm_fund			−1.000	(0.708)	−0.971	(0.756)	−0.662	(0.627)
firm_house			−0.569	(0.696)	−0.755	(0.725)		
firm_insurer			−1.075	(0.581)*	−1.005	(0.605)*	−0.786	(0.443)*
firm_advisory			0.020	(0.622)	−0.025	(0.630)		
firm_otherfin			−1.555	(0.747)**	−1.695	(0.773)**	−1.294	(0.651)**
firm_ubank			−1.025	(0.510)**	−0.907	(0.520)*	−0.813	(0.386)**
firm_broker			−0.634	(0.601)	−0.623	(0.627)	−0.349	(0.496)
firm_other			−0.409	(0.622)	−0.362	(0.646)	−0.205	(0.498)
occup_analyst			−1.310	(0.682)*	−1.251	(0.712)*	−1.220	(0.676)*
occup_executive			0.339	(0.450)	0.423	(0.472)	0.387	(0.456)
occup_specialist			0.034	(0.604)	0.062	(0.623)	0.094	(0.591)
occup_broker			−0.277	(0.412)	−0.010	(0.449)	−0.191	(0.412)
occup_findir			−0.660	(0.638)	−0.661	(0.657)	−0.267	(0.664)
occup_owner			0.139	(0.405)	0.249	(0.423)	0.251	(0.412)
occup_other			1.438	(1.199)	1.587	(1.209)	1.233	(1.203)
asset_pfixed			0.483	(0.425)	0.416	(0.444)	0.352	(0.438)
asset_ffixed			0.602	(0.674)	0.562	(0.695)	0.619	(0.690)
asset_pstock			0.210	(0.388)	0.212	(0.399)	0.133	(0.397)
asset_fstock			−0.802	(0.502)	−0.839	(0.525)	−0.650	(0.520)
asset_estate			0.446	(0.441)	0.534	(0.458)	0.286	(0.445)
asset_hrisk			0.498	(0.374)	0.557	(0.387)	0.501	(0.387)
doln					−0.715	(0.609)		
kuja					−0.379	(0.527)		
lube					0.018	(0.593)		
lubu					0.731	(1.165)		
lodz					0.147	(0.770)		
malo					−0.509	(0.527)		
opol					−1.836	(1.341)		
podk					−0.258	(0.595)		

Table 2: Regression analysis results (continued)

podl					−0.463	(0.707)		
pomo					−0.647	(0.555)		
slask					−1.008	(0.547)*		
warm					−0.804	(0.806)		
wiel					−0.280	(0.572)		
zach					−0.699	(0.775)		
info_satisfact							0.270	(0.099)***
info_change							0.313	(0.416)
info_much							0.139	(0.273)
info_large							0.491	(0.279)*
info_visual							0.430	(0.300)
info_one							0.313	(0.270)
N	171		335		335		327	
Log-likelihood	−103.0		−189.5		−185.2		−182.7	
AIC	215.9		427.0		446.5		419.4	
BIC	231.6		518.5		591.4		521.8	
HQ	222.3		463.5		504.3		460.3	
% predicted	69.6		73.4		71.6		74.3	
LR	7.4	[0.11]	39.2	[0.02]**	47.7	[0.11]	42.0	[0.03]**

enabled them to more accurately diagnose social media content potential. We believe that the observed patterns can be at least partly explained by a psychological effect according to which more experience leads to the attitude of shedding illusions and, as a result, to less optimism. More experienced people are more cautious and reserved. Considering that not only more experienced respondents, but also those who were more directly involved in making investment decisions or recommendations, displayed a higher likelihood of skepticism about social media potential for earning additional returns, the latter explanation seems to be more plausible. Alternatively, the observed relationships can be attributed to a higher expertise of more experienced respondents.

Also, the importance of previous experience for the perception of social media informative potential can be confirmed by positive relationship between info_satisfact variable and dependent variable. What we established indicates that the respondents who were more satisfied with the information sources they used were more likely to recognize the potential of social media for their work purposes. Moreover, the probability was also higher among those respondents who shared the opinion that analyzing large sets of diversified data and information can guarantee outstanding performance in the market (info_large). This is reasonable as the recognition of social media potential for the opportunity of achieving additional returns must be preceded by deep understanding of big data prospects and a belief that they are realizable. Although statistically insignificant, a visible and positive correlation occurred also between the dependent variable and variables representing the changing demand for data and information in recent years (info_change), as well as the lack of one complete and comprehensive source of data and information (info_one).

6 Conclusions

We found out that the majority of surveyed finance professionals believed that social media content could be useful in pursuing additional financial market returns. Interestingly, more experienced financial market professionals, especially analysts, were more inclined to neglect the potential of social media content in this respect. Moreover, we established that those who were more satisfied with

the sources of information on which they had relied so far were also more inclined to affirm that the use of social media can increase market returns. Overall, these findings point out a particular role of former experience for the attitudes towards the opportunities created by social media for financial market participants, a phenomenon known from other fields. Undoubtedly, social media as an information source for financial community is still a novelty. Hence, the perception of its prospects is subject to the same factors as the perception of other innovations, and previous experience is certainly one of them. What we observe today can be considered a natural wariness typical for the early stages of innovation developments. This wariness is further enhanced by ambiguous results of sentiment-based empirical research. The insignificance of almost all firm-specific variables in the models which we applied in our study is understandable and can be justified by the specificity of the dependent variable, i.e. financial professionals' perception of social media potential for achieving additional returns. Such variables as views, opinions or perceptions are better explained by personal respondent-specific characteristics.

Although the majority of respondents recognized the potential of social media, only one out of four expressed an interest in professional software allowing for real-time social media monitoring and converting its content into useful decisional signals. This finding is intriguing as it is contrary to considerable interest in social media as an informational source in and of itself. Certainly, the reasons behind this mismatch seem to be one of the most interesting avenues for further research. At the same time, the observed mismatch can suggest that the prospects for business intelligence firms developing professional software solutions for finance industry interested in making use of social media content can be questionable.

Our study is limited in some respects and these limitations create opportunities for future research. Firstly, since the existing literature on the use of social media by finance professionals is still scarce, we tested as independent variables only the parameters suggested by the literature and intuitively relevant for the issue under consideration. Presumably, some other variables exist that can be potentially significant for a better understanding of finance professionals' attitudes towards social media potential. Secondly, perhaps the application of an alternative research model would reveal some other important patters. We applied logit models which are typically used to analyse factors that influence the probability of a certain occurrence, or when a phenomenon can be described by a binary variable. Thirdly, we cannot exclude the possibility that our results are country-specific, which opens an avenue for more extensive international comparative studies.

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Ali lahko družbena omrežja vplivajo na povečanje donosov na finančnih trgih? ugotovitve s Poljske

Ozadje in namen: V zadnjih letih se je pokazalo vse več dvomov v ustreznost klasične teorije finančnih trgov, ki temelji na racionalnosti odločevalcev. Ponavljajo se anomalije in odstopanja od te teorije, ki postajajo »nova normalnost«. Zato strokovnjaki posvečajo vse več pozornosti vedenjskim konceptom, ki se lahko z drugega vidika osvetlijo odločitve udeležencev na finančnem trgu. Hitri razvoj družbenih medijev je spodbudil raziskave, ki bi proučevale takšne koncepte, saj so mediji odprli nov "laboratorijski prostor" za preverjanje vedenjskih hipotez. Glavni namen članka je preučiti, ali strokovnjaki na finančnem trgu verjamejo, da je mogoče vsebine družbenih medijev uporabiti za doseganje dodatnih donosov na finančnih trgih, in identificirati dejavnike, ki vplivajo na te donose.
Zasnova / metodologija / pristop: V raziskavi smo zajeli vzorec več kot 400 strokovnjakov na finančnih trgih v institucijah, ki delujejo na Poljskem, in analizirali rezultate z uporabo logit regresijskih modelov.
Rezultati: Skoraj 60% anketiranih finančnih strokovnjakov prepoznava potencial družbenih medijev za doseganje dodatnih donosov. Ugotovili smo tudi, da bi lahko razlike v zaznavanju tega potenciala pojasnila predvsem heterogenost njihovih delovnih izkušenj in, v manjši meri, njihovo delovno mesto. Pokazalo se je, da izkušeni strokovnjaki manj verjetno prepoznajo te možnosti manj izkušeni posamezniki. Za posamezna podjetja specifični dejavniki po naših ugotovitvah nimajo pomembnega vpliva na dodatne donose.
Zaključek: Mnenja strokovnjakov na finančnih trgih glede povezave med družbenimi mediji in dodatnimi donosi, so mešano. To se sklada z ugotovitvami, ki jih so jih prinesle študije, ki temeljijo na raziskovanju občutkov.. Naše ugotovitve potrjujejo ključno vlogo predhodnih izkušenj pri pojasnjevanju odnosa do novosti in inovacij (kot so družbeni mediji), pojav, znan iz drugih področij in iz vsakdanjih izkušenj.

Ključne besede: *družbeni mediji; sentiment; vedenjske finance; finančni trg; donosi na finančnih trgih*

Appendix

Listed below are only the questions relevant to theme of the article (as mentioned in the article, our aim was to achieve a number of research objectives in one survey).

Q1: To what extent your information needs are satisfied by the sources used by you in the job?
- Very high
- High
- Moderate
- Low
- Very low
- Difficult to say

Q2: Indicate the statements you identify yourself with as to your job.
- We need different data and information from what we needed couple of years ago
- The magnitude of data and information is so big that it is hard to work the way through it
- The advantage is hidden in the analyses of massive amounts of non-homogenous data and information
- Visualization of data and information gains in the value
- Despite progress, we lack all-encompassing database for financial market professionals
- The information needs are sufficiently well-feed, hence there is no necessity for a change in this field

Q6: Do you think that monitoring of social media content can result in abnormal returns?
- Yes
- No
- Difficult to say

Q7: What would you like to extract from social media content for your job purposes?
- Sentiment
- Emotions
- Message volume
- Polarization of opinions
- Other (which?)

- Q8: Would you like to have software allowing for real-time monitoring of internet media, including social media, and converting its content into numbers, such as proxy of market sentiment?
- Yes
- No
- Don’t know – I would have to learn more about that

Respondents’ particulars:
Q12: What is the institution you work in?
- Universal bank
- Investment bank
- Brokerage house
- Other brokerage activity
- Investment funds / Asset management / Private equity / Venture capital
- Insurance company
- Finance advisory company
- Other financial institutions
- Other

Q13: What is your job position in the institution? (Open question)

Q14: Since when you are on the position (in completed years)?
- 1 or less
- 2-4
- 5-7
- 8-10
- More than 10
- No answer

Q15: How long have you been working with listed companies analytics or / and asset management (in completed years)?
- 1 or less
- 2-4
- 5-7
- 8-10
- More than 10
- No answer

Q16: Indicate the value of assets under management of the institution you work in (in PLN million).
- (0; 100]
- (100; 1,000]
- (1,000; 10,000]
- (10,000; $+\infty$)
- No answer

Q17: Indicate approximated percentage share of the following assets in the institution you work in.
- Cash & equivalents
- Polish fixed-income assets
- Foreign fixed-income assets
- Polish shares
- Foreign shares
- Real-estate assets
- Other
- No asset management

Q18: Indicate voivodeship the institution you work in is located.
(List of 16 voivodeships in Poland)

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Model of Knowledge Management Factors and their Impact on the Organizations' Success

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Purpose: The purpose of this research is to identify the factors of knowledge which have a significant impact on the outcome (measured as value added per employee) of the company. The existence, long-term survival, profitability, etc. of the company depends on the competitiveness of the products and services (regardless of industry or economic branch). Transformation of "raw materials" into competitive products is possible only with the knowledge of employees. Therefore, it is necessary to identify the factors of knowledge which can influence a positive result of the company.
Methodology: We reviewed the relevant literature in the field of knowledge management. On this basis, we summarized the factors of knowledge. We performed a survey among the 69 largest Slovenian commercial companies (public and banking sectors excluded). Based on the research, we developed a regression model of value added per employee in euros.
Results: The study showed that, of all factors studied, motivation in the form of assessing employees' performance has the largest positive correlation with the value added per employee. Furthemore, training for the performance, the use of technological tools and organizational climate can bring significant value added per employee. The most important factor that affects the value added per employee is the industry branch which the company deals with. The factors which follow are the simplicity of using IT tools and the example that the managers give to the employees.
Conclusion: A model of knowledge management factors helps to identify which knowledge factors should be given priority to for increasing the company's performance. The model also considers the industry in which the company operates.

Keywords: *Knowledge management; knowledge factors; human capital*

1 Introduction

Continued development and rapid distribution of information technology caused a cyclical - continuous struggle for market share and fight for every customer between manufacturers and suppliers of similar products. As demonstrated by several studies, e.g., *Linking intellectual capital and intellectual property to company performance* (Bollen, Vergauwe & Schnieders, 2005, 1182) and *Impact of knowledge management capabilities on knowledge management effectiveness* (Bharadwaj, Chauhan, Raman &, 2015), the existence of a company primarily depends on the success of the intellect materialization of its employees and their intellectual potential. Therefore, it is crucial to understand the importance and impact of the knowledge of those involved in the production process, development department and commercial activities.

Our primary objective was to analyse the relationship

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between the factors of knowledge and value added per employee as indicator of economic performance of the company. Consequently, our secondary objective was to propose a model that explains the relation between the factors of knowledge and value added per employee. The motive of the survey was to discover whether the knowledge available in the company can provide a better management of the company in terms of increasing its revenues. In our research question, we wanted to find out which factors are most important, and how and to what extent they affect the performance of the organization, with the benchmark of the company being the value added per employee in euros.

2 Literature review and theoretical basis

2.1 Knowledge, inovativeness and competitive environment

Critical skills to the company's success in the business environment are the creative ideas and knowledge which the company can realize at the right time and in the right market (Ovsenik and Ambrož, 2010, 78). Knowledge is a multifaceted concept with a multifaceted range of meanings and is defined as a justified true belief which results in a value increase (Nonaka, 1994, 21). On the other hand, Bhatt (Bhatt, 2001, 70) notes that data is a set of raw facts which by means of processing and organizing turn into information, whereas knowledge is a piece of logically completed information. Knowledge can be classified as tacit knowledge or explicit knowledge (Nonaka, 1994, 19). Tacit knowledge is knowledge, which can not be defined (Smith, 2001, 313). Smith defines tacit knowledge as automated knowledge which requires very little time for taking a decision. It can be said that this is collective behavior and collective consciousness of the organization (Smith, 2001, 314). It can also be considered as a structural concept that describes the relationship between different types of knowledge (Gupta, Iyer, & Aronson, 2000, 17). Explicit knowledge is academic or technical data (or only information) described in formal language (Smith, 2001, 316).

Examples of explicit knowledge are manuals, mathematical expressions, copyrights and patents (Smith, 2001, 316). Seen from the distance, the development of the company is directly connected to the development of employees (regardless of their position in the company) and their knowledge. Various authors (e.g. Hsu & Shen, 2005, 355) researched the link between the life cycle of the product, knowledge and development of the company. Knowledge management (KM) is a systematic approach to improving the organization's ability to mobilize knowledge for the purpose of making more precise decisions in the formulation of business strategies (Hsu & Shen, 2005, 354). When the life cycle of the product reduces, the role of KM increases, because faster manufacturing cycle (also investments in company development and increased commercial activities) of the product results in greater competitiveness on the market, forcing the competition to adapt to the new situation or withdraw from the market. Such a continuous process leads to an increasingly competitive environment which offers survival only to those organizations that are able to produce products with value added, based on innovations. Innovations are the result of a creative business environment that is stimulated by the market demand or also crisis (Ovsenik & Ovsenik, 2015, 155). The condition for increasing production is the result of knowledge or knowledge – innovation correlation (Hsu & Shen, 2005, 355). Moreover, generally only the third generation of products following the introduction of KM delivers the benefits of the innovation process, the first and the second generation bring only advantages from synergies and optimization of working processes (Hsu & Shen, 2005, 355). In today's competitive world, the value of organizations is based on the intellectual capital. Therefore, knowledge is power that can bring changes and improvements with which the organizations aim to maintain long-term sustainable growth and development (Akhavan, Hosnavi, & Sanjaghi 2009, 283).

2.2 KM factors

There has been a lot of research done on the subject of knowledge and its relationship to the organizations' performance. We focused on qualitative and quantitative findings of some of the research studies. They offered us tested framework and the scientific matter for the study. Based on qualitative case studies and findings on knowledge management, it has been confirmed that the most important internal KM factors are the organizational infrastructure and employee's motivation (Davenport & Prusak, 1998, 159) or "knowledge management is the management of people and vice versa" (Davenport & Volpi 2001, 218). Similar to Davenport and Prusak, authors Wong and Aspinwall (2005, 74-75) also confirmed the hypothesis that the most important internal KM factors which affect the result of the company (measured in value added per employee) are organizational culture, organizational infrastructure and employee's motivation. Later, a more recent study (*Impact of knowledge management capabilities on knowledge management effectiveness*) confirmed that the organizational infrastructure is a very important internal factor that has a significant impact on improved communication, collaboration and exploitation of knowledge within the organization. All the above mentioned has a positive effect on productivity.

They also found that organizational culture is deeply rooted among the employees in the organization and requires a lot of effort to change. Larger companies are managed centrally, therefore it is easier to change their

organizational culture as in smaller organizations, which, from this perspective, gives them an advantage in the implementation of KM (Bharadwaj, Chauhan, Raman &, 2015, 430). Empirical research by Valmohammadi (2010, 920) showed great deviations from the findings by Davenport, Wong and Aspinwall. They noted that rewarding and motivating employees were insignificant factors in the medium-sized companies. However, other factors, such as limitations in the implementation of KM, education and training of the employees and the relevance of human resources, were identified as very important in achieving the organization's objectives. Valmohammadi (2010) notes that it is important to distinguish between large and small companies while exploring KM. Moreover, the results obtained should be interpreted correctly, for example, the KM factor which is ranked the highest in the survey needs to be addressed prior to the other factors by the managers. The empirical research on a sample of 301 selected respondents in major private and public research centers, (Akhavan, Hosnavi, and Sanjaghi, 2009, 283-285) revealed that the scope of KM consists of three important groups of factors. The first group, human resources management, consists mainly of concepts that are the foundation of the KM system in the organization. These include: organizational culture, collaboration and communication among employees, motivation, teamwork and job security. The second most important group is KM (storage, transmission and renewal of knowledge). The third group of factors involves certain issues which are more general in comparison to the other two groups. These are necessary for the successful establishment of the organization not only of a KM system. These factors are measurement, transparency and support of the company's management (Akhavan, Hosnavi, & Sanjaghi 2009, 283-285).

Many studies, for example, the research by Tasmin, Rusuli, & Hashim (2010, 9-11) in companies dealing with multimedia, revealed that successful knowledge management within the company depends heavily on the behavior of the employees. In cases where all of the employees do not participate in the exchange of knowledge, no matter how good and how strong their information technology, culture or organizational structure is, KM does not reach the targets. Furthermore, the establishment of KM in companies does not guarantee progress, if the implementation and strict adherence to the strategy do not follow the defined KM objectives. A common cause for poor KM results is exactly its incomplete implementation (Brahma & Mishra, 2015). In addition to that, the lack of the management support, poor control over the results, improper planning and misplaced organizational structure also occur as negative factors. These can be understood as "causal" for the poor implementation of KM. However, there are also negative factors that occur as a result of KM, these are the improper planning of resources, shifting responsibility for tasks, loss of knowledge due to retirement and staff turnover as well as incorrect selection technology (Frost, 2014). The authors Luo and Lee (Luo & Lee, 2015, 62-69) propose the inclusion of a special procedure - "failure mode" in the KM strategy with the goal to prevent errors during the implementation of KM strategies.

Immediately, when a deviation is detected, the process of determining causes and the start-up of elimination procedure is initiated. They suggested a list of potentially dangerous deviations from the implementation of KM strategies, which are evaluated with the critical factors, and the procedure to eliminate the deviation (Luo & Lee, 2015, 62-69). Another important aspect of KM is transfering the experience from the elderly to the younger. Recent surveys also show a correlation between KM and the protection of intellectual property. Intellectual property (in terms of patents, stored knowledge in the form of products, etc.) can be understood as a form of KM, therefore, it is necessary to protect it and increase the cumulation of human capital in companies, with a view to identify market opportunities (Manuel, 2016, 62). Table 1 presents a list of the literature on which we built the factors of knowledge. Literature is reproduced according to the article Akhavan, Hosnavi, & Sanjaghi (2009, 276-288). We updated the literature and we also replaced (Table 1, highlighted in bold) those parts which relate to the cultural and organizational differences (original study from a different cultural environment).

3 The research method and hypotheses

The survey questionnaire is reproduced from the research of the author Valmohammadi (2010, 915-924). We looked at the knowledge in organizations from 31 perspectives – hereafter defined as elements of knowledge. For the purposes of analytical data processing, we combined the 31 elements of knowledge into 12 meaningful sets of "knowledge factors" (Table 2). When reducing the elements of knowledge into the knowledge factors, we used the methodology used in the study (Valmohammadi 2010, 915-924). We connected the elements of knowledge with knowledge factors from the questionnaire (the questionnaire states which knowledge elements belong to a certain knowledge factor). For proper connection, we reviewed the literature from Table 1. The hypotheses are based on the 12 knowledge factors resulting from the examined literature (Table 1).

Table 2 shows the link between the elements and factors of knowledge, where a factor of knowledge is defined as a logical unit, consisting of different elements of knowledge. The table shows the elements that we combined into our knowledge factors.

Table 3 shows the structure of the questionnaire, resulting from the links between the elements and the factors.

Respondents were asked to respond to the question

Table 1: Reference literature of factors of knowledge
Source: Adapted from Akhavan, Hosnavi and Sanjaghi (2009, 276-288) and supplemented with recent sources.

Knowledge elements	**Source**
Transparency, trust and organizational culture	· (Akhavan, Jafari, & Fathian, 2006, 97-113) · (Luo & Lee, 2015, 62-75)
Database and technological tools for knowledge searching	· (Davenport E., 2001, 61-75)
Documentation of knowledge	· (Davenport & Volpel, 2001, 212-221)
Measuring performance	· (Moffett & McAdam, 2009, 44-59) · (Bharadwaj, Chauhan, & Raman, 2015, 421-434)
Comparative analysis	· (Moffett & McAdam, 2009, 44-59) · (Frost, 2014)
Structure of knowledge	· (Davenport & Prusak, 1998) · (Bharadwaj, Chauhan, & Raman, 2015, 421-434)
Management of changes	· (Ovsenik & Ambrož, 2006)
Knowledge exchanging	· (Davenport & Volpel, 2001, 212-221) · (Mustafa, Lundmark, & Ramos, 2016, 273-295)
Company's willingness for KM strategy	· (Akhavan, Jafari, & Fathian, 2006, 97-113)
Systematic approach to KM	· (Akhavan, Jafari, & Fathian, 2006, 97-113)
Knowledge and measurement of knowledge	· (Wong & Aspinwall, 2005, 64-82)
Architecture of knowledge	· (Skyrme & Amidon, 1997, 27-37) · (Brahma & Mishra, 2015)
Continuous learning	· (Skyrme & Amidon, 1997, 27-37) · (Luo & Lee, 2015, 62-75)
Creating knowledge	· (Skyrme & Amidon, 1997, 27-37) · (Manuel, 2016)
Administrator of knowledge	· (Moffett & McAdam, 2009, 44-59)
Organizational structure	· **(Ovsenik M., 1999)** · **(Ovsenik & Ambrož, 2010)**
Repositories and transmission of knowledge	· (Davenport E., 2001, 61-75) · (Kim, Mukhopadhyay, & Kraut, 2016, 133-156)
Knowledge management	· (Davenport & Prusak, 1998)
Teamwork	· **(Šumanski, Kolenc, & Markič, 2007, 102-116)** · (Jafari, 2015, 82-93)
Information infrastructure	· (Wong & Aspinwall, 2005, 64-82) · (Kim, Mukhopadhyay, & Kraut, 2016, 133-156)
Cooperation and communication	· (Drucker, 2001) · (Mciver, Lengnick - Hall, Lengnick - Hall, & Ramachandran, 2013)
KM integration with existing systems	· (Moffett & McAdam, 2009, 44-59) · (Kim, Mukhopadhyay, & Kraut, 2016, 133-156)
Knowledge and winning organization	· (Coulson - Thomas, 2007, 108-112)

Table 1: Reference literature of factors of knowledge (continued)

Job security	· (Egbu, 2004, 301-315) · (Frost, 2014)
Climate in the organization	· (Wong & Aspinwall, 2005, 64-82)
Human resources management and motivation	· (Egbu, 2004, 301-315) · (Jafari, 2015, 82-93)
Flexible and dynamic organizational structure	· **(Bukovec, 2009, 4-23)**
Management support and commitment to the goals	· (Davenport & Volpel, 2001, 212-221) · **(Bukovec, 2006)**
Awareness and understanding of employees	· (Garrick, Chan, & Lai, 2004, 329-338)
Training and education of employees	· (Garrick, Chan, & Lai, 2004, 329-338)
Teamwork and problem solving	· (Zarraga-Oberty & De Saa-Perez, 2006, 60-76) · (Jafari, 2015, 82-93)

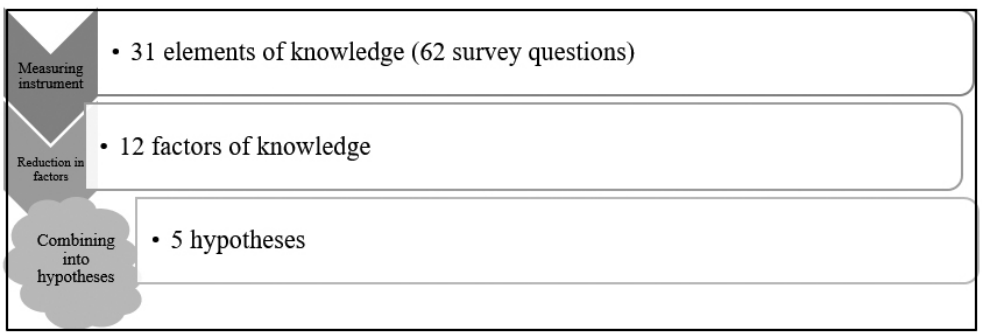

Chart 1: Reduction of knowledge factors into hypotheses

"To what extent do these arguments apply to a company in which you are employed (rating from 1 to 6)?". We chose an even graduated scale because we wanted to avoid arithmetic central responses.

Table 4 is presenting links between the factors of knowledge and the hypotheses.

In formulating the hypotheses, we based on the already conducted research (Akhavan, Hosnavi, & Sanjaghi 2009, 277-283). The hypotheses were partially summarized from the mentioned research, the difference being in the elements of knowledge. With the H1 and H2, we wanted to check whether KM (or what managers believe) is detected as a part of the innovation process and if the KM, according to the employees' opinion, participates in the realization of the company's objectives. The same applies for H3 and H4. We wanted to determine whether KM is recognized as a positive factor that contributes to the company's success. We adjusted the reference literature (Table 1) for designing the elements of knowledge in the fields which deviate from the environment in which we conducted the research. In particular, these areas relate to the cultural aspect, the organizational structure and understanding of work in general. We added hypothesis 5 that was not included in the reference research (Akhavan, Hosnavi, & Sanjaghi 2009, 277-283). Respondents could respond to the listed hypotheses by CONFIRM or REJECT. With the study, we wanted to identify the factors of knowledge that affect the performance of the organization, so it was very important that the respondents identify KM - knowledge as a potential factor impacting the performance of the organization. The last hypothesis allowed us at least a partial view of the sincerity of the answers. If the respondent decided to reject the first four statements and confirmed the fifth, this would mean that we could reasonably suspect the validity of the responses and we eliminated the complete questionnaire. The same applies to the contrary, e.g., if the respondent rejected the last statement and confirmed the other four.

4 Sampling, conducting a survey and analysing

Our target research group were managers, researchers or people who make essential decisions in an organization.

Table 2: Link between factors and elements of knowledge

Knowledge factor	Knowledge elements
Factor 1: Management leadership and support	Teamwork
	Management support and commitment to the goals
	Transparency, trust and organizational culture
Factor 2: Organizational culture	Climate in the organization
	Organizational structure
	Cooperation and communication
	Awareness and understanding of employees
Factor 3: Information technology	Database and technological tools for knowledge searching
	Information infrastructure
Factor 4: KM strategy	Company's openness for implementing KM strategy
	Knowledge management
	Administrator of knowledge
	Knowledge and measurement of knowledge
Factor 5: Performance measuring	Benchmarking
	Teamwork and problem solving (measuring the effectiveness of cooperation on challenges)
Factor 6: Infrastructure of the organization	Documentation of knowledge
	Knowledge exchanging
	Repositories and transmission of knowledge
Factor 7: Processes and activities	Architecture of knowledge
	Systematic approach to KM
	Creating knowledge
Factor 8: Rewarding and motivation	Human resources management and motivation
	Knowledge and winning organizations
Factor 9: Elimination of restrictions	Job security
Factor 10: Training and education	Continuous learning
	Training and education of employees
Factor 11: Human resources management	Flexible and dynamic organizational structure
	Change management
Factor 12: Comparative analysis	KM integration with existing systems
	Measuring performance
	Structure of knowledge

The sample included people who are heads of development departments, managers and experts. In terms of education, respondents were in most cases highly educated (Table 5). We collected the data for our research from a nonrandom sample of companies.

We targeted all the companies that were listed in the article *"300 biggest and best Slovenian companies in 2010"* (Bertoncelj Popit, 2011), which included data about value added per employee. The list of companies included 300 of the biggest companies in Slovenia, excluding the financial sector. All companies gave consent prior to the publication of data in the electronic version of Delo. The list includes most economic activities in which the companies are engaged in general and, from the revenue point of view, present the largest proportion regarding to the total numbers of activities. We carried out a parallel test of the correctness of the data published by the web application Gvin[1]. The review showed that there were no deviations from the published data.

Before carrying out the actual survey, we conducted a pilot study to determine whether the measuring instrument is appropriate. The respondents were selected among the authors' colleagues and acquaintances. All of them met the conditions for the target population in terms of education

1 Web service that allows registered users an insight (in Slovenian registered companies) into business, ownership share, market developments, etc. (Internet source).

Table 3: Factors of knowledge and survey questions
Source: Reproduced from the questionnaire (Valmohammadi, 2010, 915-924).

Factor 1: Management leadership and support
- Managers act as catalysts for KM.
- Managers create the necessary conditions for KM.
- Managers act as an example to show the desired behavior.
- Managers encourage knowledge creation, sharing and use.
- Managers recognize KM as an important factor that contributes to the business success.
- Managers show attachment and support of KM.

Factor 2: Organizational culture
- High organizational culture that values knowledge and problem solving.
- A high degree of trust among employees is important when exchanging knowledge.
- Frank exchange of errors between employees without fear of punishment.
- Collaboration between employees is important.
- Encouraging of teamwork among employees.
- Empowering employees to explore new possibilities.
- Encouraging people to ask questions.
- Accepting the exchange and sharing of knowledge (not accumulation) as organizational strength.

Factor 3: Information technology
- The use of an appropriate system for managing KM.
- Using technological tools (tools for collaboration, knowledge base, search engines, document management systems, intelligent systems, etc.).
- The utilization of intranet or internet.
- Easy use of technology.
- Relevance of KM system according to the user's needs.

Factor 4: KM strategy
- Having clear goals and objectives of a shared vision that employees support.
- It is necessary to develop a KM strategy at any cost.
- Having clear tasks and clearly defined objectives of KM.
- Alignment of KM strategy with business strategy.

Factor 5: Performance measuring
- Measurement of the benefits of KM depending on initiatives stemming from KM.
- Monitoring the progress of the development of the KM.
- Assessing the impact of KM on financial performance.
- Updating of indicators (financial and the organizational climate ones) for measuring KM.
- Measuring the value of intellectual capital.

Factor 6: Infrastructure of the organization
- The company has a knowledge trustee (administrator of knowledge, etc.).
- The company defines the roles and responsibilities for the purpose of carrying out the tasks of KM.
- The company has a clearly defined ownership of the initiatives arising from the KM group.
- The company has a flat organizational structure of the KM working groups.

Factor 7: Processes and activities
- Generating new ideas and knowledge.
- Documenting the key skills and knowledge.
- Effective classification and storage of knowledge.
- Improving procedures for finding the necessary knowledge.
- Sharing knowledge with the use of electronic media or personal contact.
- Communication (formal and informal) among employees.
- Immediate implementation of best quality knowledge in products and services.
- Promotion of continuing education at all levels.
- Providing for the protection of knowledge assets from unauthorized exposure or theft.

Factor 8: Rewarding and motivation
- Guaranteeing the right motivators to encourage the production of new knowledge.
- Motivating employees to use new knowledge.
- Visibly rewarding employees who share their knowledge.
- Rewarding employees for successful teamwork.
- Motivating work performance by means of assessment system.

Factor 9: Elimination of restrictions
- Provision of funds for investment in KM.
- Sufficient funding investment for the construction of KM technological system.
- Ensuring sufficient human resources to create new knowledge.
- Providing employees with time for knowledge management related activities.

Factor 10: Training and education
- Training on the concept of knowledge and KM.
- Training on the use of KM systems and tools.
- Training individuals to assume roles related to KM.
- Training to develop knowledge skills such as creative thinking, problem solving, communication, team building, etc.
- The possibility that employees are involved in both internal and external learning opportunities such as conferences, training seminars, etc.

Factor 11: Human resources management
- Employment of workers in order to fill gaps related to knowledge.
- Employment of workers due to their positive attitude to knowledge.
- Rewarding employees for the purpose of retaining.
- Providing opportunities for career promotion.

Factor 12: Comparative analysis
- Constant care for benchmarking system performance (measuring the usefulness of KM initiatives with regard to financial or non-financial indicators of the company).
- Encouraging employees to compare with other organizations.
- Establishing the internal mechanism with a view to coordinating the company's strategy, budget and human resources management.

Table 4: Link between the hypotheses and the influential factors of knowledge management

Hypotheses	Influential factors of knowledge management
H 1 - Knowledge management creates innovation processes.	Factor 7: Processes and activities
	Factor 8: Rewarding and motivation
H 2 - Knowledge management realizes the company's strategies.	Factor 9: Elimination of KM restrictions
	Factor 4: KM strategy
	Factor 5: Performance measuring
H 3 - Knowledge management creates conditions for the competitiveness of the organization.	Factor 2: Culture of the organization
	Factor 6: Infrastructure of the organization
H 4 - Knowledge management provides the foundations to new knowledge.	Factor 3: Information technology
	Factor 10: Training and education
	Factor 11: Human resources management
H 5 - Knowledge management helps to the success of the organization.	Factor 1: Leadership management and support
	Factor 12: Comparative analysis

and the workplace. We conducted a survey among 21 people by interviewing them personally, using the questionnaire in printed form. The collected data was processed using the SPSS programme. We focused on data reliability analysis calculating Cronbach's coefficient α (alpha). The selected respondents filled the questionnaire twice, because the first time we did not reach the minimum value of Cronbach's coefficient α of 0.7; the average of all factors was 0.54. Therefore, the questionnaire was corrected, especially in terms of further clarifying the survey questions. Some questions were reshaped and some of them excluded, because we realized that they did not contribute to the further clarification but in certain aspects even gave rise to doubts into questions that had already been answered. The revised questionnaire was tested again in the circle of colleagues and acquaintances but this time among different people. The second pilot study included 19 people. In this case, the critical value for Cronbach coefficient α (alpha) was reached (0.76).

As a tool for collecting survey responses on-line, we used Google documents - Forms (Do more in cooperation with other office applications with Google Drive, 2013). Only the selected companies could access the questionnaire. The invitations for filling out the questionnaire were distributed by e-mail. They listed all the relevant information about the study, the recipient of the invitation (it was intended for managers, researchers or people in organization who make crucial management decisions) and the electronic link to the online form. We deliberately avoided the e-mail addresses that included personal names, so that the respondents would not regard (perceive) them as spam and delete them. Therefore, we prefered using e-mail addresses such as info@company.si.

5 Results

When gathering the companies, we realized that 14 (4.7%) of the companies from our range had ceased their activities for various reasons, therefore 286 or 95.3% of the initially planned electronic invitations were sent. In 97 cases (33.9% of all outgoing emails), we received notice that the e-mail address does not exist anymore. We concluded that these were mainly companies, which ceased to exist since the list had been published. A total of 71 completed questionnaires (24.8%) were returned. We excluded four responses from the analysis because they were incomplete. Responses came from 28 men and 34 women, five respondents did not indicate their gender. The average age of the participants was 43.2 years.

5.1 Testing hypotheses

To analyze the reliability of the questionnaire, we used the Cronbach's coefficient α (alpha). We checked whether the responses vary because of different opinions of the respondents, and not because the survey was unclear or because multiple-choice questions could have several explanations (Cronbach, 1951, 297-334). We confirmed or rejected the hypotheses in the following successive steps:

1. We reviewed the responses according to each hypothesis. The respondents evaluated each hypothesis by Confirm of Reject. The first four hypotheses represented the arguments that we wanted to test. The fifth and final hypothesis was a test and a partial indicator of the sincerity of the answers. In two cases the respondents confirmed the first four hypotheses, but not the last one. This clearly indicates that we may reasonably doubt in the accuracy of the results, so we eliminated the two questionnaires. None of the

Table 5: Position in the company and the educational level of respondents
** The person who carries out the tasks but has the possibility of influencing on the decisions regarding the tasks.*

Job position/ education	PhD	Master's degree	Specialization	High school	Higher education	College	No response	Total
Manager*	2	3	2	5	8	6	2	28
Expert		2	1	2	5	3	2	15
Head of department	3	3	2	1	5	6	1	21
(no response)					1		2	3
Total of	**5**	**8**	**5**	**8**	**19**	**15**	**7**	**67**

Table 6: Industry branch in which the company operates

Activity of the company	Other	Finance	Informatics	Human Resources Department	Management	Manufacturig	Marketing	No response	Total
Count	7	10	6	10	8	10	10	6	67

Table 7: Workplace of the respondens

Industry branch of the company	Count
Commerce	13
Other service companies	10
Other industries	7
Food industry	9
Energetics	6
Telecommunications and media	5
Metal industry	5
Automotive industry	3
Tourism	2
Construction	2
Transporting people and goods	2
Pharmaceutical industry	1
Insurance	1
Chemical industry	1
Total	**67**

respondents confirmed the final hypothesis, but not the first four.

2. Each of the hypotheses, as we have already explained, is based on the influential factors (Table 4). To confirm the hypotheses, we determined the following rule: The arithmetic mean of all the sub-questions (on a scale from 1 to 6) must be at least 3.5 ($x \geq 3.5$) with the distribution within + - 1.3 of the standard deviation. We assumed that the Likert scale has the same spacing between the ordinal classes (e.g. responses 1 and 2 have the same interval distance).
3. For each hypothesis, we have tried to establish (by means of the factor analysis - PCA method) the existence of latent (hidden) variables, which could explain the greater part of the variability of the hypotheses, and whether the observed latent variables (factors) can be usefully applied to the hypotheses.

We calculated the descriptive statistics indicators, such as arithmetic mean, standard deviation, asymmetry and kur-

tosis. The calculation was based on the results of descriptive statistics directly from the questionnaire responses, using values of the Likert scale (1 to 6).

The last, fifth hypothesis deviates due to an increased standard deviation. In this stage of the analysis, we rejected hypothesis 5. All responses are within one standard deviation. Also, the values of the standard error for all hypotheses were quite the same, confirming the homogenity of the average of the responses per the hypothesis. The hypotheses were tested according to the assumed normal distribution of average responses obtained. We used the non-parametric Shapiro-Wilk test. We found out that in most calculated averages of responses for each hypothesis, a normal distribution can be assumed (statistical significance < 0.05).

5.2 Factor analysis

We used the factor analysis to determine whether there are hidden components that can explain the greater part of the hypotheses' variability. We used the method of Principal Component Analysis (PCA). Before performing PCA analysis, we further tested the answers of the respondents with D`Agostino test. This test was chosen because of the structure of the responses: namely, the answers were given in a Likert scale of 1 to 6. The test is particularly suitable for determining the normality of the distribution of variables which contain multiple identical responses, in our case from 1 to 6. The test was checking whether the answers received are distributed normally. The objective of the PCA analysis was to identify whether there are other - hidden factors of knowledge which had not been detected in the literature studies and research. The results of our analysis (Table 10) were similar to the studied literature and research by Valmohammadi (2010, 919).

Table 10 shows the synthesis of the main findings of the PCA analysis. According to the test results, it can be concluded that the respondents are aware of knowledge accumulated in the company and they agree with the the statements that KM provides not only progress but also the basic existence of the company. One of the objectives of the study was to identify knowledge factors. The factor analysis confirmed that the established new factors, e.g.

Table 8: Descriptive statistics of the hypotheses
** The arithmetic mean of all responses in relation to the hypothesis.*

Hypotheses	Test value arith. mean* = 3.5				
	t	Sig. (2 - tail)	Diff. arith. Mean	95% Interval	
				Lower	Upper
H 1 - Knowledge management creates innovation processes.	5,237	,000	,44577	,2759	,6156
H 2 - Knowledge management realizes the company's strategies.	6,918	,000	,48839	,3475	,6293
H 3 - Knowledge management creates conditions for the competitiveness of the organization.	5,262	,000	,46915	,2912	,6471
H 4 - Knowledge management provides the foundations to new knowledge.	5,992	,000	,50940	,3398	,6790
H 5 - Knowledge management helps to the success of the organization.	5,806	,000	,47484	,3116	,6380

Table 9: Shapiro-Wilk normality test

	Shapiro-Wilk normality test	
	Statistic	Sig.
H 1 - Knowledge management creates innovation processes.	,317	,000
H 2 - Knowledge management realizes the company's strategies.	,559	,000
H 3 - Knowledge management creates conditions for the competitiveness of the organization.	,508	,000
H 4 - Knowledge management provides the foundations to new knowledge.	,397	,000
H 5 - Knowledge management helps to the success of the organization.	,346	,000

Table 10: Summary of PCA analysis - Hypotheses 1 to 5

Hypotheses	KMO test	Bartlett's test	Identified latent components		Rotat.	% rot. comp.	Cum. %
H 1 - Knowledge management creates innovation processes.	0,752	0,001	1.	Technical approach to knowledge in the company (storage, editing, sorting)	Direct Oblimin	30,60%	
			2.	The protection and transmission of accumulated knowledge (protection, intervention, learning, motivation in the application of new knowledge)		11,15%	41,75%
H 2 - Knowledge management realizes the the company's strategies.	0,643	0,009	1.	The economic aspect of knowledge management (KM investment assets, measurement of KM yield, KM consistency with company's strategy)	Varimax	17,67%	
			2.	Strength of intellectual capital (KM development, updating of indicators measuring KM and measuring the value of intellectual capital)		16,71%	34,38%
			3.	Financial effects of KM per unit of time (the time to perform the KM tasks and effects on financial performance)		13,15%	47,53%
H 3 - Knowledge management creates conditions for the competitiveness of the organization.	0,729		1.	Motivation and teamwork (providing resources for research, knowledge administrators, promoting teamwork, confidence in the exchange of knowledge)	Varimax	23,59%	
		0,001	2.	Constructive approach in resolving errors (frank exchange of errors without fear of punishment, promoting questions, clearly defined responsibilities)		23,32%	46,91%
H 4 - Knowledge management provides the foundations to new knowledge.	0,747	0,007	1.	Use of information technology (provision of simplification and clarity of systems, use of technology systems)	Varimax	21,98%	
			2.	Employment due to skills needs (priority in employment of those who accept and pass on knowledge, new employments to fill the gaps of knowledge)		15,64%	37,62%
			3.	The adequacy of the current KM system (training of individuals to assume the roles associated with KM, training for skills development)		13,80%	51,42%
H 5 - Knowledge management helps to the success of the organization.	0,738	0,002	1.	Management support of KM (managers are acting as an example, as catalysts for KM, they recognize KM as an important factor)	Direct Oblimin	31,90%	
			2.	Comparative analysis (measurement of the usefulness of KM initiatives in relation to the financial or non-financial indicators of the company)		14,07%	45,97%

the area of human resources management, the importance of warehousing and distribution of knowledge and organizational culture largely coincide with the reference survey (Valmohammadi 2010, 915-924). In their study, authors Wong and Aspinwall (Wong & Aspinwall, 2005, 74-75) confirmed the importance of positive motivation of employees in the company. Our research confirmed this finding. We have learned that the motivation by superiors is a very important factor. We concluded that we can in average explain 46.7% of the variabilities of all five hypotheses with identified new latent components - factors.

6 Developing a model of knowledge management factors

The studied literature showed that there are several methods of measuring human capital, but, as we noted, there are many similarities between them. We searched for the theoretical foundations on which index to use for measuring knowledge as a predictor - predictive variable of value added per employee. Considering the required amount of data collection, the most understandable and therefore most affordable method of measuring intellectual capital is the calculation based on the formula published by Pulić (2004, 64), using the index VAIC. This method is based on the difference between the market value and the bookkeeping[2] value of the company. The difference between both categories is human capital. Intellectual capital or intellectual property of the organization (patents, stored knowledge in the form of products, etc.) is understood as a form of KM, therefore, it is necessary to increase the cumulation of human capital in companies with the purpose of identifying market opportunities (Manuel, 2016, 62). The index VAIC (Value Added Intellectual Coefficient) can be used for comparison among companies. The main idea of VAIC coefficient is a measure of productivity "knowledge" and not intellectual capital. The calculation is based on the coefficient proposed by the author Pulić (2004, 64). To understand the importance of intellectual capital, it is necessary to measure and compare it with other organizations. The coefficient is composed of the following sum: VAIC = (Value added) / (Human capital) + (Value added) / (Financial capital) + (Value added) / (Structural capital). Value added can be calculated by means of subtracting the cost of materials and services from all of the company's income (Pulić 2004, 65). Value added is, according to Pulić, the real indicator, because it shows that organizations create value and not the products. In this case, the value added replaces the financial indicators such as ROI and ROE. Value added can be a "measure" of company's intellectual capital.

When compared with the index ROA (which is an indicator for assets), value added can indicate quite the opposite; the same also applies to the index ROI (profitability of investments). The value added is not correlated with financial indicators and, as such, may well represent the "value" of human capital in the company (Iazzolino & Lais, 2013, 561). Therefore, we chose the value added per employee as a variable, because it is based on the knowledge of the employees.

6.1 The link between the company and the respondent

For the construction of the statistical model of the factors of knowledge, it was necessary to link the company and the responses to our survey. We used the data collected via questionnaires to identify the company to which a respondent was affiliated.

6.2 Designing the statistical model of knowledge factors

First, we identified three relatively homogeneous groups (Table 11) based on published data (data was checked with a web application Gvin) on value added per employee. We used the method of two-step cluster analysis. For the differentiation between the three newly formed groups, we used a categorical variable: »Which industry (economic branch) the company deals with« and the continuous variable: »Value added per employee«.

The model of knowledge factors in connection to the value added is built out of two independent sections (explained in the next chapter). Figure 1 shows the design of the statistical model of knowledge factors.

6.3 Multiple discriminant analysis

In the first section of the model, we analyzed where, on the basis of questions presented in Table 11, the respondent – company belongs. This method, based on linear discrimination functions, is placing the respondent's company in one of the three groups (Table 11), according to the value added per employee. For discrimination, we used those variables that largely contributed to clarify the variance between the groups (Table 12).

From the findings, we concluded that if the answers to those questions explain the largest proportion of the variance of the latent components, then the listed variable can discriminate between groups of companies in terms of value added per employee. In discriminant analysis, we considered the fact that there is no multicolinearity be-

2 Under the term bookkeeping value we understand the sum of company's funds and physical capital (buildings, land, etc.), whereas the market value represents the product of the number and value of shares

Table 11: Descriptive statistics of value added per employee formed in three groups

Group	N	Arith. mean in EUR	Std. deviation	Std. error	95% Confidence interval of arith. mean change	
					Lower	Upper
1	17	41.876,5	22.985,5	5.574,8	30.058,5	53.694,6
2	26	53.334,8	39.228,2	7.693,3	37.490,2	69.179,5
3	25	62.200,5	45.144,7	9.028,9	43.565,7	80.835,3
Total	68	53.729,7	38.638,0	4.685,5	44.377,3	63.082,1

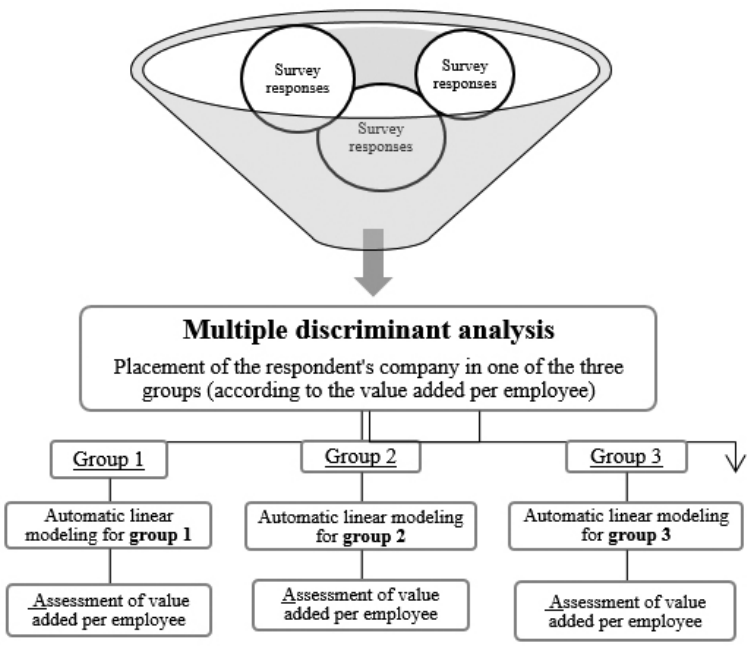

Figure 1: The model of knowledge factors - three independent sections

tween the independent variables, the variances are homogeneous within the independent variables and that they are distributing "normally". Using the classification function coeficients presented below (and in Table 11), we calculated which group (from 1 to 3) the respondent (company) belongs to:

1. Classification linear function for group 1 = Q35 * 4,193 + Q41 * 2,417 + Q42 * 1,719 + Q25 * 2,611 + Q48 * 1,011 + Q50 * 0,331 + Q9: * 1,425 + Q12 * 2,586 + Q13 * 2,696 + Q15 * 3,932 + Q18 * 6,192 + Q53 * 5,119 + Q62 * 2,42 + Q3 * -0,221 -56,938

2. Classification linear function for group 2 = Q35 * 5,409 + Q41 * 3,743 + Q42 * 2,514 + Q25 * 3,321 + Q48 * 1,669 + Q50 * 0,356 + Q9: * 2,135 + Q12 * 2,757 + Q13 * 3,301 + Q15 * 5,543 + Q18 * 8,521 + Q53 * 4,998 + Q62 * 4,685 + Q3 * -0,019 -98,984

3. Classification linear function for group 3 = Q35 * 6,966 + Q41 * 5,051 + Q42 * 2,943 + Q25 * 3,364 + Q48 * 1,736 + Q50 * 0,09 + Q9: * 2,814 + Q12 * 2,851 + Q13 * 2,957 + Q15 * 5,551 + Q18 * 10,584 + Q53 * 6,841 + Q62 * 6,15 + Q3 * -0,918 -134,662

We substantiated the regularity of the new results with a table of cross-verifiability of classification into groups (Table 3). All replies received were re-tested with discriminant analysis. A total of 95.2% of cases were successfully classified according to the actual - a priori and planned clasification. Cross-checking of classification cathegory also showed a high percentage of 85.7%. With linear classification functions (discriminant analysis), we correctly predicted 95.2% of the existing cases according to their a priori values.

Table 12: Discriminant analysis - the classification function coefficients; questions were rated on a scale from 1 to 6.

	Groups		
	1	2	3
Q. 35: To what extent is efficient sorting and storing of knowledge important?	4,193	5,409	6,966
Q. 41: To what extent do you agree with the statement that it is important to protect knowledge assets against unauthorized exposure or theft?	2,417	3,743	5,051
Q. 42: To what extent do you agree with the statement that your company has enough proper motivators to encourage the production of new knowledge?	1,719	2,514	2,943
Q. 25: How often do you carry out the monitoring of the progress of KM development?	2,611	3,321	3,364
Q. 48: To what extent do you agree with the statement that your company has adequate financial investment in the construction of the KM technological system?	1,011	1,669	1,736
Q. 50: To what extent do you agree with the statement that enough time to perform knowledge-related activities is provided for the employees?	,331	,356	,090
Q. 9: To what extent does the following statement apply: *There is a frank recognition of mistakes without fear of punishment*?	1,425	2,135	2,814
Q. 12: To what extent does the following statement apply: *There is enough stimulation and resources for the employees to explore new possibilities*?	2,586	2,757	2,851
Q. 13: To what extent does he following statement apply*: Inividuals are encouraged to ask questions*?	2,696	3,301	2,957
Q. 15: To what extent does the following statement apply: *We use an appropriate KM system*?	3,932	5,543	5,551
Q. 18: To what extent does the following statement apply: *Our company provides a simple use of information technology*?	6,192	8,521	10,584
Q. 53: To what extent do you agree with the statement that company provides adequate training for taking the KM related roles?	5,119	4,998	6,841
Q. 62: To what extent does the following statement apply: *The company has an established system of internal mechanism with a view to coordination strategy, budget and managing the human resources of the company*?	2,420	4,685	6,150
Q. 3: To what extent does the following statement apply: *The managers act as an example to show the desired behavior*?	-,221	-,019	-,918
Constant	-56,938	-98,98	-134,66

Table 13: Discriminant analysis - Classification table groups and value added per employee

		Groups	**Estimated classification into groups**			**Total**
			1	2	3	
Actual classification into groups	**N**	1	17	0	0	17
		2	0	22	2	24
		3	0	1	21	22
	%	1	100,0	,0	,0	100,0
		2	,0	91,7	8,3	100,0
		3	,0	4,5	95,5	100,0
Cross-check of classifying groups	**N**	1	14	3	0	17
		2	0	22	2	24
		3	0	4	18	22
	%	1	82,4	17,6	,0	100,0
		2	,0	91,7	8,3	100,0
		3	,0	18,2	81,8	100,0

Automatic linear modeling

The second section includes the calculation of the estimated value added per employee by using the linear regression coefficients. We used an automatic linear modeling method (Yang, 2013). Typically, the variables with the ordinal measurement scale are unsuitable for linear regression function, so we used a special method of linear modelling, namely the automatic linear modeling (part of the SPSS statistical program package). For the dependent variable, we chose value added per employee, the independent variables depend on the cathegory determined by multiple discriminant function. For each group of values added per employee, we set variables which contribute the most to clarification and regression of value added per employee, by means of automatic linear modeling. Independent variables data is drawn only from the corresponding group, this means that if the discriminant analysis selects Group 1, the regression coefficients are calculated only from independent variables (described below) which belong to Group 1. Below, we present a linear model for each group according to value added per employee.

Group 1 with regards to the value added

In the case of the linear regression model of Group 1, five independent variables, which are presented in Table 14, were selected. The selected variables for the linear regression model of Group 1 are: **(Table 14)**.

The table of regression coefficients of Group 1 explicitly and clearly shows the relative magnitude and direction of the coefficients. It was possible to answer each independent variable (survey question) only with the predetermined values, e.g. *To what extent (1 to 4) do you agree with the statement that the work performance is motivated by a grading system?* - the possible answers are 1, 2, 3 and 4. According to the reply of the respondent, the regression coefficient which is set for a specific response is used for the calculation value.

Group 2 with regards to the value added

In the case of the linear regression model of Group 2, six independent variables, which are presented in Table 15, were selected. Below are the selected variables with the corresponding coefficients: **(Table 15)**

We eliminated two answers from the analysis, because they were perceived as surplus values, which could distort the model. Further, we added a diagram and tables of coefficients. Additional explanations and descriptions of the results are not given because of a similar interpretation as in the previous section, with the difference of changed calculated values of coefficients.

Group 3 with regards to the value added

In the case of the linear regression model of Group 3, six independent variables, which are presented in Table 16, were selected: **(Table 16)**

To use the model for assessment of the value added per employee, we need new answers (e.g. from a person who is a manager or deals with knowledge related tasks in the company). For the classification into one of the three groups, the respondent must first answer the questions presented in Table 12. Then, for the prediction of value added per employee (it applies to the respondent's company), we place the new questions depending on the before ranked group (e.g. if the company is classified in Group 1, then we place questions from Table 14). With automatic modeling, we calculate the new "possible answers", namely 1 to 4 or 1 to 5. Previously, it was possible to submit the answers

Table 14: The table of regression coefficients of Group 1

Selected variables for linear regression - Group 1	Possible answers	Regression coefficients
Q. 46: The work performance is motivated by a system of evaluation (1 to 4).	1	2.738,11
	2	57.173,90
	3,4	0
Q. 49: The company sufficiently provides resources to create new knowledge (1 to 5).	2,3,5	-7084,648
	1,4	0
Q. 51: The company provides sufficient education for KM (1 to 5).	2	23844,307
	1,3,4,5	0
Q. 58: We are rewarding for the purpose of retaining employees (1 to 4).	1,3	-12468,932
	2,4	0
Q. 7: There is a high organizational culture that values knowledge (1 to 4).	2,3	10823,943
	1,4	0
Intercept		40322,159

from 1 to 6 (multiply each answer with the corresponding regression coefficients and then sum it all together).

7 Discussion and conclusion

It is important for the company's management to know, primarily, which of the knowledge factors mostly affect other factors within the organization, and, secondary, how much they contribute to the overall result of the company. Knowledge can also be expressed in other ways, not only as a "know-how" notion, but collective forms of knowledge, such as organizational culture and climate in the organization, can also be perceived. The empirical analysis was made to determine in what way the respondents understand the stated hypotheses. We tested the hypotheses

Table 15: The table of regression coefficients of Group 2

Selected variables for linear regression	Possible answers	Regression coefficients
Q. 10: It is considered that the cooperation between employees is important (1 to 3).	1	-21616,482
	2,3	0
Q. 25: We are regularly monitoring the progress of KM development (1 to 3).	3	-23677,136
	1,2	0
Q. 31: The company has a clearly defined ownership of the initiatives arising from the KM group (1 to 3).	1	21259,937
	2,3	0
Q. 36: It is important to improve procedures for finding the necessary knowledge (1 to 4).	3,4	-24194,388
	1,2	0
Q. 53: The company provides adequate training for taking the KM related roles (1 to 4).	4	34867,215
	1,2,3	0
Q. 66: What is the industry (economic branch) of your company?	10	33965,614
	1,2,3,7	0
Intercept		51994,262

Table 16: The table of regression coefficients of Group 3

Selected variables for linear regression	Possible answers	Regression coefficients
Q. 14: The knowledge is accepted and shared among employees (1 to 4).	3	-16391,569
	1,2,4	0
Q. 16: We use technological tools (tools for collaboration, knowledge base, search engines, document management systems, intelligent systems, etc.) in the company (1 to 4).	2	-33275,606
	1,3,4	0
Q. 21: It is necessary to develop a KM strategy at any cost (1 to 4).	4	29738,143
	1,2,3	0
Q. 37: Knowledge exchange through usage of electronic media or personal contact is important (1 to 4).	2	26742,352
	1,3,4	0
Q. 52: Company provides sufficient education for the use of KM systems and tools (1 to 4).	2,4	26414,401
	1,3	0
Q. 66: What is the industry (economic branch) of your company?	10	51293,661
	1,2,3,7	23347,973
	6,8,9,11,12,14	0
Intercept		33716,551

and successfully verified four out of five. The last, fifth, rejected hypothesis – *'Knowledge management helps to the success of the organization'* did not meet the requirements for approval with the calculated criteria. This was due mainly to dispersed answers and the fact that standard deviation was unexpectedly large. Knowledge management can positively contribute to the success of the organization, if well managed. Respondents were selected from different sized companies and from different industry branches, so large deviations in answers are not surprising.

Compared to the previous research by other authors (Akhavan, Hosnavi, & Sanjaghi, 2009), (Valmohammadi, 2010), (Davenport & Prusak, 1998), (Brahma & Mishra, 2015) and (Bharadwaj, Chauhan, & Raman, 2015), our findings are in certain parts confirming and in others deviating. Deviations were detected in the area of motivation. As a restriction of the research, we especially considered the definition of knowledge as a research matter. Knowledge can also be expressed in other ways, e.g. in a collective form, such as organizational culture and climate in the organization. Although knowledge contributes an important part in realizing the company's performance, there are also other elements, which we did not cover in this research, and also have a strong impact on the company result, e.g. economic development of the area in which the company operates, the role of government, market discipline, etc.

As a guideline for future research, we suggest periodic repetitions of the research and inclusion of coefficients that reflect the economic and market situation in the observation period (e.g. economic growth, employment rate, interest rates - the price of money, etc.). By comparing the results of the periodic analysis, we can measure the deviations of value-added companies in conjunction with the factors of knowledge, as well as the impact of the economic situation on the generation of new knowledge, etc.

8 The practical value of the study

We see the applicable value of the study in the identification of the most important factors of knowledge with the connection to the company's success measured in euros per employee. Primarily, we found out that industry branch in which the company operates strongly impacts the value added per employee. In addition, we confirmed that the motivation by assessing work performance is in a strong positive correlation with the value added per employee. This means that a fair assessment (evaluation only, with no money reward, etc.) of the employee by the employer has a major impact on the value added. Besides the industry branch in which the company is engaged, it turned out that commendation for a job well done in the long-term affects the company's success. What follows is a factor that is positively associated with value added, namely the ongoing monitoring and evaluation of the company's progress. On the other hand, training for performing tasks related to knowledge management and the use of technological tools (knowledge base, search engines, document management systems, intelligent systems, etc.) also have a positive impact on the value added. The survey also showed that employees appreciate the positive organizational culture; it was recognized as a factor of knowledge that positively affects the value added, but to a lesser extent. The same applies to a clearly designed business strategy, cooperation between employees as well as the access and sharing of knowledge within the company. Other factors of knowledge identified in the literature were also recognized as influential in regard to the value added per employee. Among the activities in which the company operates are large differences in the average value added per employee.

The highest value added was observed in companies engaged in the telecommunications and media sector, pharmaceutical companies and the energy sector. We also found that there is a positive correlation between the amount of value added and the answers that are associated with motivation and rewarding of the employees. Rewarding and employee's motivation are reflected in increased value added. Positive correlation was also found between value added per employee and the opinion that it is necessary to develop strategies related to KM. The factor that defines the coordination of human resources was also placed high on the scale of importance. On the other hand, we discovered that inciting for comparing with other similar organizations has a negative impact on the value added. The common characteristic of companies with high value added per employee is shown in the fact that the majority of all the received replies concerning motivation, rewarding, training and education of employees were rated as very important.

We have detected the lowest value added per employee in companies engaged in the construction, chemical and tourism sector. For these companies, the opposite applies as for companies with high value added. The biggest disadvantage which we detected in these companies is weak organizational culture, insufficient investment in education of the employees and inadequate update of the IT infrastructure. What is more, the statement »*Leaders do not give proper respect to employees*« was described as "agree". We concluded that this is the result of the poor management of the companies and not of the employees' work.

The applicability of the study can also be seen in the construction of a statistical model, with which the value added can be "assessed". We built a model of the factors of knowledge which allows us to estimate the value added per employee. The assessment of value added is based on business results from 2010 and therefore has no real predictive power, so if we form the model today, the result – estimation of value added per employee would not be entirely the same. To start up the model, we need to as-

semble new answers to the questions (among others, there would also be issues which are not directly linked to the knowledge as such, e.g. the year the company was founded in, the ownership structure, whether the company is in bankruptcy or expects bankruptcy, etc.) from the person who is the administrator of knowledge or is well familiar with the internal structure and operation of the company. In chapter 6, titled *Developing a model of knowledge factors*, we have described the process in detail. Based on the responses received, we would place the company into one of the three groups by calculating the coefficients of multiple discriminants analysis. Additional questions tailored to each company's group would follow, depending on the group to which the company is placed. This time, using the coefficients of the linear model, we would "predict" the expected value added per employee. The most important practical value of this model is seen in the fact that managers can identify to which knowledge factors should they give priority to, and consequently, provide additional training, or improve communication between employees as well as renovate information technology. This would enable managers to enhance better performance of the company, with the right approach and minimal inputs.

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Model dejavnikov managementa znanja in njihov vpliv na uspešnost organizacije

Namen: Namen raziskave je identifikacija dejavnikov znanja, ki pomembno vplivajo na rezultat merjen v dodani vrednosti na zaposlenega. Dolgoročni obstoj podjetja, profitabilnost, itd. temelji na konkurenčnosti produktov ali storitve organizacije. Transformacija »surovih materialov« v konkurenčne produkte je mogoča samo z znanjem zaposlenih. Zato je pomembno, da identificiramo dejavnike znanja, ki imajo pozitivni vpliv na uspešnost organizacije.
Metoda: Proučili smo relevantno literaturo s področja upravljanja z znanjem. Na podlagi tega smo povzeli dejavnike znanja. Izvedli smo anketo med 69 največjimi slovenskimi gospodarskimi družbami (javni in bančni sektor sta bila izključena). Na podlagi raziskave smo razvili model dejavnikov znanja v povezavi z dodano vrednostjo na zaposlenega.
Rezultati: Raziskava je pokazala, da je motivacija z ocenjevanjem delovne uspešnosti zaposlenih izmed proučevanih dejavnikov v največji pozitivni korelaciji z dodano vrednostjo na zaposlenega v podjetju. Tudi usposabljanje za opravljanje, uporaba tehnoloških orodij in organizacijska klima pomembno doprinesejo k dodani vrednosti na zaposlenega. Najbolj pomemben razlikovalni dejavnik podjetij glede na dodano vrednost na zaposlenega je dejavnost s katero se podjetje ukvarja, naslednja po pomembnosti sta kako enostavna je uporaba informacijskih orodij ter kakšen zgled med zaposlenimi imajo vodje oziroma nadrejeni.
Zaključek: Model dejavnikov znanja pomaga identficirati tiste dejavnike znanja katerim bi morali posvetiti dodatno pozornost z namenom povečanja dodane vrednosti na zaposlenega. Model upošteva tudi dejavnost s katero se podjetje ukvarja.

Ključne besede: *Upravljanje z znanjem; dejavniki znanja; človeški kapital*

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Perceived Gender Equality in Managerial Positions in Organizations

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Background and Purpose: This research aims to achieve two main objectives: to investigate differences between male and female managers regarding the perceived gender equality in organizations and to analyze the gender differences in relationships among the perceived gender equality, the perceived satisfaction with employment position and career, the perceived satisfaction with work, and the perceived work-family conflict.
Design/Methodology/Approach: The sample of research includes 82 managers in Slovenian organizations. In first stage, we analyzed with t-test differences between male and female regarding perceived gender equality in decision-making positions. In the next step we developed the conceptual models and used structural equational modeling (SEM), and analyzed differences between constructs in two conceptual models.
Results: The research results show that female managers perceive gender equality in organizations in general to be significantly lower than males; furthermore, perceived gender equality is positively related to the perceived satisfaction with employment position and career as well as to the perceived satisfaction with work, but both relationships are significantly stronger for female managers. On the other hand female managers seems to cope more efficiently with the perceived work-family conflict since it has significantly different impact on female managers' perceived satisfaction with work, as compared to the male managers.
Conclusion: To achieve more gender equality within organizations and a reduction of the gender gap, the legislative initiatives cannot be successful without appropriate corporate strategy sets, which presents the framework for doing business and determines the internal working culture. The findings offer several policy, as well as business practice-oriented implications.

Keywords: *gender balance; decision-making position; employment satisfaction; work satisfaction*

1 Introduction

Gender equality in all areas of life and work is a fundamental right, a common value of the European Union (EU), and a necessary condition for the achievement of the EU objectives in terms of economic growth, employment, and social cohesion—the main targets of the *Europe 2020 Strategy* (European Commission 2010b). It has been the focus of EU since the *Treaty on European Union in 1957* (Consolidated version of the Treaty on EU 2012). Yet despite all efforts, research results in EU countries show that women are still disadvantaged in the labor market, where segregation and inequalities persist in working conditions (Franc et al. 2010). The EU and its member states have responded with policies (the adoption of national laws based on the Community acquis) to reduce the imbalances in gender equality and reconcile the professional, private, and family lives of women and men. In addition, European social partners actively promote gender equality at the workplace through various programs and projects, tackling gender inequality at the workplace in different fields (Austrian Institute for SME Research 2010).

The European Commission's (2014a) *Report on equality between women and men 2014* outlines the progress achieved in the six priority areas (i.e., equal economic independence for women and men; equal pay for work of equal value; equality in decision-making; dignity, integrity, and the end of gender-based violence; promotion of gender equality beyond the EU; and horizontal issues like gender roles, including the role of men, legislation, and governance tools) of the *Women's Charter* (European Commission 2010a) and the commission's *Strategy for equality*

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between women and men 2010-15 (European Commission 2011c). Gender gaps in employment and decision-making (the focal point of the present research) have narrowed in recent years, but women in EU-28, for example, still account for less than a quarter of company board members, despite representing almost half of the employed workforce (46%). Furthermore, the extent of gender equality varies substantially across member states and has not reached everyone (European Commission 2014a). In the Slovenian labor market (the case country of the present research), the general participation rate of women (63%) is still lower than the general participation rate of men (71.2%) (European Commission 2014a). Slovenian students' educational choices show an overrepresentation of women in traditionally female fields (e.g., education) and an overrepresentation of men in traditionally male fields (e.g., engineering). Statistical data for the EU member states (European Commission 2015) show that women are underrepresented in decision-making positions, particularly in politics and business. However, the situation differs substantially among EU countries. In Slovenia, an important shift has occurred within the last few years regarding women's representation in decision-making positions. Namely, the share of women on boards (20%) is equal to the EU-28 average (20%), whereas the share of women in national government stands at 38%, which is far above the EU-28 average (28%) (European Commission 2014a). The unadjusted gender pay gap in 2013, presenting the difference between average gross hourly earnings of male and female paid employees, expressed as a percentage of the former, is in Slovenia well below the EU-28 average. In Slovenia, women earned 3.2% less than men in 2013 (EU-28: 16.4%) (Eurostat 2015). Across member states, the gender pay gap varied by 26.7 percentage points. As expected, economic sectors with even negative gender gaps were male-dominated sectors in 2013.

Deficient work–life balance policies hamper women's employment and therefore the potential for economic growth (European Commission 2014a), while on the other hand previous research has suggested the strong positive relationship between the gender equality (measured by the Gender Equality Index) and the gross domestic income across EU member states (EIGE 2013). Duflo (2012) argued that a bi-directional relationship exists between economic development and gender equality, stating that in one direction development alone can play a major role in driving down inequality between men and women whereas, in the other direction, continuing discrimination against women can hinder development.

Gender balance and equality can have an important effect on national economies at the macro and micro level, but previous research results have led to vague conclusions (Seguino 2008; European Commission 2011a) for several reasons. On the other hand, the empirical research into several different aspects by which gender equality may affect work performance is still scarce, particularly regarding the perceived gender equality in decision-making positions within organizations. Thus, the focus of the present research is to analyze different aspects of gender equality in decision-making positions within organizations in Slovenia. The two main objectives of this research are (i) to investigate differences between male and female managers regarding the perceived gender equality in organizations and (ii) to analyze the differences in relationships among perceived gender equality, perceived satisfaction with employment position and career, perceived satisfaction with work, and perceived work-family conflicts between male and female managers.

2 Theoretical background and hypothesis development

2.1 Perceived gender equality between male and female managers

With female labor-force participation on the rise and more women gaining access to top management positions, an important question is how these changes affect the workplace environment and well-being of workers (Semykina and Linz 2013). The research results in the literature explaining the gender differences regarding the relationships of gender equality in the organizations are vague and often focused on particular perspectives. Gender inequality may arise when considering career advancement, in which women are most likely to be at a disadvantage (Powell and Butterfield, 1994). Research results indicate that gender has not been identified as a factor that would be independently associated with the inequality perception (Shanafelt et al. 2012). Several organizational and sociocultural factors have been identified in the literature that impede women the benefits of upward mobility. Examples of such factors explaining vertical segregation are human capital barriers (lack of education, resources, and experience), differences in communication styles, exclusion from informal networks, lack of mentors and role-models, and limited management support for work/life programs (Lewis 1997, 1998; Mani 1997; Dolan 2004; Sabharwal 2015). Social and organizational psychologists (e.g., Heilman and Parks-Stamm 2007; Koenig et al. 2011) studied the causes of this factors based on gender stereotyping. A commonly held assumption is that women lack adequate human capital for managerial positions (Burke 2000). This perception lead to the stereotype, that woman may be less effective top managers than men. In light of this fact, this article examines differences in perceived gender equality in decision-making positions between men and women.

In order to investigate differences regarding perceived gender equality in organizations between male and female managers (objective (i) of this research), hypothesis H1

was formed:

H1: Regarding perceived gender equality in decision-making positions within organizations, significant differences between female and male managers exist.

2.2 Gender equality perception and job satisfaction

Studying job satisfaction has long been of great interest to researchers and management professionals. Higher job satisfaction is associated with improved employee productivity and is often cited as instrumental to maintaining high employee retention rates (Wood et al. 2012, Green 2010, Munyon et al. 2010, Sousa-Poza and Sousa-Poza 2007). The concept of perceived satisfaction was grounded in the Herzberg's (1968) two-factor job satisfaction theory. According to this theory, satisfaction and dissatisfaction are not two opposite extremes, but two independent continua. Employees react to their working conditions and distinguish job context factors named ''hygienes'' and job content factors named ''motivators'' that determine two independent continua. If the motivation needs are fulfilled, they will lead to employee satisfaction. However, when motivation needs are not fulfilled they will not lead to employee dissatisfaction but to no-satisfaction. Similarly, absence of hygiene needs will lead to employee dissatisfaction but their fulfillment will lead to employee no-dissatisfaction

In our research the perceived gender equality is included as factor that contributes to the satisfaction of individuals motivational needs, therefore it could be expected that it contributes to the managers' job satisfaction. But, gender differences regarding this relationship are observed and several view-points may be taken into account. Namely, the previous research results revealed, that levels of job satisfaction generally do not vary by gender (Poggi 2010). But on the other hand, the "Paradox of the contented female worker" (Mueller and Wallace 1996; Phelan 1994) tries to explain roughly equal levels of job satisfaction among men and women, despite the fact that women often face inferior working conditions (lower pay, fewer promotion opportunities), based on the lack of sensitivity to perceived gender inequality. It is also vague if the gender equality at the workplace affects men's job satisfaction. As pointed out by Semykina and Linz (2013), men may be indifferent to it, yet working for an organization that treats all employees equally may affect men's job satisfaction both positively or negatively. It can be expected that men have negative attitudes toward women in top manager positions (Baldwin et al. 2001); they may also perceive the organization's policy that allows women access to the top management positions as creating a more competitive work environment for them, resulting in a lower satisfaction with work and career. Yet men might enjoy higher job satisfaction working for organizations that promote gender equality in top management positions (Semykina and Linz 2013).

The importance of both extrinsic rewards (received for job performance) and intrinsic rewards (associated with job attributes), as well as the importance of workplace environment (Linz and Semykina 2012, Wood et al. 2012, Bockerman and Ilmakunnas 2009, Stewart et al. 2007, Carr et al. 2003) have been extensively studied in literature. Since perceived gender equality at workplace shape the overall workplace environment, this factor may explain variation in job satisfaction. Examining the roles of such factors is also important from the organization's point of view. The management of career perceptions has a direct impact on employee performance, which in turn impacts the organization's performance (Hitt et al. 2001). However, perceptions are likely to be influenced by worker personality and aspirations, which, if not accounted for, may bias the results (Poggi 2010). To examine perceived gender equality, one should take these subjective criteria into account. We therefore focus on perceptual data, referring to employees' assessment of the gender equality and satisfaction with the employment position and career as well as the work, to get a precise understanding of the relationship between perceptions and gender.

The nature of managerial work tasks often leads to situations, where they take their jobs home with them (on one hand) and do not leave their family problems outside the organization (on the other hand) (Netemeyer et al. 2005). Therefore they experience high level of conflicts between work and family domain (Drew and Murtagh 2005). The impact of work interfering with family proved to be significantly related to job satisfaction for different groups of employees (Adams et al. 1996) and for both genders (Karateppe and Baddar 2005). Traditional gender roles and stereotypes are still present in societies, suggesting that household activities and childcare continue to be seen as women's tasks. That is why the perceived work-family conflict is included into this research, where we emerge from job demands of managers that interfere with performing home and family responsibilities.

In order to analyze the gender differences regarding relationships among perceived gender equality in organizations, perceived satisfaction with employment position and career, perceived satisfaction with work, and perceived work-family conflicts, between male and female managers (objective (ii) of this research), hypotheses H2 through H5 were formed:

H2: Significant gender differences exist regarding the relationship between perceived gender equality in decision-making positions within organizations and perceived satisfaction with the employment position and career.

H3: Significant gender differences exist regarding the relationship between perceived gender equality in deci-

sion-making positions within organizations and perceived satisfaction with the work.

H4: Significant gender differences exist regarding the relationship between perceived work-family conflicts and perceived satisfaction with the employment position and career.

H5: Significant gender differences exist regarding the relationship between perceived work-family conflicts and perceived satisfaction with work.

Furthermore, the higher the level of satisfaction with employment position and career, the higher on average the level of satisfaction with work in general, both for men and women, as reported by previous research results. Mishra et al. (2014) reported that such a constantly positive causation is found between composite measures of job satisfaction and life satisfaction. Similar results have emerged in this field of research, with 90% of cases showing positive directions of this relationship and with none of the scattered negative relationships being significant (Rice et al. 1980).

H6: Gender differences regarding the relationship between perceived satisfaction with employment position and career and perceived satisfaction with work are not significant.

3 Data and methodology

3.1 Sample

Data for this research were gathered via a questionnaire from a random sample of female and male managers in Slovenian organizations. The questionnaire was designed in three phases. In the first phase, we reviewed the literature, which enabled us to develop a research model with multidimensional constructs (i.e., variables)—namely, perceived gender equality in organizations, perceived work-family conflicts, perceived satisfaction with employment position and career, and perceived satisfaction with work. Because of the lack of an established and standardized way of measuring these phenomena in the academic literature, where to date only partial solutions have been used (European Commission 2011b; Judge et al. 1994; Karatepe and Baddar 2006; Orser and Leck 2010; Singhapakdi et al. 2013; Lyness and Brumit Kropf 2005; Shapiro and Olgiati 2002), we performed in-depth individual interviews with three female and three male managers in five companies in Slovenia in February 2015. Two companies were considered large and three medium sized based on the number of employees. The aim of this part of the qualitative research was therefore to obtain information that helped us in the design of specific domains that constitute the multidimensional variables used to analyze the complex phenomena.

In the second step, the questionnaire was prepared and pretested online with three male and three female managers. This step resulted in the measurement scales of multidimensional variables, as described in Appendix A. All items, consisting of single multidimensional variables, were assessed by respondents using a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree).

In the third phase the questionnaire was used in the survey research. The random sample of 200 medium-sized and large companies was selected from the population of medium-sized and large companies in Slovenia. The survey was conducted in 2016 using e-mail addresses of male and female top managers and executive managers. A 41% response rate was achieved, meaning $n = 82$ completely filled in the questionnaires. The entire population in Slovenia is 207 large companies and 1076 medium-sized companies (Rebernik and Širec 2016).

In the structure of the sample, 43.9% of respondents were males and 56.1% were females. The majority of them were university graduates (79.3%), while 33% of respondents held a postgraduate degree (master's degree or doctorate in science). Regarding their management position in the organization, 52.5% of respondents were partners, managers of the company, or regional managers; 26.9% were presidents or members of the management boards or company directors; and the remainders held other managerial positions in organizations.

3.2 Methodology

Descriptive statistics and parametric *t*-test were used (0.05 significance level) to test gender differences regarding the perceived gender equality in organizations (i.e., hypothesis H1). To test hypotheses H2 through H6, first reliability and validity were explored. The analysis of the data set was based on exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). Structural equation modeling (SEM) was used to test the conceptual framework and assumptions.

The EFA (Hair et al., 2010) employed the principal component analysis and Varimax method. The Bartlett's Test of Sphericity (BTS), the Kaiser-Meyer-Olkin statistics (KMO > 0.5), and the significance level ($p < 0.05$) were calculated. Fulfillment of criteria regarding factor loadings ($\eta \geq 0.5$), communalities of variables ($h > 0.4$), and eigenvalues of factors ($\lambda \geq 1.0$), was analyzed. Item reliability was assessed using R^2.

The reliability and validity of the measurement instrument were assessed, keeping in mind the Cronbach's alpha ($\alpha > 0.7$). Scale validity was analyzed by focusing on convergent validity. As part of the convergent validity, we examined average variance extracted (ρc^{AVE}) and

composite reliability coefficients (ρc^{CR}), keeping in mind the criterion (Hair et al. 2010; Fornell and Larcker 1981; Bagozzi and Yi 1988): $\rho c^{AVE} > 0.5$ and $\rho c^{CR} > 0.7$ and the criterion by Byrne (2010) $\rho c^{CR} > \rho c^{AVE}$. In order to check multicollinearity, we used variance inflation factors (VIF) < 5.0 (Hair et al. 2010).

The quality of the measurement model was also measured by the variance explained by the model for a particular construct (R^2) as well as the Stone-Geisser (Stone 1974) Q-squared coefficients; thus, we examined the predictability value of the structural model. Acceptable predictive validity in connection with an endogenous latent variable is suggested by a Q-squared coefficient greater than zero (Kock 2013). To test the model, the following rules were also applied: average path coefficient (APC, $p < 0.05$), average R-square (ARS, $p < 0.05$), average adjusted R-square (AARS, $p < 0.05$), average block VIF (AVIF < 5.0), average full collinearity VIF (AFVIF < 5.0), Sympson's paradox ratio (SPR ≥ 0.7), the R-squared contribution ratio (RSCR ≥ 0.9), statistical suppression ratio (SSR ≥ 0.7), nonlinear substantiated by an association causality direction ratio (NLBCD ≥ 0.7), and goodness-of-fit (GoF ≥ 0.5) (Tenenhaus et al. 2005; Schepers et al. 2005; Kock 2013).

To test the hypotheses, we used the path coefficient associated with a causal link in the model (β or γ), *t*-value, significance level ($p < 0.05$), and indicator of Cohen's effect (f^2) with 0.02, 0.15, and 0.35 indicating the small, medium, and large effect sizes (Cohen 1988). The Statistical Package for the Social Sciences (SPSS) and WarpPLS software (which is usually used in the case of small samples) were used.

To test significance of gender differences, the pooled standard error method was used (Kock, 2013).

4 Results

Hypothesis H1 was tested based on individual statements in the measurement scale for perceived gender equality in decision-making positions within organizations. Results in Figure 1 and in Appendix B show that male and female managers differ significantly ($p < 0.05$) in terms of the average agreement on 8 out of 11 items and at all 8 aspects women perceived the lower level of gender equality as compared to men. On only one item did female managers assess the agreement with the statement to be on average equal than male managers: Female managers were in general equally self-confident regarding the necessary abilities and skills needed for leading positions compared to male managers (women: 5.69 ± 1.227; men: 5.69 ± 1.390). This was also the highest assessed item by women.

The results further revealed that the important differences ($p<0.001$) between female and male managers are especially regarding the decision-making process (GE9) (women: 4.76 ± 1.594; men: 6.22 ± 0.637), regarding equal payment (GE11) (women: 4.63 ± 1.743; men: 5.89 ± 1.116), regarding opportunities to be at the managerial position (GE4) (women: 4.50 ± 1.643; men: 5.78 ± 1.222) and regarding influence in the organization (GE10) (women: 4.65 ± 1.676; men: 5.94 ± 0.893),

Thus, support for H1 was found: The results demonstrate that, regarding perceived gender equality in decision-making positions within organizations, significant gender differences exist between female and male managers.

When testing hypotheses H2 through H6, we first present the results regarding the conceptual model, including both males and females, to form the measurement scales for constructs of the research. A measurement scale development process consisted of genereting initial 31 items for all 4 constructs together; after performing the EFA, results indicated that it was meaningful to use EFA for all four constructs (all KMO > 0.5; BTS significance $p < 0.001$), and the item analysis in the second and the third iterations of the factor analysis led to a one-dimensional factor solution for all constructs in the conceptual model (Appendix C). The obtained mesurement scales consisted of six items for perceived gender equality in decision-making positions within organizations, of seven items for perceived satisfaction with the employment position and career, further on of four items for perceived satisfaction with the work and finally of three items for perceived work-life conflicts. In the process of development of constructs we therefore had to exclude items GE2, GE3, GE7 and GE8 of perceived gender equality in decision-making positions within organizations, items SEC2 and SEC4 of perceived satisfaction with the employment position and career, as well as items SW1, SW3, SW4 of perceived satisfaction with the work, due to values of communalities being less than 0.4, or due to factor weights being less than 0.5, indicating the low share of item variance explained by the factor (construct) obtained. To obtain the one-dimensional factors we also excluded items GE5 and SEC5.

All four obtained measurement scales proved high reliability (all Cronbach's alpha > 0.7). Results in Table 1 indicate that 75.4% of the total variance is explained by the perceived gender equality in decision-making positions within organizations construct. Furthermore, 77.8% of the total variance is explained with the construct of perceived satisfaction with the employment position and career, 65.3% of the total variance is explained by the perceived satisfaction with the work construct, while the perceived work-life conflicts construct explains 85.2% of the total variance.

In the next step, we employed CFA; the results are presented in Table 1. All factors weights and R^2 of items for constructs were higher than value 0.5. The structure of constructs therefore remained unchanged.

Descriptive statistics and the correlation matrix are presented in Table 2. Table 3 shows the results of the AVE

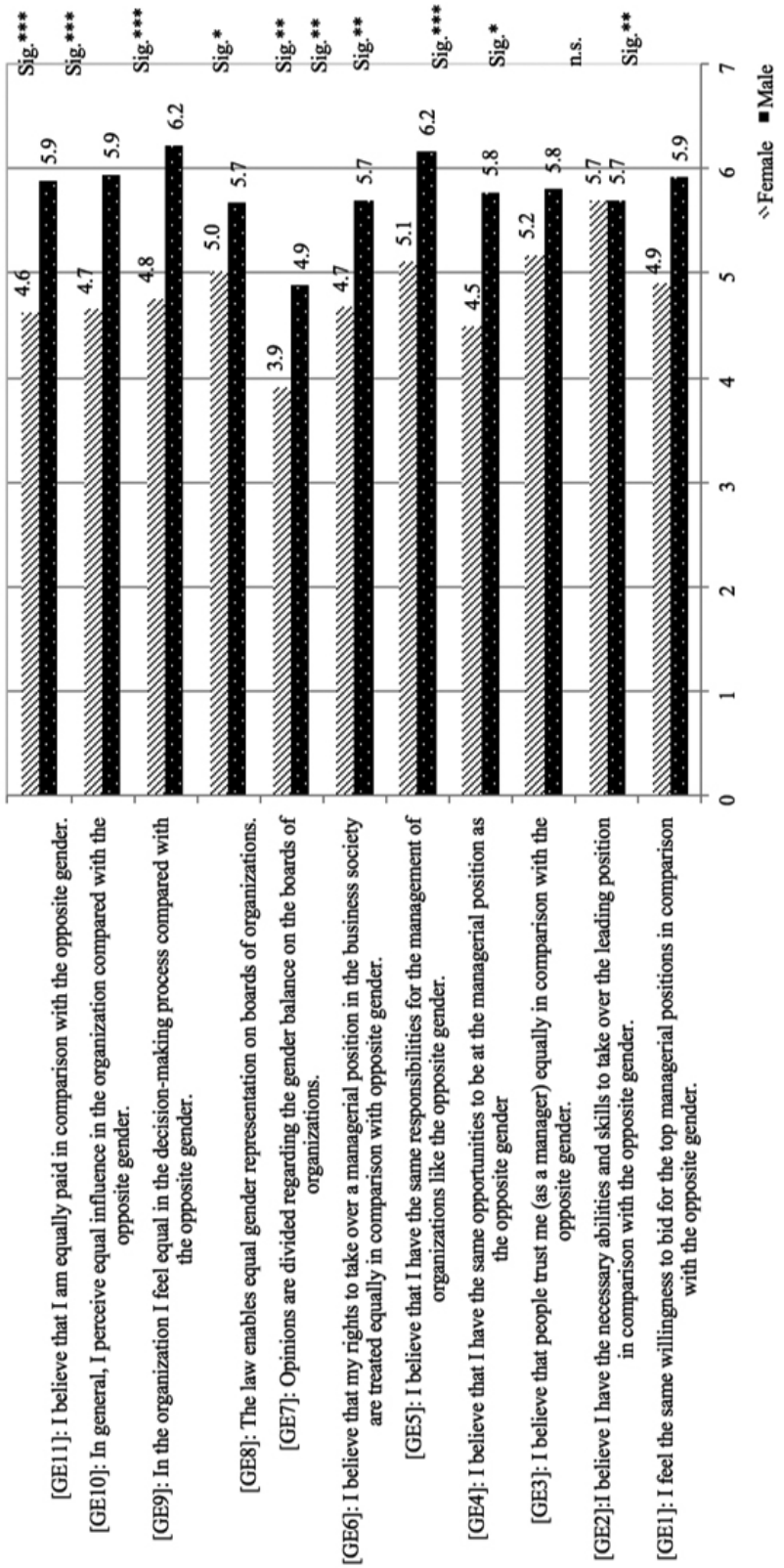

Figure 1: Results of testing H1 (individual items)
Sig. - gender difference significant at the 0.05 level; Sig.** - gender difference significant at the 0.001 level.*

Table 1: Confirmatory Factor Analysis Results
Notes: [a] All factor loadings are significant at the 0.001 level. [b] Measured on a 7-point scale, ranging from 1 = strongly disagree to 7 = strongly agree, Mean (M); Std. Deviation (SD); perceived gender equality in decision-making positions within organizations (GE); perceived satisfaction with the work (SW); perceived satisfaction with the employment position and career (SEC); perceived work-life conflicts (WFC).

Model path	Factor loading[a]	Variance explained	R^2 (item reliability)	M[b]	SD
Perceived gender equality in decision-making positions within organizations - GE					
GE1 ← I feel the same willingness to bid for the top managerial positions in comparison with the opposite gender.	0.774		0.599	5.35	1.526
GE4 ← I believe that I have the same opportunities to be at the managerial position as the opposite gender.	0.889		0.790	5.06	1.597
GE6 ← I believe that my rights to take over a managerial position in the business society are treated equally in comparison with opposite sex.	0.812	75.39	0.659	5.12	1.590
GE9 ← In the organization I feel equal in the decision-making process compared with the opposite gender.	0.945		0.893	5.40	1.456
GE10 ← In general, I perceive equal influence in the organization compared with the opposite gender.	0.921		0.848	5.22	1.524
GE11 ← I believe that I am equally paid in comparison with the opposite gender.	0.856		0.733	5.18	1.619
Perceived satisfaction with the employment position and career- SEC					
SEC1 ← Overall, I am satisfied with my working position.	0.879		0.773	5.38	1.321
SEC3 ← In general, I am satisfied with the type of work I'm doing on the job.	0.884		0.781	5.54	1.033
SEC6 ← In general, I am satisfied with the success that I have achieved in my career.	0.826		0.682	5.34	1.288
SEC7 ← I'm satisfied with the progress in meeting the goals of my entire career.	0.925	77.8	0.856	5.28	1.230
SEC8 ← I'm satisfied with the progress in meeting the goals regarding my personal income.	0.816		0.666	4.72	1.605
SEC9 ← I'm satisfied with the progress in meeting goals for my career promotion.	0.896		0.803	5.01	1.410
SEC10 ← In general, I am satisfied with my career.	0.941		0.885	5.45	1.198
Perceived satisfaction with work - SW					
SW2 ← People in the organization respect my expertise in my field of work.	0.747		0.558	3.96	1.469
SW5 ← My working position allows me to strengthen my professional skills.	0.790	65.3	0.624	4.23	1.542
SW6 ← My work requires a lot of creativity.	0.793		0.629	5.34	1.288
SW7 ← My working position helps me develop creativity outside the workplace.	0.749		0.561	5.28	1.230
Perceived work-life conflicts – WFC					
WFC1 ← Difficulties of my working situation interfere with my family life.	0.924		0.854	4.16	1.774

Table 1: Confirmatory Factor Analysis Results (continued)

WFC2 ← Due to the time devoted to my work it is hard to meet my family obligations.	0.943	85.2	0.889	4.10	1.726
WFC3 ← Because of the duties associated with the work I have to often change plans for family activities.	0.902		0.814	4.18	1.827

Table 2: Descriptive Statistics and Correlation Matrix of all Variables
*Notes: ***correlations are significant at level 0.001, n.s. non-significant; Square roots of average variances extracted (AVEs) shown on the diagonal; perceived gender equality in decision-making positions within organizations (GE); perceived satisfaction with the work (SW); perceived satisfaction with the employment position and career (SEC), perceived work-family conflicts (WFC)*

Constructs	Mean	SD	1	2	3	4
1. SEC	5.25	1.140	(0.882)			
2. GE	5.22	1.343	0.557_{***}	(0.868)		
3. SW	4.26	1.114	0.540_{***}	0.437_{***}	(0.770)	
4. WFC	4.15	1.638	$-0.079^{n.s.}$	$-0.097^{n.s.}$	-0.411_{***}	(0.923)

Table 3: Indicators of Quality of Research Model
Notes: Perceived gender equality in decision-making positions within organizations (GE); perceived satisfaction with the work (SW); perceived satisfaction with the employment position and career (SEC), perceived work-family conflicts (WFC)

Constructs	Cronbach's α	pc^{CR}	pc^{AVE}	R^2	Adj. R^2	Q^2	VIF
1. SEC	0.952	0.961	0.778	0.355	0.339	0.348	1.765
2. GE	0.934	0.948	0.754	(-)	(-)	(-)	1.508
3. SW	0.771	0.853	0.593	0.466	0.445	0.468	1.811
4. WFC	0.913	0.945	0.852	(-)	(-)	(-)	1.248

Table 4: Standardized Path Coefficients for Proposed Model for Females
*Notes: ***p < 0.001, **p < 0.01; n.s. non-significant; f^2 effect size; S.E. standard error; perceived gender equality at decision-making positions within organizations (GE); perceived satisfaction with the work (SW); perceived satisfaction with the employment position and career (SEC); perceived work-family conflicts (WFC); GoF = 0.614, APC = 0.316 (p < 0.01), ARS = 0.482 (p < 0.001), AARS = 0.452 (p < 0.001), AVIF = 1.315, AFVIF = 1.179, SPR = 1.000, RSCR = 1.000, SSR = 1.000, NLBCDR = 0.800.*

Hypothesized path	Path coefficient	f^2	S.E.
γ_1 (GE → SEC)	0.641^{***}	0.419	0.114
γ_2 (GE → SW)	0.354^{**}	0.225	0.128
γ_3 (WFC → SEC)	$-0.043^{n.s.}$	0.010	0.145
γ_4 (WFC → SW)	$-0.155^{n.s.}$	0.058	0.139
β_5 (SEC → SW)	0.388^{**}	0.251	0.126

analysis. It can be seen that the AVE values are above 0.5 and, moreover, are above the correlation coefficients for each type of construct.

To check the reliability of the constructs, we tested convergent validity. The ρ_c^{AVE} values for this model exceeded 0.5 for the reflective constructs (Hair et al. 2010), thereby indicating convergent validity for all constructs (see Table 3).

Table 3 indicates that all values of the latent-variable Q^2 coefficients are greater than zero. Adjusted R-squared coefficients are equivalent to R-squared coefficients, with the key difference that they correct for spurious increases in R-squared coefficients due to predictors that add no explanatory value in each latent variable block. Composite reliabilities ρ_c^{CR} for the three constructs ranged from 0.853 to 0.961, exceeding the minimum requirement of 0.7. As all ρ_c^{CR} values were higher than ρ_c^{AVE} values, we confirmed the convergent validity for all the constructs studied. The VIF values ranged between 1.248 and 1.811 (well below 5.0), providing confidence that the structural model results were not affected by collinearity. The examination of the endogenous constructs' predictive power showed that satisfaction with the work and the prediction of satisfaction with employment position and career were significant.

To test hypotheses H2 through H6, first the structural equation models for each gender were formed (see Tables 4 and 5 and Figure 2); the results of testing the significance of gender differences regarding the path coefficients are presented in Table 6.

The important results of this research is, that the effect of perceived gender equality in organizations on perceived satisfaction with employment position and career is significant and positive for both genders, but the effect is significantly stronger among female managers. Thus, we found support for hypothesis H2—namely, that significant gender differences exist regarding the relationship between the perceived gender equality in decision-making positions within organizations and the perceived satisfaction with the employment position and career.

On the other hand, the effect of perceived gender equality in managerial positions in organization on perceived satisfaction with work is positive and significant among female managers, while not significant (but negative) among male managers. The gender difference regarding this relationship is significant. Therefore, hypothesis H3—namely, that significant gender differences exist regarding the relationship between the perceived gender equality in decision-making positions within organizations and the perceived satisfaction with the work—is supported.

Support for H2 and H3 suggests that perceived gender equality has a significantly stronger positive effect on perceived satisfaction with work as well as on perceived satisfaction with employment and career among female managers, as compared to their male colleagues.

Among female managers the perceived work-family conflicts have no significant effect neither on the perceived satisfaction with employment position and career nor on perceived satisfaction with work. Among male managers the strong significant and negative effect on perceived satisfaction with work was found. The gender difference regarding this relationship was also significant, while regarding the relationship between perceived work-family conflicts and perceived satisfaction with employment position and career, it was not. Therefore, the hypothesis H4 is not supported, nevertheless the weak yet significant positive relationship between perceived work-family conflicts and perceived satisfaction with employment position and career among male managers undoubtedly calls for further research in the future. Martins et al. (2002) examine factors that moderated this relationship (e.g. age, gender, marital and parental status) and found out that career satisfaction of female managers and that of older individuals of both genders were the most adversely affected by work-family conflict. Whereas women's career satisfaction was negatively affected by work-family

Table 5: Standardized Path Coefficients for Proposed Model for Males
Notes: $^{***}p < 0.001$, $^{*}p < 0.05$; $^{n.s.}$ non-significant; f^2 effect size; S.E. standard error; perceived gender equality at decision-making positions within organizations (GE); perceived satisfaction with the work (SW); perceived satisfaction with the employment position and career (SEC); perceived work-family conflicts (WFC); GoF = 0.441, APC = 0.293 ($p < 0.01$), ARS = 0.307 ($p < 0.01$), AARS = 0.256 ($p < 0.05$), AVIF = 1.020, AFVIF = 1.461, SPR = 1.000, RSCR = 1.000, SSR = 1.000, NLBCDR = 0.800

Hypothesized path	Path coefficient	f^2	S.E.
γ_1 (GE → SEC)	0.243*	0.068	0.149
γ_2 (GE → SW)	-0.049n.s	0.006	0.163
γ_3 (WFC → SEC)	0.259*	0.076	0.148
γ_4 (WFC → SW)	-0.549***	0.316	0.130
β_5 (SEC → SW)	0.363**	0.148	0.141

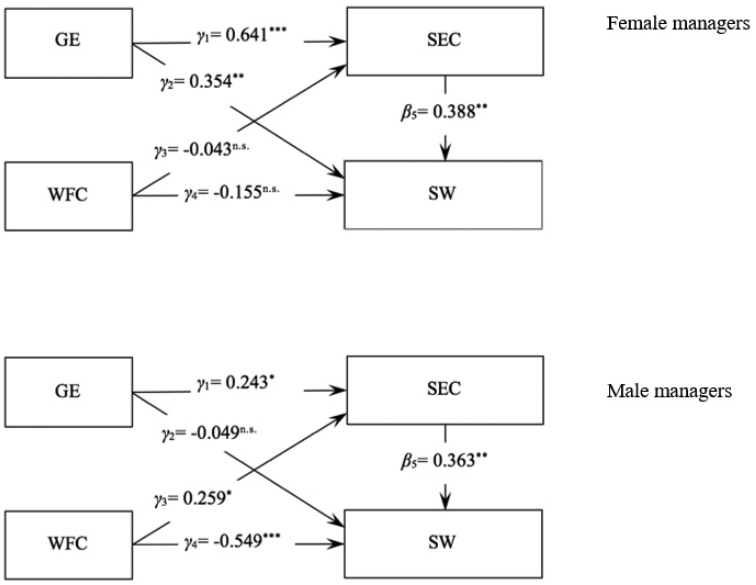

Figure 2: Conceptual models with results

Table 6: Significance of Estimated Coefficients and Differences for Males and Females

Notes: $^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$; $^{n.s.}$ non-significant; perceived gender equality at decision-making positions within organizations (GE); perceived satisfaction with the work (SW); perceived satisfaction with the employment position and career (SEC); Perceived work-family conflicts (WFC)

	Males		Females		Differences between males and females	
	β	Std. error	β	Std. error	Difference (male – female)	*t*-value
γ_1 (GE → SEC)	0.243*	0.149	0.641***	0.114	-0.398*	-2.187
γ_2 (GE → SW)	-0.049n.s	0.163	0.354**	0.128	0.305*	-1.998
γ_3 (WFC → SEC)	0.259*	0.148	-0.043n.s.	0.145	0.216n.s.	1.102
γ_4 (WFC → SW)	-0.549***	0.130	-0.155n.s.	0.139	-0.394*	-2.046
β_5 (SEC → SW)	0.363**	0.141	0.388**	0.126	-0.025n.s.	0.134

conflict throughout their lives, men showed such adverse effects only in later career, when they were 40 and older. This parameter, that might shad the light on our results, will be studied in future research. These findings are consistent with previous research that suggests that men and women prioritize their work and family roles differently (Tenbrunsel et al., 1995). But we found the support for hypothesis H5—namely, that significant gender differences exist regarding the relationship between the perceived work-family conflicts and the perceived satisfaction with work.

The important result of this study is also that perceived satisfaction with the employment position and career significantly affects perceived satisfaction with the work. This effect is positive and significant regardless of the gender. The gender difference between the coefficients in both models is also not significant; therefore, we found support for hypothesis H6—namely, that gender differences regarding the impact of perceived satisfaction with the employment position and career on perceived satisfaction with the work are not significant.

5 Conclusions and discussion

Despite the non-discriminatory legal regulations, the presented study results show that several gender differences

and inequalities exist regarding the balance in the decision-making positions within Slovenian organizations. The research results suggest that perceived gender equality is perceived significantly differently by female and male managers. Female managers perceive gender equality to be significantly lower in general than males, including the lower assessment of personal willingness to bid for the top managerial positions compared with the opposite gender. As female managers are self-confident in the necessary skills and abilities needed for decision-making positions in organizations, there are obviously other reasons for the underrepresentation of women in top managerial positions in organizations. One reason for this is undoubtedly the general organizational culture in organizations, as female managers perceive having significantly lower opportunities for acquiring the top managerial position than the opposite gender.

The research highlights that women not only get fewer leadership opportunities than men, but they also often get different kinds of opportunities. Psychology professors Michelle Ryan and Alex Haslam described the glass cliff as a phenomenon in which women are more likely to be put into leadership roles under risky and precarious circumstances. First, some evidence suggests that the selection of a woman can signal a change in direction, especially when a company has a history of having all male leaders. Second, research indicates that we believe men possess qualities that fit better with running successful companies, while women possess qualities that can make them more suitable in difficult situations. These kinds of findings have led some to conclude that, when we think crisis, we think female (Ryan et al. 2011). Perceived gender equality within organizations showed significant differences between female and male managers in decision-making positions. Hypothesis H1 was therefore supported.

We further found solid support for hypothesis H2, claiming the existence of significant gender differences regarding the relationship between perceived gender equality in decision-making positions within organizations and perceived satisfaction with the employment position and career. Our results confirmed a significant and positive effect among women managers in terms of perceived gender equality in organizations on perceived satisfaction with employment position and career, the same was among male managers. The difference between the two was also significant.

We also confirmed hypothesis H3, suggesting the existence of significant gender differences regarding the relationship between perceived gender equality in decision-making positions within organizations and perceived satisfaction with the work. The significant positive effect is confirmed for female managers, while negative yet not significant effect was found among male managers, with the significant difference among genders. The business climate in organizations in general does not provide equal respect and equal evaluation of managers, as female managers perceived these attitudes significantly lower in general. If these results are added to previous findings on the lower perceptions of opportunities in the top managerial positions for males, it seems that female managers face different treatment than their male colleagues. For example, the glass cliff phenomenon (Ryan et al. 2011) may result in negative consequences all around. For individual female managers, being put in command when the odds of success are low can set them up to fail. Despite inheriting the problems, women in glass cliff positions are seen to be fully responsible for the bad state of affairs. After becoming synonymous with a failure, career advancement can be undermined. It seems that, in Slovenia, men in the top management positions do not have clear positive attitudes toward gender equality in decision-making positions within organizations. Some results found in the literature (Baldwin et al. 2001) also describe the situation where gender equality at work is perceived as a more competitive work environment for men. Furthermore, our research results show equal average self-confidence of male managers regarding their own abilities and skills to take the leading positions when compared with female managers. This supports the conclusion that gender equality in decision-making positions may be, to a certain extent, understood as a threat to males in top management positions.

Gender equality therefore act as motivator for both genders, as far as the perceived satisfaction with employment position and career is considered, but its' effect is significantly stronger for female managers. Regarding the motivation effect when perceived satisfaction with work is analyzed, results are not so clear; while significant positive effect was found among female managers, among male managers it was not, even more, it was negative, yet not significant.

We also confirmed the gender differences regarding the effect of perceived work-family conflicts on satisfaction with work – hypothesis H5; but the hypothesis H4, about the gender differences in effect of perceived work-family conflicts on perceived satisfaction with employment position and career, was not supported. Additional moderating factors should be studied to gain a deeper insight into this phenomenon. Bardwick (1980) suggest that women place emphasis on relationships throughout their lives, whereas men are more likely to sacrifice relationships for the sake of their careers in early career. In later career, when many individuals plateau, it is likely that they will be less inclined to prioritize career over family and personal life and, thus, they may be less tolerant of work-family conflict (Bardwick, 1986). It seems that female managers cope with the perceived work-family conflicts more efficiently, since their perceived conflicts in work-family interface has significantly different impact on their perceived satisfaction with work, as compared with males (the effect among female managers themselves is also even not significant).

Past research results, that are very scarce and also deal with some selected groups of employees, didn't confirm gender differences regarding the perceived work-family conflicts (Karatepe and Baddar 2005), while our research revealed that female managers not only perceive work-family conflicts on average lower as compared to male managers, but also that female managers on average experience lower negative effects of these conflicts on perceived satisfaction with work, as compared with male managers.

Hypothesis H6 suggested that gender differences regarding the influence of the perceived satisfaction with the employment position and career on perceived satisfaction with the work do not exist. We confirmed that this effect is positive and significant regardless of the gender and that the gender difference between the coefficients in both models is not significant.

These research results confirm that perceived gender inequalities in Slovenian organizations do persist despite the non-discriminatory legal regulations. Therefore, several policy- and business practice-oriented implications need to be addressed. One instrument in this context is the identification, highlighting, and dissemination of good practices of companies and employers with an outstanding commitment and business policy fostering gender equality. For this purpose, different tools have been developed and initiatives have been created. They are aimed at corporate-level barriers as non-legislative instruments, especially labels, prizes and awards, charters, and rankings/indexes for organizations that have developed internal good practices on gender equality in decision-making positions (Austrian Institute for SME Research 2010).

In order to improve gender balance in company boardrooms, the Proposal for a directive adopted by the European Commission on 14 November 2012 set a quantitative objective of at least 40% representation for each gender among nonexecutive directors (supervisory board members in a dual board system) by 2020 (or 2018 for state-owned undertakings). The commission's proposal applies to companies listed on stock exchanges in the EU member states, but excludes all small and medium-sized companies (SMEs), even if they are listed on stock exchanges (European Commission 2014b). In line with the commission's proposal, the Slovenian Ministry intends to upgrade the legislation introducing the establishment of minimum quotas for the less represented gender. Drafts of the principle of quotas for managerial positions in companies will be ready this year and will be followed by a broad public debate (STA 2015).

To achieve more gender equality within organizations and a reduction of the gender gap, the legislative initiatives cannot be successful without appropriate corporate strategy sets, which presents the framework for doing business and determines the internal working culture. Experience shows that gender equality—in order to be sustainably established—has to be an integral part of the overall corporate strategy. Management is responsible for the implementation of the corporate strategy, where individual managers act as role models and multipliers within and outside the company. The human resource department, as a central point of contact for human resource issues of business units, needs to offer strategic advice on how to address gender equality sustainably and provides instruments and processes to attract, retain, and develop top talent (e.g., by designing regular evaluation processes). To achieve the objectives of balance equality in decision-making positions in organizations, the educational system at all levels of education is important to both female and male managers. Cultural and social norms are very difficult to change, yet certainly not in a short period of time. From this perspective, the integration of the principles of gender equality in all areas of work and life into all stages of the education system is a measure that can contribute to changes in deep-rooted principles of gender inequality in the cultural and social norms.

The current study also comes with limitations, several of which offer opportunities for future work. From the methodological point of view the limitation of our paper is that only quantitative approach was used, although the topic of the research, that refers in a wider sense to the sociology of organization may call for qualitative approach as well, especially using in-dept interviews within case studies (Small, 2009). As already mentioned above the relationship between perceived work-family conflicts and perceived satisfaction with employment position and career calls for further research in the future, as well as other relationships in the model, could be investigated with an appropriate combination of qualitative and quantitative research. In a quantitative part of the research also the enlargement of a sample size should be reconsidered, which is relatively limited in the present research.

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Zaznana enakost spolov na vodstvenih položajih v organizacijah

Ozadje in namen: Namen raziskave je doseči dva temeljna cilja: raziskati razlike med moškimi in ženskimi managerji glede zaznane enakosti spolov v organizacijah in analizirati razlike med spoloma v odnosih med zaznano enakostjo spolov, zaznanim zadovoljstvom na delovnem mestu in kariero, zaznanim zadovoljstvom z delom, in zaznano konfliktnostjo relacije delo-družina.
Zasnova/metodologija/pristop: Vzorec raziskave zajema 82 managerjev v slovenskih organizacijah. V prvi fazi smo s t-testom analizirali razlike med moškimi in ženskami glede zaznane enakosti spolov na položajih odločanja. V naslednjem koraku smo razvili konceptualna modela in z uporabo strukturnih enačb (SEM) analizirali razlike med konstrukti.
Rezultati: Rezultati raziskave kažejo, da ženske managerke zaznavajo enakost spolov v organizacijah na splošno bistveno nižja kot moški; dojemanje enakosti spolov je pozitivno povezano z zaznanim zadovoljstvom na delovnem mestu in kariero, kot tudi z zaznanim zadovoljstvom z delom, vendar sta obe povezavi precej močneje izraženi na strani žensk. Zdi se tudi, da se ženske managerke bolj učinkovito spopadanje z zaznano konfliktnostjo, ki izvira iz relacije delo-družina, saj ima slednji bistveno drugačen vpliv na zaznano zadovoljstvo žensk z delom, v primerjavi z moškimi.
Zaključek: Za doseganje večje enakosti spolov v organizacijah in zmanjšanje razlik med spoloma, ne gre pričakovati, da bi bile lahko zgolj zakonodajne pobude uspešne brez ustreznih poslovnih strategij organizacij, saj le te predstavljajo okvir za poslovanje in določajo notranjo delovno kulturo. Izsledki ponujajo implikacije tako oblikovalcem politik, kot tudi poslovni praksi.

***Ključne besede*:** *ravnotežje med spoloma; položaj odločanja; zadovoljstvo z zaposlitvijo; zadovoljstvo z delom*

Appendix

Appendix A

Perceived gender equality in organizations
[GE1]: I feel the same willingness to bid for the top managerial positions in comparison with the opposite gender.
[GE2]: I believe I have the necessary abilities and skills to take over the leading position in comparison with the opposite gender. [GE3]: I believe that people trust me (as a manager) equally in comparison with the opposite gender. [GE4]: I believe that I have the same opportunities to be at the managerial position as the opposite gender. [GE5]: I believe that I have the same responsibilities for the management of organizations like the opposite sex. [GE6]: I believe that my rights to take over a managerial position in the business society are treated equally in comparison with opposite sex. [GE7]: Opinions are divided regarding the gender balance on the boards of organizations. [GE8]: The law enables equal gender representation on boards of organizations. [GE9]: In the organization I feel equal in the decision-making process compared with the opposite gender. [GE10]: In general, I perceive equal influence in the organization compared with the opposite gender. [GE11]: I believe that I am equally paid in comparison with the opposite gender.
Perceived satisfaction with the employment position and career
[SEC1]: Overall, I am satisfied with my working position. [SEC2]: I often think about stopping engagement in a managerial position. [SEC3]: In general, I am satisfied with the type of work I'm doing on the job. [SEC4]: Most people in similar workplaces are very satisfied with the work situation. [SEC5]: People working in a senior managerial position often think about stopping the pursuit of a leading position. [SEC6]: In general, I am satisfied with the success that I have achieved in my career. [SEC7]: I'm satisfied with the progress in meeting the goals of my entire career. [SEC8]: I'm satisfied with the progress in meeting the goals regarding my personal income. [SEC9]: I'm satisfied with the progress in meeting goals for my career promotion. [SEC10]: In general, I am satisfied with my career.
Perceived satisfaction with the work
[SW1]: I feel valued in the business environment. [SW2]: People in the organization respect my expertise in my field of work. [SW3]: I feel that working on my position allows me to realize my potential overall. [SW4]: I feel that I learned new things that can help me better perform work activities. [SW5]: My working position allows me to strengthen my professional skills. [SW6]: My work requires a lot of creativity. [SW7]: My working position helps me develop creativity outside the workplace.
Perceived work-family conflicts
[WFC1]: The demand of my work interfere with my home and family life. [WFC2]: The amount of time my job takes up makes it difficult to fulfill my family responsibilities. [WFC3]: Due to work-related duties, I have to make changes to my plans for family activities.

Appendix B

Items	Gender	Mean	Std. Dev.	Sig.
[GE1]: I feel the same willingness to bid for the top managerial positions in comparison with the opposite gender.	F	4.91	1.697	$p < 0.05$
	M	5.92	1.052	
[GE2]: I believe I have the necessary abilities and skills to take over the leading position in comparison with the opposite gender.	F	5.69	1.227	$p > 0.10$
	M	5.69	1.390	
[GE3]: I believe that people trust me (as a manager) equally in comparison with the opposite gender.	F	5.17	1.403	$p < 0.05$
	M	5.81	1.167	
[GE4]: I believe that I have the same opportunities to be at the managerial position as the opposite gender	F	4.50	1.643	$p < 0.001$
	M	5.78	1.222	
[GE5]: I believe that I have the same responsibilities for the management of organizations like the opposite gender.	F	5.11	1.663	$p < 0.01$
	M	6.17	1.108	
[GE6]: I believe that my rights to take over a managerial position in the business society are treated equally in comparison with opposite gender.	F	4.67	1.606	$p < 0.01$
	M	5.69	1.390	
[GE7]: Opinions are divided regarding the gender balance on the boards of organizations.	F	3.91	1.532	$p < 0.01$
	M	4.89	1.652	
[GE8]: The law enables equal gender representation on boards of organizations.	F	5.02	1.273	$p < 0.05$
	M	5.67	1.195	
[GE9]: In the organization I feel equal in the decision-making process compared with the opposite gender.	F	4.76	1.594	$p < 0.001$
	M	6.22	0.637	
[GE10]: In general. I perceive equal influence in the organization compared with the opposite gender.	F	4.65	1.676	$p < 0.001$
	M	5.94	0.893	
[GE11]: I believe that I am equally paid in comparison with the opposite gender.	F	4.63	1.743	$p < 0.001$
	M	5.89	1.116	

Appendix C

Items of "Perceived gender equality at decision-making positions within organizations"	Comm.	Factor 1 - " Perceived gender equality at decision-making positions within organizations " - loadings
GE1	0.600	0.774
GE4	0.791	0.889
GE6	0.659	0.812
GE9	0.893	0.945
GE10	0.849	0.921
GE11	0.733	0.856
KMO: 0.811; BTS: Chi-square=295.764. p<0.001; Cronbach's Alpha: 0.880		
Items of "Perceived satisfaction with the work"	Comm.	Factor 1 - "Perceived satisfaction with work" - loadings
SW2	0.597	0.747
SW5	0.670	0.790
SW6	0.690	0.793
SW7	0.656	0.749
KMO: 0.755; BTS: Chi-square=114.036. p<0.001; Cronbach's Alpha: 0.710		
Items of "Perceived satisfaction with the employment position and career"	Comm.	Factor 1 - "Perceived satisfaction with the employment position and career" - loadings
SEC1	0.772	0.879
SEC3	0.782	0.884
SEC6	0.682	0.826
SEC7	0.856	0.925
SEC8	0.666	0.816
SEC9	0.803	0.896
SEC10	0.885	0.941
KMO: 0.900; BTS: Chi-square=591.580. p<0.001; Cronbach's Alpha: 0.947		
Items of "Perceived work-family conflicts"	Comm.	Factor 1 - " Perceived support of family " - loadings
WFC1	0.853	0.924
WFC2	0.889	0.943
WFC3	0.814	0.902
KMO: 0.741; BTS: Chi-square=170.083. p<0.001; Cronbach's Alpha: 0.912		

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Psychosocial Factors in the Development of Low Back Pain Among Professional Drivers

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Background and purpose: Professional drivers as a group are exposed to high risk of developing low back pain due to ergonomic factors and work conditions. The purpose of the study was to examine to what extent the low back pain occurs among Slovene professional drivers as a result of the development of various psychosocial factors.
Methodology: The study involved 275 respondents (professional bus drivers, car/van drivers, international truck/lorry drivers, and ambulance car drivers). Hypotheses were tested using multivariate statistical method (regression analysis) and analysis of variance. Data were collected by structured questionnaire comprised of three parts: socio-demographic data, basic psychosocial factors causing low back pain, and incidence, duration and severity of low back pain as a result of psychosocial risk factors, was implemented.
Results: The results of quantitative survey suggest that low back pain is mostly caused by lifting and carrying heavy loads, inadequate working conditions, poor physical fitness, regular nights out, shift work, and stress. Only the impact of gender on low back pain distress among professional drivers was confirmed, predominantly among bus drivers and lorry drivers on international routes. Low back pain occurrence was less common, albeit not statistically significant, among professional drivers of vans and passenger cars.
Conclusion: Our study suggests that psychosocial factors are also important cause for the development of low back pain among professional drivers and can limit the quality of their social and professional lives.

Keywords: *low back pain; psychosocial factors; professional drivers; prevention; Slovenia*

1 Introduction

Evidence suggests that around three-quarters of the world's population is confronted with low back pain once in life, most frequently individuals between 20 and 50 years of age, while they are in the prime of their physical and mental abilities and in their most active period of life (Hartvigsen et al., 2000; Tse et al., 2006; Bach & Cosic, 2008; Knauer et al., 2010; Cox, 2011; Kresal et al., 2015). Attacks of low back pain due to work-related factors are a common reason for short-term or long-term absences from work, resulting in huge economic burden for both, individuals and society (Thorbjörnsson et al., 2000; Harris & Rampersaud, 2015; Shojaei et al., 2017). Accordingly, absenteeism due to low back pain represents a major health problem because of long-term medical treatment and early invalidity retirement, as well as socioeconomic factors (Margan et al., 2009). Recent evidence suggests high level

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of absenteeism due to low back pain among professional drivers in Slovenia (Krčevski Škvarc, 2001; Šinigoj et al., 2011; Meško et al., 2012a; Meško et al., 2012b; Kresal et al., 2015).

Evidence also suggests that individuals experience most often the acute phase of low back pain lasting less than 6 weeks, while the sub-acute phase of low back pain lasts between 6 to 12 weeks, and chronic phase of low back pain commonly lasts for more than 3 months (MacNeela et al., 2010; Hanscom et al., 2015) with the remedial procedures and treatment effectiveness being minimal in the latter phase.

Low back pain distress worsens the quality of life and can forces affected individuals into dependency and inability to care for themselves (Aronoff et al., 2000; Tziner & Birati, 2015; McGill, 2016; Leclerc, 2017). In worst cases, the low back pain leads to a loss of physical functions and muscle tone, causes overall weakness, and reduces well-being through exerting periodic or continuous pain. Consequently, the loss of normal functioning of an individual can indirectly leads to his/her social isolation, which could result in less social activities in his/her spare time, and impaired relations or connections in his/her close environment, stress in the family and possible loss of income. Social disability often causes mental disorders with the emergence of insomnia, irritability, anxiety, depression, and somatic disorders (Van der Beek, 2012; Yoo, 2016; Shojaei et al., 2017).

Waddell (1998) describes low back pain as a medical and health disaster of the last century, to large extend due to existing health care system medical model of western countries. Current system is mainly focused on the identification of symptoms and signs, diagnosing, patient management with physical therapy and anticipation of a positive outcome of treatment, but at the same time ignoring the biological, psychological and social determinants (Gregg et al., 2015). Thus neglecting the need for more holistic treatment of patients with low back pain, which is offered by the biopsychosocial model of treatment (Dedessus-Le-Moustier & Lerouge, 2011). Professional truck and bus drivers are, due to the specific working positions, a group which is largely exposed to health and other risks while conducting their profession (Miyamoto et al., 2008; Bouffartigue et al., 2010; Jones et al., 2013; Lerouge, 2014; International Spine Study Group, 2015).

Bilban (2014) argues that trucks and cars are not designed to fully meet physiological needs of professional drivers who are often overloaded and exposed to vibrations, uncomfortable seats and limited workspace and prolonged sitting due to forced position while driving and the level of vibrations caused by poor roadway (Funakoshi et al., 2003; Rehn et al., 2005; Szeto & Lam, 2007; Louit-Martinod et al., 2016). This can result in spine problems and malfunctions of organs in the chest area and abdominal cavities. Due to insufficient blood supply to the lower part of the body caused by prolonged sitting, professional drivers are also exposed to cardio vascular system diseases and high blood pressure. Additionally, they are often exposed to diseases of the locomotor system, especially the lower spine, as well as to psychological problems (Hasle, 2007; Bilban, 2014; Louit-Martinod et al., 2016).

Several studies show strong correlation between low back pain and professional drivers (Videman et al., 2000; Gimeno et al., 2004; Tse et al., 2006; Campbell & Guy, 2007; Alperovitch Najenson et al., 2010; Dedessus-Le-Moustier & Lerouge, 2011; Louit-Martinod et al., 2016). Others scholars (Breuer and Brettel, 2012; Knox et al., 2013; Hopayian & Notley, 2014; Janwantanakul & Akkarakittichoke, 2017) find high probability for developing the low back pain in certain professions, like lorry drivers, manual workers, and nurses.

The most common cause for low back pain among professional drivers is forced posture and sedentary work, mostly due strong vibrations and increased tone of certain muscles. Heavy physical workload, like heavy lifting, can also results in low back pain among professional drivers (Tamrin et al., 2007; Robb & Mansfield, 2007). According to Alperovitch Najenson et al. (2010), 45.4 percent of professional drivers experienced low back pain due to the ergonomic factors associated mainly with uncomfortable seats and uncomfortable back supports and the psychosocial factors associated with limited resting time periods during the work day and heavy traffic on bus routes. Several other studies suggest preventive measures in order to reduce work-related stress, drivers' seat improvements to lower whole-body vibrations and forced torso posture, and strong encouragement for more regular sport activities among professional drivers to improve their mental and physical well-being, and work productivity (Xu et al., 1997; Okunribido et al., 2007; Chen et al., 2005; Tamrin et al., 2007; Bovenzi, 2010; Gangopadhyay & Dev, 2012).

Less commonly stated causes for low back pain among professional drivers are psychosocial risk factors such as satisfaction with job, work requirements, lifestyle (little sports activity, poor diet, smoking) and non-prescription medication (pain-killers) (Adams et al., 1999; Proctor et al., 1999; Kerr et al., 2001; Linton, 2001; Okunribido et al., 2007; Robb & Mansfield, 2007; Rabenu & Tziner, 2016; Šinigoj et al., 2011; Roblek & Bertoncelj, 2014; Askenazy, 2014).

The extensive review of scientific and professional literature in the field of occupational risk factors among professional drivers suggests insufficient research based on holistic views of psychosocial risk factors for low back pain in professional drivers.

The main aim of this study was to examine the theoretical foundations of psychosocial risk factors in low back pain, to determine which are the most common psychosocial risk factors for absenteeism, and the extent to which low back pain occurs among Slovenian professional

drivers as a result of the impact of various psychosocial risk factors. The research question was: What are the most common psychosocial risk factors for absenteeism, the extent to which low back pain occurs among Slovenian professional drivers as a result of the impact of various psychosocial risk factors?

Therefore, in our study, we focused on psychosocial factors for low back pain among professional drivers in order to determine whether and to what extent psychosocial factors affect, in the opinion of the respondents – professional drivers, low back pain occurrence.

2 Research methodology

2.1 Hypotheses

The following three hypotheses were set for the purpose of the study:

H1: Psychosocial factors influence the occurrence of low back pain among professional drivers
In recent decades, many scholars have studied different psychosocial risk factors in professional drivers that have direct impact on the low back pain (Grossi, Soares Ängeslevä & Perski, 1999; Devereux, Buckle & Vlachonikolis, 1999; Linton, 2001). In this study, psychological factors from different studies were combined and studied whether they can cause and effect the occurrence of low back pain.

H2: Occurrence of low back pain depends on gender, age and years of work among professional drivers
Low back pain typically occurs in the most active period of life when individuals are at the peak of their mental and physical abilities, that is, between 35 and 55 years of age (McBeath, 1970; Magora, 1973; Frymoyer & Cats Baril, 1991; Margan, Turk, & Palfy, 2009). Low back pain occurs in both men and women, although some researchers determined that low back pain is more frequent in women (Walsch, Crudas, & Coggon, 1922; Papageorgiou, 1995). Alcouffe et al. (1999) have determined that the risk factor of low back pain, which is characterized in particular for men, is the years of work. The study investigated whether the age, the gender and the years of work as a professional driver have an effect on the incidence of low back pain and to what extent.

H3: Occurrence of low back pain varies among different groups of professional drivers
Truck drivers are particularly exposed to the low back pain. In addition to vibration, approaching the resonance frequency of the spine, they are exposed to the other risk factors, such as a small work space, not ergonomic seats etc. (Bilban, 2014). Taxi drivers are exposed to vehicle vibration, unpredictable situations on the road and the stress caused by the drive (Miyamoto et al., 2008). The study investigated whether there is any variability in low back pain occurrence among professional drivers of various vehicles (buses, taxis, and commercial vehicles).

2.2 Sample description

In 2013 there were 8320 professional drivers in Slovenia. Out of this population, a stratified sample of 300 to 350 professional drivers was selected. Descriptive statistics was as follows: 93.8 percent of respondents were men and 6.2 percent were women, aged from 23 to 66 years with mean age of 41.6 years. Respondents weighed between 55 and 156 kg, on average 83 kg. The smallest respondent was 162 cm and the highest was 191 cm tall, average height was 175.6 cm.

2.3 Survey questionnaire

The survey questionnaire was prepared and previously tested on a pilot sample of 35 professional drivers in order to evaluate the reliability and validity of the instrument. The survey questionnaire consisted of 46 questions: 8 questions were open type, 12 closed type with one possible answer, 1 closed type with multiple-choice answers, 2 questions were semi-open type (the option “other”, in which the respondent added the appropriate answer), 23 questions were closed type on different scales from 1 to 7 (never - very often, medium - very strong, can stand without problems - very difficult to stand, does not affect low back pain - a significant impact on low back pain, not true - absolutely true).

The questionnaire was comprised of three sets of questions:

- First, to determine *socio-demographic data*: gender, age, weight and height, marital status of respondents, type of vehicle, years as a professional driver, number of days of absence from work, number of days absent from work due to low back pain, satisfaction with work, personal life, and leisure time, the frequency of engaging in sports and the reasons for doing sport, and lifestyle (smoking, drinking, use of painkillers.
- Second, the *following basic psychosocial factors were explored*: dissatisfaction with work, bad relationships between colleagues, poor attitude of managers, working in shifts, lifting and carrying heavy loads, inadequate working conditions, job loss, stress and personal dissatisfaction, misunderstanding of a partner, divorce, death of close family member, drinking coffee more than three times a day, smoking, regular nights out, poor physical condition and personal hygiene.
- Third, the incidence and severity of *low back pain as*

*a result of psychosocial risk factors were explored by asking respondents how often they feel low back pain, how intense was and how di*fficult it was to deal with. Respondents were also asked whether the low back pain persists after resting, regular exercise and medication, which posture pain was the strongest, how often they conduct exercises to prevent low back pain, how much time per day they devote to rest, and which activities were considered as active rest.

2.4 Study progress

Data collection *was conducted in 2012 and 2013. Online survey was anonymous and active from October till December 2013 and was limited to respondents in geographical area* of the Republic of Slovenia, covering altogether 275 respondents. It was estimated to be a representative sample. Completing the survey took respondents from 20 to 30 minutes on average. Most of the surveys were completed by interviewing the respondents, because of the complexity of questions and the need for additional explanations. In almost half of all cases, respondents were initially afraid to answer questions, mainly due to fear of losing their jobs, therefore complete anonymity was provided.

3 Results of the study

3.1 Descriptive statistics for the sample of the study

Among the respondents 93.8 % are men and 6.2% women, aged between 23 and 66 years. Average age is 41.6 years, with a standard deviation of 8.9 years. Respondents weight between 55 and 156 kg, on average, 83 kg, with a standard deviation of 12.2 kg. Most of the respondents (38.5%) live in a consensual union, followed by those who are married (28.7%) and single (19.3%). A quarter of respondents are city bus drivers, 24.4% professional car drivers, 16.0% of them drive truck, and 8.4% of the respondents chose the answer »other« (van, ambulance or taxi drivers). They work as professional drivers on average 13.5 years, with a standard deviation of 8.3 years. In the last year they were absent from work on average 16.6 days, with a standard deviation of 13.4 days. Due to the low back pain they were absent on average 5.5 days, with a standard deviation of 11.3 days.

More than half of all respondents (53.5 percent) were satisfied with their work, and 40.4 percent of them were partially satisfied with their work. 72.7 percent of all respondents were satisfied with their personal life, and 25.5 percent of them were partially satisfied. 77.8 percent spent their free time with friends, 75.3 percent with their family, and/or 53.1 percent watching TV. 33.8 percent of all respondents were involved in sport activities 2 to 3 times a month, 26.5 percent once a week, meaning more than half of them did sports in order to maintain good physical condition.

36.7 percent of all respondents were regular smokers that were smoking on average for 17.8 years, 4.4 percent were occasional smokers that were smoking on average for 14.7 years. 22.9 percent of all respondents had smoked in the past but ceased to smoke. Alcohol was occasionally consumed by 78.9 percent of all respondents, and 1.8 percent of respondents were regular drinkers. 74.9 percent of all respondents were occasionally taking painkillers, and 9.8 percent were using them regularly.

In the Table 1 the psychosocial factors were presented assessed by respondents on a scale from 1 (no impact on low back pain) to 7 (high impact on low back pain).

Almost half of all respondents (48.4 percent) claimed that low back pain was the strongest when bending forward, 40.4 percent stated that they exercise at least once a week in order to prevent lower back pain, but 40.0 percent of them never exercised. 36.0 percent of all respondents devoted time to rest from one to two hours, 30.5 percent of them rested from half an hour to one hour, and 27.3 percent rested for more than two hours a day. 37.5 percent of all respondents did, as active rest, walking/trekking, 22.5 percent were reading books, and 21.5 percent of them were listening to music.

3.2 Testing of hypotheses

The first hypothesis “Psychosocial factors cause and effect the occurrence of low back pain among professional drivers” was verified through multiple regression analysis. Stepwise regression analysis was performed (Boslaugh & Watters, 2008).

In the regression model, a dependent variable the incidence of low back pain and as independent variables the psychosocial factors were included.

Model 1: Psychosocial factors cause and effect the occurrence of low back pain among professional drivers.

Five regression models were developed through the “stepwise” method. The first regression model included variable inadequate working conditions, which explained 34.4 percent of the variability of variable incidence of low back pain. The second regression model included variable dissatisfaction with work, which explained 4.7 percent of the variability, and the third regression model included variable shift work, which explained 1.8 percent of the variability. The fourth regression model included variable job loss, which explained 1.1 percent of the variability, and the fifth regression model included variable disrespectful attitude of managers, which further explains 0.9 percent of the variability of the dependent variable.

Table 1: Descriptive statistics of psychosocial factors

Psychosocial factors	M	SD
dissatisfaction with work	2.7	1.9
bad relations among colleagues	2.1	1.2
disrespectful attitude of managers towards employees	2.6	1.8
shift work	4.0	1.1
lifting and carrying heavy loads	5.1	1.3
unsuitable working conditions (working space, cabin seat, noise, traffic, vibrations)	5.0	0.9
job loss	3.1	1.5
stress	3.3	1.7
personal dissatisfaction	3.0	1.9
misunderstanding of partners	2.4	1.8
family split (separation from spouses)	2.7	1.9
death of nearest family member	3.1	1.7
drinking coffee more than three times a day	1.8	1.0
smoking more than one packet of cigarettes a day	1.9	1.1
regular nights out	4.1	1.9
poor physical condition	4.9	1.8
personal hygiene	2.0	1.5

Table 2: Summary of regression for H1

Model	*R*	R Square	Adjusted R Square	Std. Error of Estimate
1	0,587[a]	0,344	0,342	1,410
2	0,626[b]	0,392	0,387	1,361
3	0,640[c]	0,410	0,404	1,343
4	0,649[d]	0,421	0,413	1,332
5	0,656[e]	0,430	0,420	1,324

a. Independent variables: (Constant), Unsuitable working conditions (part: do not affect the LBP - low back pain)

b. Independent variables: (Constant), Unsuitable working conditions (part: do not affect LBP, Q23a Dissatisfaction with work: does not affect LBP

c. Independent variables: (Constant), Unsuitable working conditions (part: do not affect LBP, Dissatisfaction with work: does not affect LBP, Work Shift: does not affect LBP d. Independent variables: (Constant), Unsuitable working conditions (part: do not affect LBP, Dissatisfaction with work: does not affect LBP, Work Shift: does not affect LBP, a Job loss: does not affect LBP

e. Independent variables: (Constant), Unsuitable working conditions (part: do not affect LBP, Dissatisfaction with work: does not affect LBP, Work Shift: does not affect LBP, a Job loss: does not affect LBP, disrespectful management relationship: does not affect LBP

Consequently, only the fifth regression model was considered. On the basis of the variables such as inadequate working conditions, dissatisfaction with work, work shift, job loss, and irreverent attitude, 43.0 percent of the total variability in the incidence of low back pain was explained. The correlation coefficient was 0.656, and standard error of estimate was 1.324 (see Table 2).

The model suggested that 5 variables out of 17 had a statistically significant effect on the incidence of low back pain, so they were included in the model. The incidence of low back pain was affected by inadequate working conditions, dissatisfaction with job, work shift, job loss, and disrespectful attitude of managers (see Table 4).

The model further suggested that 43.0 percent of the variability in incidence of low back pain can be explained by some psychosocial factors. The regression model was statistically significant (F = 40.617, α = 0.000). Therefore, the hypothesis "Psychosocial factors cause and effect the occurrence of low back pain among professional drivers" was confirmed.

It was apparent that only the following psychosocial factors had statistically significant effect on the dependent variable: inadequate working conditions, dissatisfaction with work, work shift, job loss, and a disrespectful attitude of managers. The values of standardized regression coefficient were as follows: for the inappropriate working conditions was 0.388 (α = 0.000), for dissatisfaction with work was 0,205 (α = 0.002), for working in shifts was 0.188 (α = 0.002), for job loss was 0.165 (α = 0.005), and for standardized regression coefficient for disrespectful attitude of managers was 0.140 (α = 0.043). All variables, except the disrespectful attitude of managers, had positive impact on the dependent variable. Increasing acceptance of influence for these factors on low back pain meant higher incidence of low back pain, while smaller concurrence with disrespectful attitude meant higher incidence of low back pain. Depending on the value of standardized regression coefficients, unsuitable working conditions had the greatest

Table 3: Statistical significance of regression model 5 in H1

Model		Sum of Squares	*df*	Mean Square	*F*	Sig.
5	Regression	356,187	5	71,237	40,617	,000
	The residue	471,799	269	1,754		
	Together	827,985	274			

Table 4: Regression coefficients for H1 (Model 5)

Model *B*		Unstandardized Coefficients		Standardized Coefficients	*t*	Sig.
		Std. Error.	*Beta*			
5	(Constant)	0,815	0,211		3,859	0,000
	Unsuitable working conditions (part: do not affect the LBP)	0,312	0,046	0,388.	6,708	0,000
	Dissatisfaction with work: does not affect LBP	0,183	0,057	0,205	3,188	0,002
	Work Shift: does not affect LBP	0,152	0,050	0,188	3,066	0,002
	Job loss: does not affect LBP	0,126	0,045	0,165	2,809	0,005
	Disrespectful relationship management: does not affect LBP	0,120	0,059	0,140	2,036	0,043

impact on incidence of low back pain, while disrespectful attitude of managers had only minimal influence on incidence of low back pain.

The second hypothesis "The occurrence of low back pain varies according to gender, age and years of work among professional drivers" was verified through a regression model, where independent variables gender, age, and years of working as a professional driver were included. A dependent variable was incidence of low back pain. Hence, the influence of gender, age and years of work as a professional driver on the importance of low back pain was examined.

Model 2: The occurrence of low back pain varies according to gender, age and years of work among professional drivers

Stepwise method was used in order to develop one regression model. This model included the variable age only, which explained 2.5 percent of variability of importance on low back pain. The correlation coefficient was 0.157, standard error of estimate was 1.946 (see Table 5).

The regression model was statistically significant ($\alpha < 0.05$) (see Table 6).

The variable age had statistically significant impact on the incidence of low back pain ($\alpha = 0.009$) (see Table 7).

Age had positive effect on the occurrence of low back pain among professional drivers. The older professional drivers were the stronger their low back pain. Therefore, the hypothesis "The occurrence of low back pain varies according to gender, age and years of work among professional drivers" was confirmed.

The third hypothesis "Occurrence of low back pain varies among different groups of professional drivers" was verified by using analysis of variance (ANOVA). The incidence of low back pain varies among groups of respondents depending on the type of vehicle they drive as professional drivers (bus, lorry internationally, suburban or peripheral, tourist bus, local lorry, tourist bus, car, etc.) was assessed. To verify third hypothesis, the variables incidence of low back pain, and type of vehicle driving by professional drivers were assessed.

Low back pain most frequently occurred among drivers of city buses (M = 4.0), followed by lorry drivers on international routes (M = 3.8), and drivers of suburban or peripheral bus routes (M = 3.5). Fewer problems with low back pain were determined among professional drivers of passenger cars (M = 3.2) (see Table 8).

Analysis of variance suggested that the results were not statistically significant ($\alpha < 0.05$). It showed that among varies groups of professional drivers there were no significant differences in incidence of low back pain (see Table 9).

Therefore, hypothesis "Occurrence of low back pain varies among different groups of professional drivers" was not confirmed.

4 Discussion and conclusion

Professional drivers as a group are exposed to high risk of developing low back pain. Namely, while working in often fixed seated position behind the wheel, they are confronted with whole-body vibration, forced position, and heavy handlings of goods. Low back pain among professional drivers is more common than in professions where work is

Table 5: Summary of the regression model for H2
a - Independent variables: (Constant), Age

Model	*R*	R Squar	Adjusted R Square	Std. Error of Estimate
1	0,157[a]	0,025	0,021	1,946

Table 6: Statistical significance of the regression model for H2

Model		Sum of Squares	Df	Mean Square	*F*	Sig.
1	Regression	26,174	1	26,174	6,914	,009[b]
The residue	1033,463	273	3,786			
Together	1059,636	274				

a. Dependent Variable: LBP is: medium

b. Independent variables: (Constant), Age

carried out in changing body positions.

Ergonomic factors associated mainly with uncomfortable seats and uncomfortable back supports are commonly stated as causes for low back pain. Our study suggests that psychosocial factors are also important cause for the development of low back pain among professional drivers that can limit the quality of their social and professional lives. Risk factors are various and include prolonged sitting, forced body position, exposure to whole-body vibration, and other parallel factors such as heavy lifting, poor diet and a number of other psychosocial factors. The study assumed that gender, age and years of work as a professional driver can impact the occurrence of low back pain, but we could not confirm that in its entirety. The study shows that professional drivers are frequently confronted with acute low back pain that can last up to 6 months. The older professional drivers (i.e., more years of work as professional drivers) the stronger their low back pain problems. Gender differences exist, although low back pain is more typical for women, and are statistically significant among professional drivers.

Our study further shows that low back pain is more often among bus drivers and lorry drivers on international routes than among professional drivers of vans and passenger cars, but without any statistical significance. Professional drivers, as a profession, are very exposed to diseases of the locomotor system, especially the lower spine, and based on the findings of the study we can conclude that there are differences among various groups due to different nature of their work. Namely, bus and lorry drivers are during their work behind the wheel practically all the time and do not have so many opportunities for rest and exercise like professional drivers of passenger cars do. The latter, on average, drive shorter distances, and often leave their vehicles. Professional drivers of vans and passenger cars namely have more time to rest and relax (stretch their legs). In order to prevent low back pain they exercise once a week, rest actively or devote their time to rest from one to two hours.

The present study represents a significant contribution to new knowledge in the field of management and governance of organizations. Its key contributions are in directing the awareness of theorists and practitioners about the importance of workplace health and lack of in-depth design, practical programs and holistic treatment. Fast technological development, sharp competition, globalisation and similar trends are forcing companies to have proper developmental goals connected to their employees. It is therefore a priority task of them to secure a high-quality human resource structure, primarily focused on raising the levels of productivity, efficiency, creativeness, innovativeness and safety at work (Sprajc, Sifrer, Novak, 2011). Also, we consider human resource management's way of functioning as a strategic partner in a company with a healthy orientation (Sprajc, Podbregar, 2016). Clarification in the scientific literature differently defined narrow scientific fields. Our aim is to clarify the unexplained holistic psychosocial risk factors and treatment effects on the

Table 7: Regression coefficients for H2

Model		Unstandardized Coefficients		Standardized Coefficients	*t*	Sig.
B		Std. Error.	*Beta*			
1	(Constant)	2,189	0,563		3,888	0,000
	Age:	0,035	0,013	0,157	2,629	0,009

Table 8: The average incidence of low back pain among professional drivers of various vehicles

Professional driver	N	M	s.o.
City bus	70	4,0	1,8
Lorry (international)	44	3,8	1,8
Suburban or peripheral bus	32	3,5	1,5
Lorry (local)	31	3,4	1,5
Other	18	3,3	2,0
Tourist bus	8	3,3	1,0
Passenger car	72	3,2	1,8

Table 9: Analysis of variance

	Sum of Squares	of	Mean Square	F	Sig.
Between groups	27,765	6	4,627	1,550	0,162
Within groups	800,221	268	2,986		
Together	827,985	274			

health of the population of the professional drivers. Such factors can lead to absenteeism. The study provides an initial demonstration research in the Slovenian practice. Furthermore, it provides solutions in a holistic approach to solve the problem managing risk factors.

To deepen our knowledge about how low back pain occurs among professional drivers, it would be interesting for future studies to continue longitudinal research in various groups of drivers and to focus on more (or all) psychosocial factors. Development of standardized questionnaire with the help of experts is a recommended approach, and more representative samples may provide a better basis for the generalization of the results.

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Psihosocialni faktorji in pojavnost bolečine v križu pri poklicnih voznikih

Ozadje in namen: Poklicni vozniki predstavljajo poklicno skupino, ki je zelo izpostavljena tveganjem, da razvije bolečino v križu zaradi ergonomski kot tudi psihosocialnih dejavnikov. Namen naše raziskave je ugotoviti pojavnost bolečine v križu pri poklicnih voznikih v Sloveniji kot rezultat različnih psihosocialnih dejavnikov tveganja.
Oblikovanje/Metodologija/Pristop: V raziskavi je sodelovalo 275 anketirancev, poklicnih voznikov iz Slovenije (poklicni vozniki avtobusv, poklicni vozniki osebnih avtomobilov, vozniki tovornjakov, taksisti in vozniki reševalnih vozil). Hipoteze smo testirali s pomočjo multivariatne statistične metode (regresijske analize) in analize variance. Podatki so bili pridobljeni s strukturiranim anketnim vprašalnikom, sestavljenim iz treh delov: osnovni demografski podatki, vprašanja v zvezi s psihosocialnimi dejavniki tveganja za bolečino v križu in posledice bolečine v križu, zaradi psihosocialnih dejavnikov.
Rezultati: Rezultati kvantitativne raziskave so pokazali, da na bolečino v križu pri poklicnih voznikih najbolj vplivajo naslednji dejavniki: dvigovanje in prenašanje težkih bremen, neprimerni delovni pogoji, slaba telesna pripravljenost, redno ponočevanje, delo v izmeni ter stres. V raziskavi smo ugotovili, da spol vplivaj na pojavnost bolečine v križu. Bolečino v križu imajo najpogosteje vozniki mestnega avtobusa in tovornih vozil na mednarodnih progah, najredkeje pa poklicni vozniki osebnih avtomobilov, vendar razlike niso statistično značilne.
Sklep: Naša raziskava opozarja, da so tudi psihosocialni dejavniki tveganja tisti, ki lahko poklicnim voznikom povzročijo pojavljanje bolečine v križu in jim posledično zmanjšajo kvaliteto njihovega zasebnega in poklicnega življenja.

Ključne besede: *bolečina v križu; psihosocialni faktorji; poklicni vozniki; preventive; Slovenija*

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Strategic Aspect of Knowledge Management

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Background and Purpose: This paper analyses the strategic aspects of knowledge management in organizations in Serbia, from the theoretical and empirical point of view. In its theoretical part, the paper analyzes the latest literature in the fields of knowledge management, relations between communications strategyes and knowledge management, generations of knowledge management and organizational culture.
Design/Methodology/Approach: In its empirical part, the paper deals with determining the level of knowledge management in Serbian organizations through diffrent generations of knowledge management, as well as the problem with explicit and tacit knowledge management. The hypotheses were tested using data colleted from organizatons in Serbia via questionnaire, which consisted of 50 questions to examine five key factors in knowledge management.
Results: The results showed that out of 41 indicators, only eight are rated positively. Results of t-test indicate significant distinctions within factors affecting the quality of knowledge management, as well as differences in quality of explicit and tacit knowledge management, therefore they confirmed both hypotheses.
Conclusion: The knowledge management projects in organizations in Serbia are initiated, as well as that belonging to the first generation of knowledge management can be defined.

Keywords: *knowledge management; strategy; explicit knowledge; tacit knowledge; knowledge generations*

1 Introduction

Organizations based on the work and the capital are increasingly being replaced by the organizations based on the knowledge, because their success and survival is conditioned by the creation of new, better and innovative products and services. As a result of globalization, companies are involved in a complex unprecedented volume of information, generating, in turn, a need to create products for current markets and dealing with new competitors, which requires their constant innovation (Garcia, & Coltre, 2017). The work based on knowledge is not any more the feature of only new information technology companies, but it is the feature of almost all organizations, in all fields. Knowledge has become a main source of wealth, and knowledge workers are the most vital asset, and how to manage knowledge is the most important task for all organisations and individuals (Wu, Ming, Wang, & Wang, 2016). It requires multidisciplinary expert knowledge and common learning in order to achieve the complex synthesis of contemporary technologies and specific domains of knowledge. The characteristic of organizations based on knowledge is the strategic and technical expert knowledge that provides them competitive position towards. Company's knowledge management is a framework that considers business processes as the processes which create value added knowledge and empower knowledge management processes through changing and correcting processes, systems, and organizational culture with the help of knowledge tools and techniques (Shannak, Ra'ed, & Akour, 2012).

According to some authors (Ghisi, 2014) we are now in the knowledge era which requires a certain *knowledge economy.* Knowledge-based companies originate profits from the commercialisation of the knowledge created by their employees (Royal, Evans, & Windsor, 2014). Name-

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ly, a great part of the investments of an organization goes to the growth of knowledge and competences, i.e. to the increase of human capital. The stock of competencies, knowledge, social and personality attributes, including creativity, embodied in the ability to perform work to produce economic value, is generally termed as human capital (Royal, Evans, & Windsor, 2014). Another part of investments goes to the development of information technologies, which can lead for a while in a drop of profits, but with a simultaneous increase of the value of organization (see for example Mitra, Sambamurthy, & Westerman, 2011, 57).

The change of the role of human capital (i.e. knowledge, skills and experience of employees) capital requires a new type of leader, able to keep up with the rapid changes in an organization. It is important for managers in organizations to actively leverage subordinates' human capital and to specifically focus their attention on the processes of converting their tacit knowledge to explicit knowledge. This becomes a critical activity in the performance management domain (Lakshman, 2014). A leader who will stimulate the transformation of individual knowledge into explicit organizational knowledge and connect the human, structural and client's capital in order to define a better business strategy will acquire an advantage in relation to the competition.

2 Theoretical background

As a ticket for the future, the organizations have begun to use knowledge more and more. The main characteristic of a modern social and economic life in its every aspect are changes (Kastratovic, Arsenijevic, & Miletic, 2016). "Why do firms differ?" A number of researchers in the field of strategy has raised this question. An answer to this question also sets the knowledge-based view of strategy (KBS) apart from other schools of thought of strategy: firms differ not just because they have different value chains and activity systems or different resources and competencies, but because they envision different futures (Takeuchi, 2013). Many authors believe that the success of a particular business strategy, among other things, depends on a coordinated resource management, which implies a coordination of the two main forms of resources that the organizations are using: (1) physical resources – money, equipment, material, buildings and time and (2) conceptual resources – data, information and knowledge (Carneiro, 2000). Therefore, we can say that for them the success of the company requires the coordination of physical, i.e. material or tangible, conceptual, i.e. intangible, resources, while a good and coordinated management provides both resources for the company to acquire and maintain competitive advantage. However, the other authors advocate for a narrower view of the resources that enable success to the company. Thus, Sharp (2006) believes that success of an organization is directly related to the manner in which we can create, use and measure intangible resources, by which a circle of crucial resources is narrowed, i.e. it directly points to the fact that today physical resources are no longer crucial for the success of the company. Similar opinion also has Kermally (2002) who says, that the intangible property plays a major role in a construction of the abilities of the company and defines that an intangible property consists of the people and their knowledge, buyers, culture, brand, process and own technology and innovations. In accordance to that, in order to rexamine the claims mentioned, Sánchez, Chaminade and Olea (2000) use Barney test. A test consists of characteristics that a particular resource must meet in order to possess the potential that provides a sustainable competitive advantage to the company. Those characterisics are: it must have its value that is visible through the ability of the resource to use the advantage or neutralize the threats from the environment; it must be rare among the current and future competitors of the company; it must be impossible to imitate; there does not exist a substitute that has the same value and it has to be rare (Barney, 1991). They stress that the intangible resources are the only ones that pass Barney test, because in essence the majority of traditional sources of competitive advantage have become easily accessible. Nowadays, the most important role in the creation of a competitive advantage has the knowledge. Knowledge sharing practices among individuals, groups and units are essential for organizations, to create, share, capture and application of knowledge that enables organizations to improve resource structuring and capacity building (Rehman, Ilyas, & Asghar, 2015). The growing importance of knowledge sharing practices has encouraged the managers to emphasize more on KMS because it helps to align the organization processes, structure and culture for better sharing of knowledge which may lead to better performance outcomes (Rehman, Ilyas, & Asghar, 2015). Improving competitiveness should take the inter-relationships and dependencies arising from the implementation of innovative processes, creating organizational aspects of management in the processes of modernization and revitalization of enterprises into account (Firlej, 2012).

In the literature, the appropriate **management strategy** that deals with knowledge in organizations is labelled with the term knowledge management. Knowledge, like all other resources has to be properly managed. Otherwise it will be lost, become useless or even counterproductive creating a chaos. Knowledge management is a set procedures developed to prevent such loss to take place (Hajdić, & Dulčić, 2013). Knowledge management is the explicit and systematic management of vital knowledge and its associated processes of creating, gathering, organizing, diffusion, use and exploring. It requires turning personal knowledge into corporate knowledge that can be widely shared throughout an organization and appropriately applied (Anand, & Singh, 2011). In an organization, knowl-

edge management represents the sharing of knowledge through an ongoing process of development and constant improvement, which increases the innovative capabilities of employees (Batra, 2010). In its simplest form, knowledge management involves three activities: knowledge acquisition, knowledge dissemination, and receptiveness to knowledge within the organization (Ooi, Teh, & Chong, 2009).

The information and knowledge are the thermonuclear competitive weapons of our time. Knowledge management is presently of specific interest to economists dealing with corporate governance, as over the last four decades they have noted a lack of influence of the traditional factors of competitive advantage due to the growing impact of global processes, diffusion of innovation and the widespread uptake of modern technologies in production processes (Firlej, & Žmija, 2017). A knowledge is more valuable and more powerful than the natural resources, big factories, or fat bankrolls. Knowledge is designed to contribute to the development of the society, improve the competitiveness of the economy, and should also help to achieve better results for companies and an increase in their value (Firlej, & Žmija, 2017). The knowledge management is a system that integrates people, processes and technology for sustainable results, by increasing performance through learning (Gorelick, & Tantawy-Monsou, 2005).

For knowledge management, we can say that it is the „recognition, creation, documentation, distribution and transfer of tacit and explicit knowledge among the individuals for the purpose of increasing organizational success" (Jackson, DeNisi, & Hitt, 2003). Or that it is „a framework that implies setting of the system, process and culture in order to manage one of the more important corporative resources – knowledge". By explicit knowledge, we refer to the knowledge that we exteriorise and formulate (Collins, 2010). Studies draw on explicit knowledge, citing rewards (Shalley, Zhou, & Oldham 2004) opportunities to learn new skills and knowledge (Amabile, Conti, Coon, Lazenby, & Herron, 1996) varied work paths, exposure to new perspectives (Williamson, 2006) and team working (West, & Farr 1990) as key drivers for enhancing creativity. Explicit knowledge refers to the knowledge which can be articulated, codified, communicated and stored in formal language or with the use of symbols such as grammatical statements, mathematical expressions, specifications, technical manuals, written procedures etc. (Nonaka, & Takeuchi, 1995). Tacit knowledge is knowledge within the individual. It originates from action, experience and involvement in a specific context. The tacit dimension of knowledge is comprised of cognitive elements (an individual's mental models consisting of mental maps, beliefs, paradigms and view-points) as well as technical component (crafts, skills, and know-how that apply to a specific context) (Alavi, & Eeidner, 2001). Tacit knowledge is characterized by the difficulty of being trustworthily formalized though a language that can be registered and shared, as in general, it is stored in the individuals' mental structures and it is displayed through the beliefs, experiences and working practices (Paolino, Paggi, Alonso, & Lopez, 2014). Call warns that a vague definition of knowledge management probably simultaneously represents the cause for the success of this field, as well as the threat for its failure. The main goal of the systemic knowledge management is to provide a tacit and explicit knowledge and creation of the conditions for innvations for the purpose of the better quality of a decision-making process. More precisely, the goal of a knowledge management should be the correlation of the questions with answers or the people who know the answer. The goal is to enhance organizational performance by explicitly designing and implementing tools, processes, systems, structures, and cultures to improve the identification, capture, validation, and transfer knowledge critical for decision making (Leavitt, & O'Dell, 2004). A knowledge may grow from subliminal to idealistic as it becomes better established and understood, then to systematic, then to pragmatic, and finally to the automatic knowledge when it is very well understood. From the well established knowledge we can then start to glimpse new ideas and concepts through creativity and innovation (Wiig, 1991).

Relations between a knowledge and strategy in the organization can be observed from the standpoint how much the knowledge and the efficient knowledge management contribute to the competitive advantage of particular organization. Some definitions of the knowledge management relate it even directly to the desired or achieved competitive advantage.

The strategy represents a certain knowledge by itself. It consists of certain knowledge structures which can be articulated and can be followed throughout their changes in time and classified into crucial and supporting elements. This knowledge is most frequently possessed by the top management of the company, but it can also be more widely distributed. It consists of the knowledge of mission and goals, knowledge of the competition, knowledge of clients (buyers), knowledge of the industry and relations between these domains of knowledge.

2.1 Relationship between knowledge management and organizational culture

By the organizational culture, we usually imply the system of assumptions, beliefs, values and norms of behavior that the majority of the members of one community have developed and adopted through the joint work and experience and which direct their way of thinking and behaviour.

One of the globally most accepted commercial tools for the evaluation of organizational culture is OCI (Or-

ganizational Culture Inventory). The OCI can be used to obtain reliable data on the behavioral norms of the organization and/or its sub-units, validate a need for cultural change on the part of participants, identify the areas where change needs to take place, develop a vision for culture change, create individual and organizational action plans for effecting cultural change, evaluate the impact of organizational change efforts (Cooke, & Lafferty, 2012). With this instrument, we measure 12 different, but related sets of norms of behavior and expectations, which are implicitly or explicitly required from the employees in order to meet the expectations of the organization or particular business unit. These twelve sets of behavior norms are categorized into three basic clusters or types of organizational culture: constructive, passive defense and aggressive defense. By focusing on behavior norms, instead of global aspects of the culture, such as common values and beliefs (although they are closely related), OCI is more aimed towards everyday activities of organization's members and thus the entire concept of organizational culture seems less abstract and easier for understanding and management.

2.2 Generations of knowledge management

As the field of the knowledge management is rather young and has started to develop at the time when the changes in business world has appeared rapidly and constantly, thus the characteristics of the knowledge management concept are rapidly changing and adapting to the business environment. Today, these changes in the field of knowledge management are referred to as the generations, i.e. phases of knowledge management. There are three generations of knowledge management mentioned in the literature that relatively rapidly replaced one another. Thus, McElroy (2000) writes that he has spotted a change in practice of knowledge management (i.e. transfer from the first to the second generation) and only a few years later, in the literature appears the third phase of development cycle of the knowledge management (Koenig, & Srikantaiah, 2004). However, this kind of a rapid development cannot be simultaneously finded in practice, and thus Carrillo (2006) writes that the first and second generation of knowledge management are rather widespread, while the third phase is in its beginnings.

The first generation of knowledge management starts with observing the company and its abilities through the resources that it owns, i.e. the acceptance of resource theory of the company's strategy, which has led to the knowledge management development. First-generation of knowledge management seeks only to enhance the integration of existing organizational knowledge through strategies such as knowledge capture and sharing (Kmci.org, 2017).

The second generation of knowledge management has resulted from the need for solving one of the main problems from the first generation – the inadequate organizational culture, which does not support the activities of knowledge management and focuses on the human and culturological dimension. Second-generation of knowledge management strives to improve knowledge integration, too, but it also seeks to improve knowledge production (Kmci.org, 2017). The top management in this generation becomes an important actor, which along with the development of awareness of the role of knowledge in a modern business world invests more and more in good management. The second generation of knowledge management revolves around the transfer of knowledge and the best practice (Sherif, 2006). This generation is also characterized by the interest for the measurement of specific benefits from the implementation of knowledge management activities.

The third generation of knowledge management is focused on simplification of the process of coding the knowledge and information, as well for its preservation so the knowledge is always and at any moment easily accessible. The characteristics of a third generation of knowledge management are: the company optimally takes care of all the factors that affect the successful knowledge management, a special care is paid to coding and storage of information and knowledge for the sake of simplicity in the access and using of them. The practical implications of the third generation of knowledge management are far-reaching and profound. Out of the third generation knowledge management school of knowledge management theory and practice has come a new type of organization in which knowledge is continually being developed and is always open to criticism: The Open Enterprise. Creating and maintaining such environments, even as command and control styles of management continue to prevail, is the overriding vision of the third generation of knowledge management. The result? High-performance knowledge processing, sustainable innovation, and greater levels of corporate integrity and accountability (Kmci.org, 2017).

Problem of the research was to establish whether there is knowledge management in Serbian organizations and at which level it is. We set our goal as to determine the level of knowledge management in Serbian organizations through diffrent generations of knowledge management, as well as the problem with explicit and tacit knowledge management.

3 Method

The goal of our research is to test the following two research hypothesis (RH):

Hypotheses

The initial hypotheses that were the starting point of the research are:

H1: Organizations in Serbia are in the first phase of knowledge management.

In the literature, the definition in the first phase of knowledge management was the introduction to describe the management activity concerned with implementing such solutions, in order to gain competitive advantage and to increase productivity and effectiveness (Firestone, McElroy, 2003). Based on the different generations of knowledge management, we've analysed the organizations in Serbia as from the standing point of the development.

H2: In organizations in Serbia it is managed more with explicit than tacit knowledge.

The categorization of knowledge into tacit or explicit has become a cornerstone in the literature on learning and knowledge management (Becerra, Lunnan, & Huemer, 2008). Our hypothese is pushing our understanding of how these two sorts of knowledge flows between organizations in Serbia.

Methodology

An instrument that was used in the study consisted of the questionnaire for the measurement of crucial factors in knowledge management (the questions are grouped into five units for examining the five key factors in knowledge management and it contains 50 questions, the key factors are: infrastructure, carriers, organizational culture, IT and usefulness measurement) (Vidović, 2008). When designing the questionnaire we've adapted the questionnaire from the master thesis (Vidović, 2008).

For data processing, we have used the statistical software SPSS. In addition to descriptive statistics, the difference between arithmetic means was also tested by T-test, as well as variance analysis ANOVA.

The sample of respondents

Studies have included Serbian companies chosen from APR (The Serbian Business Register Agency) register. The sample consisted of medium and big companies and there was a total of a 100 of them. The characteristics of the companies examined: by the size – from 50 to 250 of employees 29,5 %, from 250 to 500 employees 35,3 %, from 500 to 1000 employees 17,6 %, more than 1000 employees 17,6 %, from different industrial branches with private (50 %) and state (50 %) ownership structure.

4 Results

By the conducted research, 41 indicators of the general state of knowledge management in Serbia has been collected. The collected indicators were grouped according to key factors that influence the knowledge management. In order to better implement the analysis of knowledge management practices in Serbian companies, ratings of the level indicator are listed (+ or -), depending on whether the indicator indicates a positive or a negative practice of knowledge management. He positively assessed indicator of knowledge management practices if it is recorded in 50% and more companies, a negative estimated is one that is present in less than 50% of them.

The questions from the questionnaire are presented in the appendix. By the analysis of answers to 11 asked questions that refer to **the infrastructure of knowledge management** (see Appendix; questions no. 1 to 11) we can conclude that only two indicators point to the positive practice of knowledge management in Serbian companies: 69% of organizations have a list of crucial knowledge and 55% of them plan and implement the knowledge of the employees according to the real needs of the company. The other indicators (comparison of the required and available knowledge at the annual level 38,5 %, education of more than 50% of employees in the previous year - 36,3 %, low fluctuation of employees after the education 34%, employment of more than 50% of new workers due to specific knowledge and skills that the organization needs 36 %, more than 1% of employees perform the jobs of knowledge management 10,5 %, the existence of own library with books and journals from the fields relevant for the company 45,1 %, the existence of the obligation to transfer the interesting things and the knowledge acquired from the conferences – 22,6 %, congresses and etc to other colleagues, implementation of the practice of meetings after the completion of projects with the aim to determine the acquired knowledge and experiences on the project – 20,9 %, an insight into the experiences acquired and practice available to the employees who have not participated in those projects– 25,5 %) that refer to education of employees and the transfer of tacit and explicit knowledge in an organization cannot be positively evaluated because they are not carried out in more than 50% of organizations.

When we talk about the indicators that refer to **knowledge carriers** (see Appendix; questions from no. 12 to 21) as a key indicator in success of knowledge management, it is important to mention that it is possible only to observe the state of facts and not determine whether it is positive or negative from the perspective of the knowledge management practice and it refers to the indicators on a person responsible for the knowledge management. From the ten indicators (knowledge is mentioned in the mission – 15,5 %, there is a person at the level of organization responsible for knowledge management – 45,2 %, person for knowl-

edge management is in top management – 23,6 %, person for knowledge management is in the human resources management sector– 86,2 %, person for knowledge management takes care of the education and development of employees – 50 %, observing operating success of the employees with a contribution to knowledge management – 29 %, observation of contribution to knowledge management in case of more than 50% of employees – 10 %, rewarding the contribution of employees to knowledge management 58 %, there is an official program of mentoring for the newly-employed – 48,4%, more than 5% of employees take part in the mentorship program – 26,7 %) only two can be evaluated as positive practice of knowledge management and they refer to rewarding of the employees and the existence of official mentoring program for the newly-employed. From the results, we can also observe the fact that top management does not provide a sufficient support to knowledge management. This can be concluded from the fact that a small percentage of the company has the knowledge management positioned at a strategic level, only 28.6%, or the importance of the knowledge involved in the organizational mission statement - 18.5%. Lack of support from top management, according to its frequency, is the third most common barrier that occurs as an obstacle to the introduction or maintenance of a system of knowledge management in Serbian enterprises. On the first and second place, there are barriers relating to the lack of available time of employees and lack of initiative to launch the knowledge management.

Study of the indicators that refer to **organizational culture** (see Appendix question no. 22) has led to the conclusion that only one of the nine indicators can be evaluated as positive for the practice of knowledge management and that is the existence of a room predicted for informal socializing of employees during the working hours: according to the perception of the person in charge of KM, open communication mainly prevails – 6,4 %, according to the perception of a person in charge of KM, there prevails the confidence among the employees – 23,7 %, according to the perception of a person in charge of KM, employees mainly mutually share their knowledge – 34 %, according to the perception of a person in charge of KM, the employees mainly openly talk about the level of their knowledge – 15 %, according to the perception of a person in charge of KM, the company is innovative – 35 %, according to the perception of a person in charge of KM, the employees have time to talk to their colleagues – 38,6 %, according to the perception of a person in charge of KM, there is a room for socializing of the employees during the working hours – 51,2 %. We can conclude that all the indicators point to the lack of knowledge culture, which implicitly points out to a very bad condition when it comes to knowledge management.

From the **indicators that refer to IT** (see Appendix; questions from no. 23 to 32), three can be evaluated positively, more precisely: the company uses IT for managing the documents for the purpose of knowledge transfer – 58,3 %, the company for more than 50% of its employees provides the connection through IT – 65,3%, company in yellow pages mentions the data for more than 50% of its employees – 57 %. The other six indicators have a negative foresign: the company uses a software for knowledge management – 21,5 %, the company uses IT in order to support dynamic communication in the form of questions and answers, online survey and offers the information on novelties within the company – 42,3%, the company publishes new documents or texts on daily basis through IT for documents management – 31%, the company uses IT for the needs of creating knowledge basis and it provides a simple archiving, categorization and browsing of specific, expert knowledge – 35,6%, they use IT for yellow pages – 31,3%, companies that believe that yellow pages should contain the data for more than 50% of employees – 45%.

The last segment of the indicators refers to those who point to the **measurement of the benefits of knowledge management** (see Appendix; questions no. 33 and 34). Those are: the companies that have indicators regarding knowledge management – 12,3% and companies that record and transfer their experiences that confirm the importance and usefulness of knowledge management – 42 %. As it can be seen from the answer, both indicators can be evaluated negatively.

When we observe the indicators for all five factors in summary, we can conclude that the poorest indicators are related to measurement of the usefulness of knowledge management, then carriers of knowledge management,

Table 1: Percentage of the positive indicators of the practice of KM in organizations in Serbia

Factor that indicators refer to	Number of indicators	Percentage of indicators favourable for KM	Rank
Infrastructure	11	18,2%	3
Carriers	10	25 %	2
Organizational culture	9	11,1%	4
IT	9	33,3%	1
Usefulness measurement	2	0%	5
Total	**41**	**19,5%**	**-**

and organizational culture. The best are those indicators that are related to IT which are used for knowledge management. Of the total of 41 indicators, only eight are positively evaluated, which points to a relatively bad practice of knowledge management in medium and big companies in Serbia, which is shown in Table 1.

When we talk about the grades of key factors, it is important to notice that IT factor has got the highest average grade – 3,31, and measurement of usefulness the lowest – 2,22. The results tell us that IT as a support to knowledge management is the most developed in all the organizations examined and the measurement of usefulness is still at its beginning.

In Table 2. the frequency of evaluation of the key factors that influence the knowledge management in Serbian enterprises is given. Assessment of key factors, as shown in Table 2, which shows the arithmetic means, standard deviations, and the range of rating the quality of the key factors of knowledge management in Serbian companies, move in the same direction as the indicators of the factors discussed in the previous part of this study because they they are based on them. Their frequencies are, however, mentioned in the purpose of more detailed analysis of the state of knowledge management in Serbian enterprises

5 Analysis

In this section we will present statistics of our research and attempt to determine the answers to our research hypothesis.

H1 Organizations in Serbia belong to the first generation of knowledge management

In order for the hypothesis set to be accepted or rejected, we have started the analysis of the existence of statistically significant difference among the grades that were attributed to organizations for the IT quality management, as basic factor of the first generation of knowledge and grades that are assigned to other factors, by applying t-test for dependent variables.

Having in mind the percentage of favourable indicators and average grade given in Tables 1 and 2, we have established that the organizations in Serbia are focused on IT significantly more than to other factors.

Looking at the percentage of favorable indicators and the average marks awarded, Serbian companies focus more on information technology than on other factors that influence the quality and success of knowledge management (Tables 3 and 4). From a total of 41 indicators, only 8 is rated positively for the practice of knowledge management, which indicates a relatively poor practice in terms of overall knowledge management practice in Serbia.

The data presented in Table 4 show that information technology is the most estimated, suggesting that it is best developed in the Serbian companies and to support knowledge management, while the least developed is measuring the usefulness of knowledge management.

However, in order to determine whether they are statistically significant differences between the arithmetic means of evaluation factors, it was necessary to carry out the t-test, whose results are given in Table 5.

The results of the t-test point to statistically significant differences of the two pairs of factors: IT and carriers –

Table 2: Frequency of the grades for key factors that affect knowledge management

Factor that indicators refer to	Arithmetic mean	Standard deviation	Rank
Infrastructure	3,26	1,24	2
Carriers	2,56	0,99	4
Organizational culture	3,09	0,89	3
IT	3,31	1,47	1
Usefulness measurement	2,22	1,43	5

Table 3: Percentage of favorable indicators of KM practices in Serbian companies, according to groups of indicators

Factor relating to the set of indicators	Number of indicators	% of indicators favorable to the practice of KM	Ranking
Infrastructure	11	18,2 (2/11	3
Carriers	10	25 (2/8)	2
Organizational culture	9	11,1 (1/9)	4
Information technology	9	33,3 (3/9)	1
Usefulness measurement	2	0 (0/2)	5
Total	41	19,5 (8/41)	-

Table 4. Arithmetic means, standard deviations, and the rank score of the quality of the key factors in KM in Serbian enterprises

Factor relating to the set of indicators	n	Arithmetic means	Standard deviation	Ranking
Infrastructure	34	3,26	1,24	2
Carriers	34	2,56	0,99	4
Organizational culture	32	3,09	0,89	3
Information technology	32	3,31	1,47	1
Usefulness measurement	32	2,22	1,43	5

Table 5: Results of the t-test for dependent variables that are used to examine the difference between factors that affect the quality of KM in organizations in Serbia.

	t-value	Significance
Pair 1: IT – Infrastructure	-0,133	0,895
Pair 2: IT – Carriers	-2,438	**0,021**
Pair 3: IT – Organizational culture	-0,793	0,434
Pair 4: IT – usefulness measurement	3,029	**0,005**

significance level 5% and IT and knowledge management usefulness measurement – significance level 1%. For the other two pairs, there were not established statistically significant differences. From these findings, it is obvious that in the organizations examined there lacks the support of top management for the knowledge management projects, which is also the problem in organizations that are in the first generation of knowledge management. And as usefulness management comes as the last phase in knowledge management, it is quite clear that organizations in Serbia are still in the first generation.

When it comes to the relationship between the assessment of information technology and infrastructure, the result indicates a lack of statistically significant differences. This is logical. In practice, usually with the launch of the system for knowledge management, the infrastructure that supports is also developing, and that is why there are no differences here. Also, the difference between the average ratings information technology and organizational culture did not show statistically significant. The assumption is that the company started its activities with knowledge management, with the construction of information technology and adequate adaptation of business processes, but have not yet reached the level when the carriers systematically advocate and support knowledge management.

Having in mind all the factors mentioned, we can conclude that **the first hypothesis is confirmed** according to which the organizations is Serbia are in the first generation of knowledge management.

H2 says that organizations in Serbia more manage the explicit than implicit knowledge.

In order to accept or reject the hypothesis set, we have accessed the t-test for dependent variables: management of the explicit knowledge and management of the tacit knowledge. The results are shown in Table 6.

The evaluations presented in the Table point to the conclusion that organizations in Serbia are more successful in explicit knowledge management. Data that refer to the mean value point to the fact that the difference is statistically significant at the level 0,05. This means that with 95% of certainty we can claim that organizations examined are better in managing the explicit than tacit knowledge.

Based on the results obtained, **we can also confirm the H2** which says that organizations in Serbia more manage the explicit than tacit knowledge.

Based on the analysis of the score frequency of the key factors that influence the knowledge management in Serbian enterprises, can be concluded that there are differences in the quality factors of knowledge management. As the total score of knowledge management is based on the marks awarded for all five factors, namely, includes the quality of the key factors, it can be said that the total score of knowledge management is the one which gives picture of the situation of the system of knowledge management in a company.

6 Conclusion

As many other European transitional countries, Serbia lost a significant amount of employment, especially during the privatization phase that was initiated by the adoption of the new privatization regulation in 2001. Beside the decline in the employment, the effects of the privatization have been

Table 6: Results of the t-test for dependent variables that were used to examine the difference between evaluation of the quality of explicit, i.e. tacit knowledge management in organizations in Serbia.

	Mean value	Standard deviation	t	Sig.
Explicit knowledge management level	3,42	1,57	-2,56	0,016
Tacit knowledge management level	2,80	1,17		

also manifested through changes in the structure of the corporate sector in Serbia (Ognjenović, 2015).

Based on the research carried out and the analysis of the obtained results, we can conclude that both hypotheses set are confirmed.

Although the results are not at the highest level when it comes to knowledge management in organizations in Serbia, we can conclude that the knowledge management projects are initiated, as well as that belonging to the first generation of knowledge management can be clearly defined. Each component of the knowledge management construct will positively affect innovation. In order for innovation to occur, managers first need to have knowledge about the internal and external forces that affect the firm – the more knowledge, and the greater the variety of knowledge, the better. Second, knowledge must flow freely around the firm – the better the dissemination of knowledge the greater the likelihood of innovation as more people within levels and departments of the organization are exposed to new knowledge that interacts with the knowledge already held. Lastly, an innovative organization is, by definition, responsive. In fact, innovation is a response in itself. Therefore, the more responsive and agile an organization is the more likely it is to be innovative (Darroch, 2005).

The analysis performed for the purpose of accepting or rejecting the second hypotheses, led to the conclusion that Serbian companies on average are most concerned with the management of explicit knowledge, that is easily visible and relatively easy to manage. As noted above, explicit knowledge represents only the tip of the iceberg, but tacit knowledge is that which is actually the most valuable for the company and one that really provides a competitive advantage. The management of explicit knowledge makes the first and indispensable step in the process of knowledge management, but it is important to emphasize that it can not stand at this level. Managing tacit knowledge is required and fluid process in which the biggest task lies on the real owners of that knowledge - to individuals. Creating a culture that encourages sharing tacit form of knowledge is the key to success and survival of the company.

Knowledge is becoming one of the most important resources of the company, regular "guidance" of employees in terms of training, education and development of crucial skills become imperative in business (Arsenijević, Lilić, & Zdravković, 2015). Information and knowledge form a virtous circle. Knowledge can't exist without information. With good information, people can make better decisions and take intelligent action (Henderson, 2000).

Organizations in Serbia should work on when ir comes to knowledge management is the measurement of usefulness and support of the top management.

The research carried out has its constraints that are reflected in the number of organizations included by the research, but still it included medium and big companies.

However, based on the implemented research for the organizations in Serbia when it comes to knowledge management: it is required to work much more on the implementation of the activities of knowledge management projects, focus on the management of tacit knowledge, greater support of top management, create and develop organizational culture that will largely support the the knowledge management and aim it towards the culture of the learning organization.

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Strateški vidik upravljanja znanja

Ozadje in namen: S prispevkom želimo tako s teoretičnega kakor z empiričnega vidika predstaviti strateške vidike upravljanja znanja v organizacijah v Srbiji. V teoretičnem delu prispevka smo predstavili najnovejše dosledke s področja upravljanja znanja, relacije med strategijami komunikacije in upravljanjem znanja ter pomenom dimenzij ustvarjanja znanja in organizacijsko kulturo.
Oblikovanje/metodologija/pristop: Empirični del prispevka predstavi opredelitev nivoja upravljanja znanja v organizacijah v Srbiji skozi vidik dimenzije upravljanja znanja in problem eksplicitnega ter tihega znanja. V prispevku smo postavili dve hipotezi: H1: Organizacije v Srbiji so na prvi stopnji upravljanja znanja in H2: Organizacije v Srbiji bolje upravljajo z eksplicitnim kakor tihim znanjem. Hipotezi sta bili testirani s pomočjo raziskave in anketnega vprašalnika, ki ga je sestavljalo 50 vprašanj. S pomočjo anketnega vprašalnika smo analizirali pet ključnih dejavnikov upravljanja znanja.
Rezultati: Rezultati so pokazali, da je bilo med 41 indikatorji samo osem ocenjenih pozitivno. Rezultati t-testi kažejo statistično pomembne razlike znotraj razločkov faktorjev v kakovosti eksplicitnega in tihgega upravljanja znanja, zatorej smo potrdili obe hipotezi.
Zaključek: V organizacijah v Srbiji so projekti upravljanja znanja na začetni stopnji kar smo utemeljili skozi prispevek in raziskavo.

Ključne besede: *upravljanje znanja; strategija; eksplicitno znanje; tiho znanje; stopnje upravljanja znanja*

APPENDIX: Questionnaire

Listed below are the questions from the questionnaire prepared for the topic of knowledge management in Serbia. Results are presented in chapter 4. The questionnaire also included questions about companies, employee position and e-mail.

1. Does the company own a list of key skills required? Yes/No

2. How often do you conduct a comparison of required and available knowledge to identify the skills that are missing? (1) Once a month (2) Every three months (3) Every six months (4) Every year (5) As needed (6) Something else. What?

3. Provide (or provide your own estimate) the percentage of employees' education arising from: (1) wishes and interests of employed (2) the current offer on the market (3) identified the real needs of enterprises (4) others. What?

4. Indicate the number of employees who were further trained last year

5. Indicate the number of additional skilled of employed who left the organization last year

6. Indicate the number of employees, according to job classification, perform the tasks of knowledge management (relating to the activities of collecting, storing and transmitting information and knowledge)

7. Please indicate what percentage of new employees are (1) in order to fill the required number of employees (2) due to the specific knowledge and skills that are lacking in the organization (3) something else. What?

8. Does the company own its own library consisting of books and magazines in the field relevant to the organization? (1) it does. The library content is regulary supplemented by new literature. (2) it does, but the content is rarely replenished. (3) does not possess.

9. Is there an obligation of the enterprise for transferring interesting and acquired knowledge with conferences, workshops and the like? (1) there is. Employees should write a report which must be available to all employees or to maintain presentation. (2) there is. Employees should write a report that is not distributed to employees. (3) it does not exist, but employees usually informally transmit acquired skills. (4) does not exist.

10. The extent to which the company conducts practice meeting after completion of the projects, stating the knowledge and experience from the project? (1) always, after each project (2) it is carried out mostly (3) it is sometimes implemented (4) not implemented.

11. Which categories of employed have access to lessons learned from the projects and the best practices identified (it is possible to encircle more than one answer): (1) employees who participated in the project (2) managers responsible for the project (3) only some employees (4) all employees (5) others. Who?

12. What is the mission of your company?

13. Is there in your company the person who is responsible for enterprise-level knowledge management (ie, chief knowledge officer)? Yes/No

14. If your company has a person who is responsible for knowledge management, specify which hierarchical level is it located?

15. Please indicate in which department is the person responsible for knowledge management.

16. Give the job title of the person responsible for knowledge management.

17. Is the employed contribution to knowledge management monitored in your company, in monitoring work performance? Yes/No

18. If it is monitored, state the percentage of employees who are followed.

19. How are employees rewarded for their contribution to knowledge management (it is possible to encircle more than one answer)? (1) by involvement in solving strategic issues (2) through the system, through the variable part of the salary or the predefined bonus (3) on the basis of a special decision on the contribution (4) a public recognition (5) a private praise (6) by joining the mentoring program (7) it is not rewarded (8) other. What?

20. Is there in a mentoring program in your company? (1) yes. Mentors are officially assigned to every or most of the new employees (2) yes. Mentors are officialy allocated to a small number of new employees (3) yes, but in an informal format (4) no.

21. Please indicate the percentage of employees participating in the mentoring program.

22. Check to what extent the conflicting statements describe your organization so that on scale of 1 to 7, circle the number that best describes the principle of operations in your organization:

- a) open communication 1 2 3 4 5 6 7 communication solely through formal channels
- b) not a trusting 1 2 3 4 5 6 7 a trusting
- c) Innovative 1 2 3 4 5 6 7 closed to new ideas and solutions
- d) Individuals keep their knowledge on the basis of which generate a competitive advantage over colleagues 1 2 3 4 5 6 7 employees readily share knowledge with colleagues
- e) employees openly say something when they do not know 1 2 3 4 5 6 7 employees hide their ignorance
- f) acquiring new knowledge depends solely on the initiative of enterprises 1 2 3 4 5 6 7 employees themselves are finding ways to acquire new knowledge
- g) in problem-solving, employees often consult their colleagues 1 2 3 4 5 6 7 employees usually solve their problems themselves
- h) employed often spend time in a conversation with colleagues 1 2 3 4 5 6 7 employed rarely take time for a conversation with fellow colleagues

23. Are there organized rooms designed for informal gatherings of employees during working hours? Yes/No

24. Which information technology is used to support knowledge management in your company (type and name of the software).

In the following four questions highlight the extent to which your enterprise use the following IT functionality (via Intranet or other specific software you have one):

25. The communication platform that supports dynamic communication in the form of questions and answers, online surveys, and provides information about news within the company. (1) it is used to a great extent (2) is mainly used (3) it is sometimes used (4) not used.

26. platform for sharing knowledge that is used to manage documents (a system to support the management, archiving, changes, administration, search and deleting of documents). (1) it is used to a great extent (2) is mainly used (3) it is sometimes used (4) not used.

27. platform for sharing knowledge that serves as a knowledge base and allows easy archiving, categorizing and searching specific, expert knowledge. (1) it is used to a great extent (2) is mainly used (3) it is sometimes used (4) not used.

28. platform for sharing knowledge that serves as the yellow pages (ie. Yellow pages), or database that contains key knowledge and skills of employees. (1) it is used to a great extent (2) is mainly used (3) it is sometimes used (4) not used.

29. If the company owns the yellow pages, the percentage of employees who are given data? (If there is no accurate data, enter your estimate!)

30. What percentage of employees for which data should be listed in the yellow pages? (If there is no accurate data, enter your estimate!)

31. How often are new documents or texts published by IT that enables document management? (1) everyday (2) every few days (3) once a week (4) every two weeks (5) once a month (6) miscellaneous. What?

32. Please indicate the percentage of employees that are enabled by IT association (email)?

33. Among the indicators developed for monitoring the performance of the entire enterprise, are there also those related to knowledge management? Yes/No

34. Are the experiences that confirm the importance and usefulness of knowledge management recorded and transferred in your company? Yes/No

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Mobbing in a Non-Profit Organisation

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Purpose: The aim of this paper is to analyse mobbing in a large, non-profit, state-owned organization in order to find out to what extent mobbing is present and in what way it takes place. In addition, the purpose of the research is to analyse whether the extent of mobbing is connected to employee's age, gender and position.
Methodology: In this quantitative research, a total of 355 opinions were collected using a random selection procedure within the selected large size, state-owned organization (between 1000 and 2000 employees). The results of the employees' experiences of mobbing were statistically analysed and tested.
Results: Similar to other researches, a third of all respondents stated they have been affected by mobbing in the last three years. Additionally, we found out that younger employees are not affected more than older. Interestingly, there are also no gender differences as both genders seem to be affected similarly. Also, a management position does not mean a person is less exposed to mobbing. Finally, we confirmed that the most frequent type of mobbing is vertical mobbing (carried out by an employer / manager on employees or vice versa).
Originality / value: The study fills a current gap in the research and understanding of mobbing in non-profit organizations in Slovenia as it presents the magnitude of mobbing experiences as well as the relations between the attackers and victims. The study also provides a good starting point for further research on this sensitive subject.
Research limitations / conclusions: Since the research was limited to one non-profit organization, it makes sense to explore the phenomenon in different individual profit companies as well as non-profit organisations in order to create plans for preventing and limiting mobbing.

Keywords: *mobbing; gender; organization; culture; conflicts; bullying*

1 Introduction

Because of the proven harmful effects on the health, behaviour and productivity of employees and, consequently, the functioning of companies, mobbing has become an important area of academic research. Mobbing is namely one of the most unpleasant work-related experiences an employee can be exposed to. Regardless of the subjective nature of experience that causes a person to classify a conflict as mobbing, these conflicts have to be resolved as soon as possible. If not resolved, mobbing conflicts can escalate. All the above mentioned is supported also by Horvat and Pagon (2012) who argue that low willingness to report the perpetrator, lenient disciplinary sanctions and the absence of proper organizational rules create favourable conditions for workplace mobbing.

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The term 'mobbing' is more frequently used in Germany, Scandinavia and Italy, while 'bullying' is the more common term in English speaking countries. In this article, both forms are used as used in the original works of different authors. While in the Northern (primarily in Sweden) and Western European countries mobbing has been researched in various aspects for three decades, this phenomenon is still relatively little known and studied in the societies of some post-communist countries (Vveinhardt & Sroka, 2017). Particularly little knowledge is available about the prevalence of mobbing and forms of its occurrence in non-profit organizations, which are not as complex organizational structures (from the perspective of human resources and the interests of enterprise stakeholder groups in a safe working environment) as profitable companies.

In a non-profit organization, one would not expect to encounter so much exploitation of employees as known in profitable sector. According to this logic, psychological and physical pressures on employees should also, in a way, be smaller. The presence of mobbing in Slovenian companies has already been studied by Brečko (2003), Mumel, Jan, Treven, and Malc (2015)which represents a serious, widespread problem with numerous consequences for victims, organizations, and society. We also recognize the connection this phenomenon has with the emergence of post-traumatic stress disorder (PTSD, confirming its presence as well as its influence on the stress level of workers. Based on their works, we set the following research question: To what extent is mobbing present in non-profit organizations?

2 Theoretical Background

The intention with mobbing is clear and cannot be misinterpreted. Mobbing always starts with a conflict. If the conflict is not solved, it can evolve into mobbing. Mobbing assaults the dignity, integrity, and credibility of the worker. This type of emotional abuse can be devastating for the individual. Tkalec (2001)katerega je raziskal ter poimenoval svedski psiholog dela Heinz Leymann. S formulacijo \"sikaniranje na delovnem mestu\" je opisoval situacijo, v kateri je posameznik v podjetju sistematicno, pogosto ter skozi daljse casovno obdobje izpostavljen napadom sodelavcev in/ali nadrejenih (Leymann, 1995: 18 argues that any bullying starts with a conflict, however, it is not necessary that every conflict ends with bullying. If a conflict is not resolved and the bullying increases in magnitude, the first conflict becomes meaningless. Whenever two people establish a relationship, conflicts can arise. But despite the negative connotation of the word *conflict* we should not understand it only as something negative. Lipičnik (1998) argues that there is also a positive side of conflicts since they point out to the problems which demand solutions. In real life, problems between subcultures in an organization are sometimes avoided for the sake of "peace." Berlogar (2006) distinguishes between different types of conflicts in organizations: between employees, between management, between employees and other people, between owners and between different organizations. In contrast to conflicts, mobbing is always negative. Leymann (1990), the pioneer researcher of mobbing, thus defined the term as "psychological terror" or "mobbing in work life." According to Leymann (1990), mobbing means hostile and unethical communication which is directed in a systematic way by one person or a number of people mainly towards one individual. Leymann (2012) adds that mobbing can take place occasionally or every day for a long period of time. The actions are systematically directed towards one individual who is, because of them, pushed into a situation from which he or she cannot escape. The victim does not believe he or she can be protected. All these hostile acts aimed at the individual cause psychological and physiological problems (Brečko, 2013). There are other terms that describe mobbing (*Table I*). However, these terms cannot fully explain the basic meaning of the word mobbing.

Mobbing is commonly used to describe all situations where a worker, a supervisor, or a manager, is systematically, repeatedly mistreated and victimized by fellow workers, subordinates or superiors (Shelton, 2011). *The International Labour Office* (*ILO*), in 1998, categorized mobbing in the same category as homicide, rape, or robbery (Davenport, Schwartz, & Pursell Elliott, 2005).

Mlinarič (2007) grouped Leymann's 45 forms of mobbing into 5 groups: attacks on communication, threats about personal connections, attacks on personal reputation, obstructing work and endangering health. According to Divincova & Sivakova (2014), the most frequent factors that could lead to mobbing are: superiority of the mobber, selfishness, personal issues often stemming from problems at home, complexes, jealousness, mutual dislike, achievement of career growth and psychological terror at the expense of another. Brousse et al. (2008) tested Leymann's *Inventory of Psychological Terror criteria for bullying as an indicator* and showed that 81 % of patients showed high levels of perceived stress at work. Sutton (2010) additionally explains that different attacks, such as personal insults and status attacks cause degradation of the victim's social position and pride in the form of status degradation. These personal insults are usually disguised by jokes or ignorance. When the abuse begins, other people gradually exclude the victim from their world. Goleman (2010) points out that because of social rejection people can suffer from a special form of grief caused by difficult and threatening relationships. Because victims do not react but suppress the anger instead, they silently communicate to the mobber that he can carry on with mobbing. Moreover, if others are passive when the victim is attacked for the first time, the mobber understands the lack of reaction as ap-

Table 1: Terms Describing Mobbing
Source: Shelton, 2011.

Reference	Terms	Definition
Brodsky (1976)	Harassment	Repeated and persistent attempts by a person to torment, wear down, frustrate, or get a reaction from another person; it is a treatment which persistently provokes, pressures, frightens, intimidates or otherwise causes discomfort in another person.
Thylefors (1987)	Scapegoating	One or more persons who, during a period of time, are exposed to repeated, negative actions from one or more other individuals.
Matthiessen, Raknes, & Rrokkum (1989)	Mobbing	One or more person's repeated and enduring negative reactions and conducts targeted at one or more person of their work group.
Leymann (1990)	Mobbing/Psychological terror	Hostile and unethical communication that is directed in a systematic way by one or more persons, mainly towards one targeted individual.
Kile (1990a)	Health endangering leadership	Continuous humiliating and harassing acts of long duration conducted by a superior and expressed overtly or covertly.
Wilson (1991)	Workplace	The actual disintegration of an employee's fundamental self, resulting from an employer's or supervisor's perceived or real continual and deliberate malicious treatment.
Ashforth (1994)	Petty tyranny	A leader who lords his power over others through arbitrariness and self-aggrandizement, the belittling of subordinates, showing lack of consideration, using a forcing style of conflict resolution, discoursing initiative and the use of non-contingent punishment.
Vartia (1993)	Harassment	Situations where a person is exposed repeatedly and over time to negative action on the part of one or more persons
Bjorkqvist, Osterman (1994)	Harassment	Repeated activities with the aim of bringing mental (but sometimes also physical) pain, and directed towards one or more individual who, for one reason or another, are not able to defend themselves
Adams (1992a)	Bullying	Persistent criticism and personal abuse in public or private, which humiliates and demeans a person

proval (Staub & Pearlman, 2009). As Staub and Pearlman (2009) claim, nothing can stop the mobber at that point.

Mobbing has many negative consequences. First of all, it influences organizational success as it lowers social capital. An organization, therefore, must persist in creating favourable working conditions for a long-term success and survival. The main components of social capital are: trust, reciprocity, and social networking. All three components can be affected when mobbing is present (Nahapiet & Ghoshal, 1998). Mobbing also indirectly lowers productivity (Divincova & Sivakova, 2014; Josipovic-Jelic, Stoini, & Celic-Bunikic, 2005). Finally, mobbing is also connected to organizational commitment in the workplace (Yuksel & Tunçsipe, 2011). Specifically, Shallcross, Sheehan, & Ramsay (2008) have discovered the toxic nature of public sector because of mobbing behaviour and workplace expulsion. Arnejčič (2016) in this respect provides additional literature review and comments.

Mobbing is also influenced by organizational culture and vice versa. If mobbing is unacceptable and often discussed, the possibilities to commit mobbing are very limited (Biloslavo, 2008). On the other hand, when being tolerated, mobbing can dramatically influence the organizational culture in different aspects. Since culture is a dynamic category that evolves through time, it is very important that organizations strive to control the organizational culture, because opinions, values, norms, principles and habits, beliefs and behaviour constantly change (Živko, Zver, & Bobek, 2005).

The negative effects of mobbing directly influence organizational climate which is an indicator of how employees comprehend organization (Meško Štok, 2009). Berlogar (2006) thus describes the satisfaction of employees working in a safe environment and a belief that high self-respect is vital for company success. Self-respect and self-valuation are connected to the opinion of the "important others." Makarovič and Rek (2014) stress the need for a positive self-valuation as a basic human need. Even more, Lipičnik and Možina (1993) see organizational climate as a pre-condition for achieving quality standards and excellence. On the other hand, the authors argue that bad interpersonal relations in companies can have an even

greater negative effect on work motivation than physical working conditions. According to the results of Okçu and Çetin (2017), the teachers' job satisfaction level decrease in line with an increase in their mobbing experiences related to their profession and social relationships, and thus, their burnout levels also increase (Okçu & Çetin, 2017).

NHS (Carter et al., 2013) performed a workplace bullying survey in the UK NHS research and discovered that an overall 20 % of staff reported having been bullied by other staff to some degree and 43 % reported having witnessed bullying in the last 6 months. In addition, male staff and staff with disabilities reported higher levels of bullying. Employees who were victims claimed to have less work commitment and experienced feelings of stress, depression, anxiety and the wish to change the work environment. Similarly *Workplace Bullying Survey* by *WBI* (*WBI*, 2014) showed that 27 % of employees have been bullied at work. Almost three quarters of Americans are aware of the problems of bullying in their work environment. 72 % of employees deny that bullying is taking place in their companies. Almost all (93 %) of employees would like to have changes in the legislation to prevent mobbing in their work environment. In a research in Slovenia, Brečko (2003) points out that the most frequent mobbing victims are: employees who have pointed to the irregularities in the company, young employees, employees with high income, employees who want changes in the work environment, employees who want more independence, and minorities (especially sex and race minorities). According to Babnik, Štemberger Kolnik, and Majcan (2012), occupations that are the most frequently exposed to mobbing are the ones in the health sector.

In Slovenia there are two laws that prohibit mobbing in the work place: *Employment Relationship Act* (*Zakon o delovnih razmerjih*, 2013) and *Civil Servants Act* (*Zakon o javnih uslužbencih*, 2007). In addition, the Decree on measures for protecting the worker`s dignity at work in state administration from 2009 defines different forms of mobbing as well as obligations of the managers and action steps. The rights to personal dignity are written also in the Articles 34 and 35 of the Slovenian Constitution and in the Article 6 of the *Employment Relationship Act* which prohibits bullying at the workplace or in connection to work (*Zakon o delovnih razmerjih*, 2013). Bullying is described as any "repetitive or systematic, reprehensible or clearly negative and insulting action or behaviour aimed at individual workers in the workplace or in connection with work" (*Zakon o delovnih razmerjih*, 2013). Additionally, *Civil Servants Act* puts employers under obligation to protect civil servants from being offended, attacked by threats and other similar actions. Also any physical, verbal or non-verbal abuse or behaviour of a public servant in any circumstance that creates a threatening, hostile, humiliating or offending work environment is restricted (*Zakon o javnih uslužbencih*, 2007). At the EU level, dignity rights are written in the *European Social Charter* ratified by Slovenian government. Besides Articles 3 and 11, Article 26 deals directly with mobbing. It demands protection in the work environment as well as education, informing and protection against repeated abuse.

Despite the substantial legislation, there are only few cases of mobbing in legal practice. In legal information system we can track only cases on higher and social court where there were 23 cases of mobbing between 2004 and 1st July 2015 (Mežnar, 2010). Among these, 8 cases showed that the misconduct was not mobbing and only in 12 cases the ruling involved mobbing. Only in 9 cases financial compensation was awarded to the victims of mobbing.

3 Methods

In this quantitative research, a total of 355 opinions were collected using a random selection procedure within the selected large size state-owned organization (between 1000 and 2000 employees). The results were gathered by using an online questionnaire designed in order to collect employees' experiences of mobbing. The participation rate was high (more than 80 %). The data was collected within one month at the beginning of 2015 and was statistically analysed and tested using *SPSS*.

3.1 Research Instrument

To measure the quantity of bullying, a part of *WBI – Workplace Bullying Institute Questionnaire* (Namie, Christensen, & Phillips, 2014) was used. We adjusted the questions for Slovenian population as well as tested and revised the questionnaire before the final version.

To measure the quantity of bullying, a part of *WBI – Workplace Bullying Institute Questionnaire* (Namie, Christensen, & Phillips, 2014) was used. We adjusted the questions for Slovenian population as well as tested and revised the questionnaire before the final version. To test the questionnaire we conducted preliminary research small scale analysis (10 % of the final sample) and revised the disparity of answers as well as the general understanding of the questions.

The first part of the questionnaire collected information on gender, age, work experience and position. The second part of the questionnaire included 12 statements on mobbing measured on 5-point Likert scale. The third part consisted of four questions regarding the quantity or presence of perceived mobbing and the attacker position. Through the random sampling procedure we managed to collect opinions from 355 respondents (321 female and 34 male). Sample gender ratio reflected the organization gender ratio 9:1 in favour of females. Sampled employees were almost equally divided into two age groups: 21 to 40 years and above 41 years. There were 16 % of managers in the sample.

3.2 Hypotheses

Based on the review of the theories we set the following research question: To what extent is mobbing present in non-profit organizations?

We set the following hypotheses:

H1: *Younger employees (bellow 40) experience mobbing more often than 41- to 60-year-olds*.

With this hypothesis we want to determine whether the subjective perception of mobbing in younger employees is different from the perception of older (Turhan, 2014; Aricioğlu, Tanoglu, & Kocabaş, 2007). These changes in perception, as well as some behavioural patterns, are in some aspects the consequences of permissive education. In addition, it is also necessary to consider the fact that the types of management changed in the last 25 years. If there was a more authoritative type of management in the previous system, nowadays we mostly encounter a more participatory management type.

H2: *Female employees experience mobbing more often*.

Following other previously conducted research, women are more liable to bullying and thus more vulnerable than men (Turhan, 2014; Aricioğlu¸ Tanoglu, & Kocabaş, 2007). When the former are younger, this is usually manifested through sexual harassment. Later in the stage of motherhood they are subjected to absenteeism due to (ill) children in need of care. It is usually expected, especially by managers, that women are not absent (Qureshi, Rasli, & Zaman, 2014).

H3: *Non-managers experience mobbing more often*.

It is usually more difficult for employees to resist mobbing from the managers (Turhan, 2014; Aricioğlu, Tanoglu, & Kocabaş, 2007). It is easier for the latter to resist mobbing from those employed on lower positions – but at the same time managers are not immune to being exposed to mobbing. In addition, it should be noted that mobbing is also present among the same rank employees. With this hypothesis we would like to determine which group perceived and experienced mobbing the most.

H4: *The most frequent attacker was the manager (one person)*.

With this hypothesis we wanted to find out whether it is likely for mobbing to be on the individual basis or it is more common that more than one person attack an individual person (collective mobbing). The possibility that mobbing is an integral part of the organizational culture and that mobbing takes place among the whole team/personnel (Turhan, 2014; Aricioğlu¸ Tanoglu, & Kocabaş, 2007), was also taken into account.

4 Results

In the last three years, 31.8 % of employees experienced mobbing and more than a half (53.1 %) have witnessed or heard of it within the organization. We tested hypothesis H1 that younger (bellow 40) employees experience mobbing more often than 40- to 60-year-olds. A Chi-Square goodness of fit was calculated comparing the frequencies of occurrence of mobbing in both groups. It was hypothesized that younger and older group would occur an equal number of times. Significant deviation was not found χ (2) = 1.418, p >0.05. Younger (21 − 40-year old employees) experience mobbing more often (34.8 %) than the 41-to 60-year-olds (30.3 %). However, the difference is not substantial. Thus, we can conclude that there are no significant differences between the age groups and we can reject H1.

Similarly, we tested H2 and discovered that there are also no significant differences between genders. Significant deviation was not found χ (1) = 0.517, p >0.05. Male employees (35.3 %) are even somewhat more exposed to mobbing than female (31.2 %) and we can reject H2.

We also tested H3 to find out if non-managers experience mobbing more often than managers. The results show that almost the same percentage of managers experienced mobbing (31.2 %) as non-managers (32.1 %). Significant deviation was also not found χ (1) = 0.024, p >0.05.

Finally, we tested H4 to find out if the most frequent attacker is a manager (one person), co-worker or several people together. Unlike the other hypothesis, we can accept H4 as significant deviation was also found χ (3) = 0.03, p <0.05. In most cases (44 %) the attacker was indeed a single person and a manager. This was followed by a co-worker (32 %), many people together (in 15 % of cases) and worker mobbing the manager (9 %).

5 Discussion

The results of our study have shown similarities to the results from other studies. For example, Picakciefe, Acar, Colak, and Kilic (2015) showed that 31.1% of health workers have experienced mobbing in the last year. Similarly, the results of Gök (2011) showed that among their respondents 32 % were victims of mobbing during the entire working life and 16 % of participants within the last year. Almost half of the victims claim to have had health problems as a result of having suffered mobbing in their workplace (da Silva João & Portelada Saldanha, 2016). In Swiss nursing homes, 4.6 % of the surveyed care workers reported mobbing experiences in the last 6 months (Tong, Schwendimann, & Zúñiga, 2017).

In Uruguay, in both hospitals and schools mobbing is

Table 2: The frequency of mobbing (the percentage of employees)

	1 time in the last three years	1 time in the last year	Every month in the last year	Every week in the last year	Every day in the last year	Total (answers)
Attacker is a manager	36.9 %	33.6 %	18.8 %	8.7 %	2.0 %	149
Attacker is a co-worker	41.3 %	24.8 %	18.3 %	11.9 %	3.7 %	109
Many attackers	45.1 %	25.5 %	13.7 %	11.8 %	3.9 %	51
Attacker is a worker attacking management	56.3 %	15.6 %	21.9 %	3.1 %	3.1 %	32

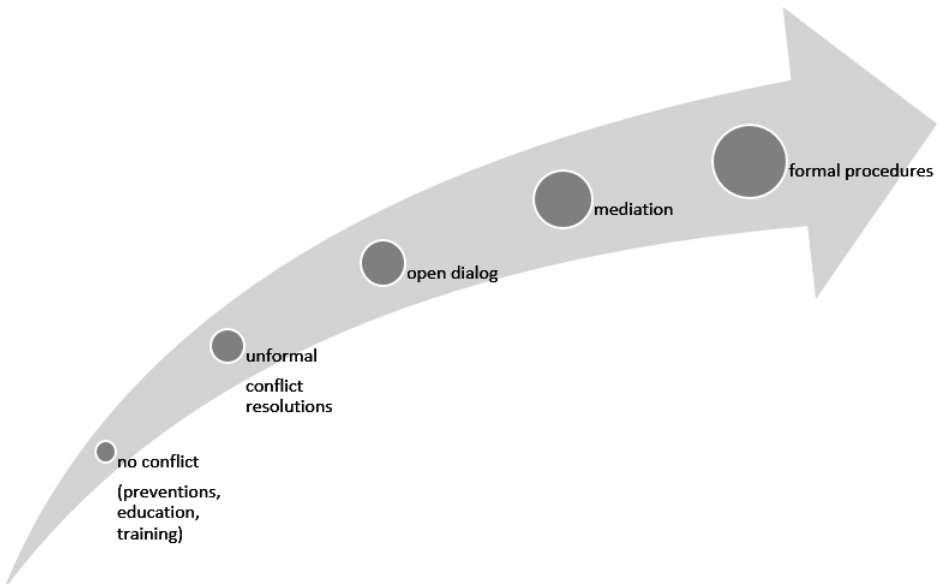

Figure 1. Handling Conflict Situations
Source: adapted from Review of Mediation Services (NHS, 2009)

more frequent among older employees, among employees who are better educated and who have been employed for a longer time. Men and women did not differ in reporting mobbing, but men reported more perceived loss of status than women. However, among women, being the victim of mobbing was strongly related to experiencing a loss of status than among men (Buunk, Dijkstra, Franco, & Zurriaga, 2017).

On a path to prevention, Brečko (2007) points out that the most important issue when dealing with mobbing is early detection. Therefore, activities in organisations must focus on improvement of both management and organizational culture. Work should be organized as teamwork. Conditions that minimize the possibility for mobbing include the improvement of organizational climate that involves open communication, clear information transfer, and possibilities for education and improvement. In addition, like in some examples of foreign companies, previously agreed procedures for reaction on mobbing with detailed information on sanctions could be introduced. Finally, systematic education and information about formal procedures in connection to mobbing could be provided for all employees. Examples where formal procedures and internal regulations have been accepted are numerous. For example, the Cardiff University created a document Dignity At Work And Study Policy (2015) in which detailed procedures are described in order to minimize the possibilities of occurrence of mobbing. Similarly, NHS (2009) created a document A Review of Mediation Services on the Basis of In-House Research of Mobbing where they discovered that procedures in conflicts are not followed through to avoid future conflicts. Thus, NHS suggests a diagram for

handling conflict situations, which can be seen in Figure 1.

The *NHS* diagram clearly shows the need to formalize procedures in all steps of conflict solving and mobbing prevention. In the organization policies it has to be stated that mobbing will not be tolerated and is against the policies of an organization. In addition, organisations have to provide personnel that victims can ask for help and advice. Providing the personnel that victims trust and know that they are capable in helping them may be the most difficult issue when dealing with mobbing. Namely, the personnel, in addition to being trustworthy, has to be competent to act in mobbing situations as well as have sufficient knowledge and skills to be able to help victims with advice and support. Beside the personnel, outside experts could provide additional support as well as training. When formal procedures are in place a wider group of employees should be included in the solving of the problem in order to prevent similar situations in the future. Nothing stated above can be achieved without sufficient support from the top management, which have to stand strong on the issues written in documents and legislation and bring procedures into effect.

6 Conclusion

According to the research question, we discovered that mobbing is indeed present on a large scale in non-profit organizations, which is consistent with other research conducted in this field (Turhan, 2014; Aricioğlu, Tanoglu, & Kocabaş, 2007; Kaya et al., 2015). Interestingly, in our study, women do not experience mobbing more often than men. An employee is being influenced substantially in the work environment by internal and external factors and mobbing seems to play an important role. Achieving quality and quantity standards thus not only consists of improving individual working skills but also improving external influence factors. Therefore, the ability to prevent and solve conflicts is essential for an organization not only to prevent mobbing but also to increase social capital and thus be more productive and achieve high quality. Manotas (2015) analysed mobbing in an educational institution arguing that institutions can build healthy environments for their employees. However, finding a solution to this serious issue is difficult for any organization, especially for a non-profit institution, as it seems that formal procedures fail as well. Regulation is present, but legal cases are few, and since almost a third of employees experience mobbing, obviously something is not working (Babnik et al., 2012). So in addition to Karakas and Okanli (2015), who showed that assertiveness training is an effective method for decreasing mobbing, it is important to consider the results of this study as a strong incentive for future research and further action on organizational and national level. Despite the fact that this research has limitations, it fills a current gap in research and in the understanding of mobbing in non-profit organizations in Slovenia. As the research was limited to one non-profit organization, a comprehensive study should be done in the future, in order to derive the appropriate measures for restricting mobbing.

Managers in non-profit organizations should pay more attention to identifying types and forms of mobbing as well as use more participatory types of management. Associates exposed to mobbing should receive adequate protection and violators should be reported. This way, understanding mobbing in non-profit organizations could contribute to developing a friendlier work environment while employees would be more devoted to their work. As a consequence, quality and quantity of the work performed would increase.

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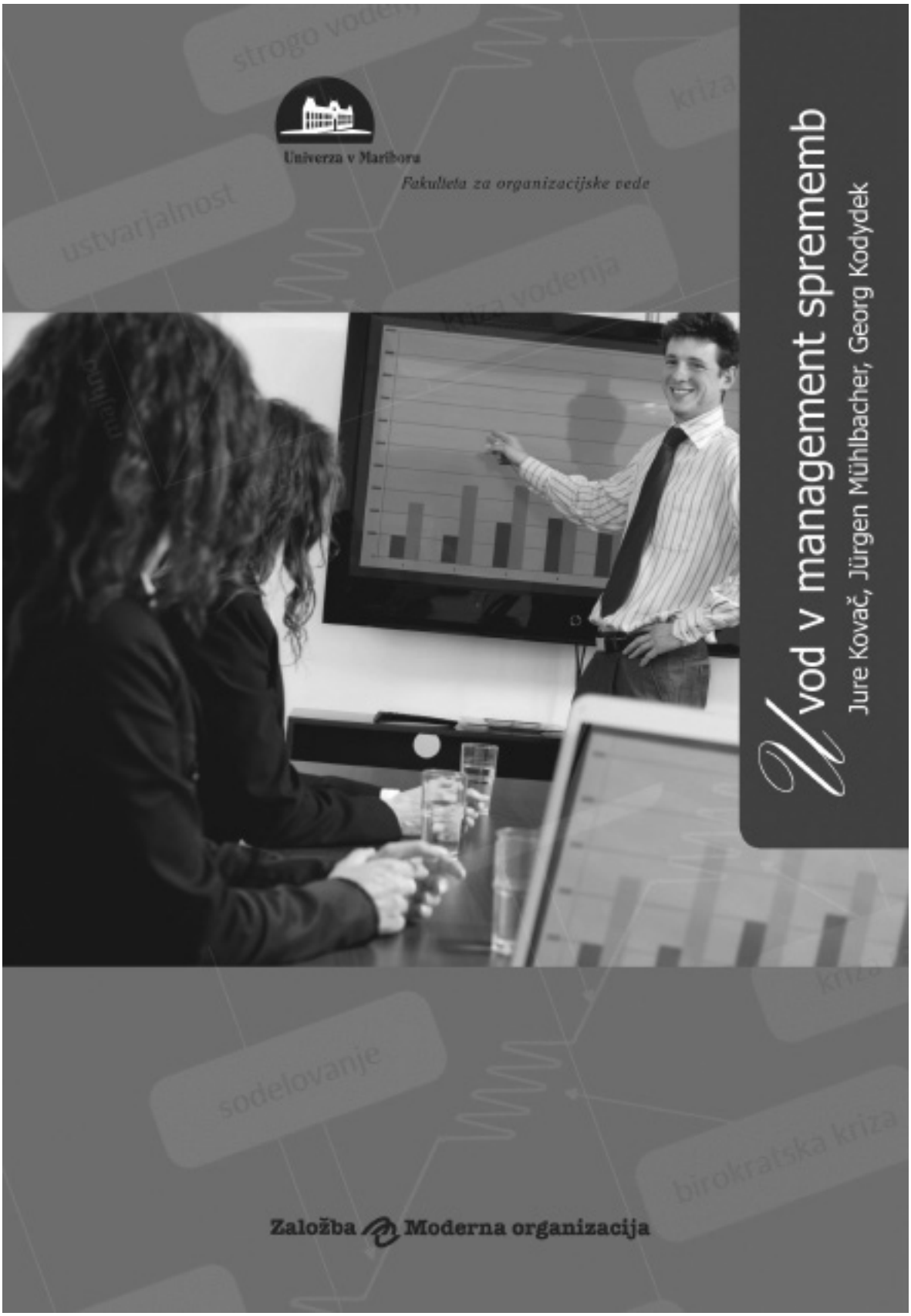
Mobing v neprofitni organizaciji

Namen: V članku je analizirana pojavnost mobinga v večji neprofitni organizaciji (med 1000 in 2000 zaposlenih) v državni lasti. Namen je bil predvsem ugotoviti kako in v kakšni meri se mobing pojavlja ter kako so starost, spol in položaj zaposlenih povezani z njegovo pojavnostjo.
Metodologija: V kvantitativno raziskavo je bilo z naključnim izbirnim postopkom vključenih 355 zaposlenih. Odgovore zaposlenih glede mobinga na delovnem mestu smo statistično analizirali.
Rezultati: Tretjina vprašanih je bila v zadnjem času žrtev mobinga. Pri analizi nismo zaznali statističnih razlik glede starosti. Hkrati nismo ugotovili razlik med spoloma. Položaj vodje tudi ne pomeni, da je oseba manj izpostavljena mobingu. Končno smo ugotovili, da je najpogostejša oblika mobinga vertikalni mobing, ki ga delodajalec ali manager izvaja na podrejenem ali obratno.
Izvirnost / vrednost: Študija zapolnjuje vrzel v raziskovanju ter razumevanju mobinga v neprofitnih organizacijah v Sloveniji. Predstavlja, v kolikšni meri je mobing prisoten, odnose med napadalci ter žrtvami, ter tako zagotavlja primerno izhodišče za nadaljnje raziskave na tem področju.
Raziskovalne omejitve / sklepi: Pojav smo raziskovali v eni neprofitni organizaciji, zato je pojav smiselno raziskati v različnih podjetjih, prav tako pa nadalje tudi v neprofitnih organizacijah, da bi tako lahko pripravili načrte za preprečevanje in omejevanje mobinga.

Ključne besede: *mobing; spol; organizacija; kultura; koflikti; nasilništvo*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