

## **Obstacles in operations management knowledge transfer in secondary schools in West Balkan**

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### **Abstract:**

*OM, as a field which has tremendous influence on revenue and cost should take important part in economic development of countries. Transitional countries (countries in transition from state to market economy) in particular have to take big steps if they want to achieve the economic level of developed countries. One of a critical issue for success of OM besides wider understanding of OM usefulness is quality and number of OM academic programs and courses. Therefore gathering objective information of OM studies and understanding of OM in countries is of vital interest. A critical issue for this is quality and number of OM academic programs and courses and exact explanation of OM scope of business implementation. It seems according to various researches that many universities are not aware of the importance of OM. The objective of this research is to contribute to fill this gap through exploratory study of OM education in one developing and transitional country Serbia. It is necessary, during the promotions of OM study programme, to make a clear distinction with similar programs to OM and to make a precise division of the areas of OM and the professions that come out of these areas.*

*Keywords: knowledge transfer, operations management, secondary schools.*

## 1. INTRODUCTION

Operations management (OM), in the broadest sense, is concerned with the production of goods and services. It involves managing people, equipment, technology, information, and many other resources. Buffa (1976) defines Operations management as an internally focused business function, concerned with manufacturing goods or delivering services with its attention on efficiency and productivity. Schroeder (1989) defines operations management as the study of decision making in the operations function.

Since the late 1950s, the increased need for companies to sharpen their competitiveness in the international market converted the operations function and productivity in general into a key competitive weapon (Boer H., 2003). Transitional countries (countries in transition from state to market economy) in particular have to take big steps if they want to achieve the economic level of developed countries. Christiansen et al. (2003) suggest that research in smaller countries could lead to new challenges and surprises for OM.

OM is the key factor to success and competitiveness of business, and the transfer of knowledge from this area is the basics for preparing the manager for the application of these techniques. The basic elements for transfer of knowledge in OM are:

- Understanding the area, importance, clear presentation of the content and single performance in the countries without doubling and mixing with other areas or studying programmes,
- Institutions that deal with the education in this area and course content.

Insufficient research of OM status has been identified as a gap mentioned by Machuca and Luque (2003), which necessities professional implementation and education in various countries, in order to improve OM field on the basis of different experiences. The identified gap is evident since only 3 studies have been done in OM education from EU countries and no one from developing or transitional countries. Transfer of knowledge is a predominant need for the success of this field.

One of the critical issues for success of OM besides wider understanding of OM usefulness is quality and number of OM academic programs and courses. Therefore gathering objective information of OM studies in countries is of vital interest (Machuca and Luque, 2003). A critical issue for this is quality and number of OM academic programs and courses. It seems that many universities are not aware of the importance of OM (Luque and Machuca, 2003).

The objective of this research is to contribute to fill this gap through an exploratory study of OM education in a case study of developing and transitional countries from West Balkan (Serbia and Former Yugoslav Republic of Macedonia). The aim is to analyze problems in knowledge transfer of OM among future students. Raised research questions are connected with problems of knowledge of OM field and recognition among students in secondary schools. The research analyzes the degree of understanding the area of OM among students in secondary schools, the recognition of this management field as well as a review of the understanding of OM basic areas of teaching. The research also makes connection between the wide knowledge of OM field, presence of OM studies and programs and their influence on business success. Therefore clear understanding of study programs and subjects is of great interest for understanding the influence of knowledge transfer on OM implementation.

The paper is valuable for researchers, OM community, associations, academic staff and Universities as well as professionals for better understanding of the actual OM status and knowledge transfer in order to improve it. This matter is of relevance since we truly believe that developing economies and modern service economies need OM knowledge and practice. We need much higher level of OM understanding, courses and program existence and much more students in OM University programs and OM professionals on decision making management positions.

## **2. METHODOLOGY**

In order to get a reply to our research questions, we analyzed the offer of academic programs in OM, in order to make a comparison of the OM program with competitive programs, as well as to research if prospect student's recognition and interest for OM. We also uncover potential problems in OM implementation and spreading of its knowledge areas and the steps which can improve knowledge transfer of OM to transitional countries.

### **2.1 Research of academic program offer**

In order to reply to the question if there is a difference and to what degree, on the basis of official data and systematization from the Commission for Accreditation and Quality Assurance (CAQA) of the Republic of Serbia and Ministry of Education and Science of FYRO Macedonia (MES), we made a comparison of bachelor academic programs divided in four categories:

- Category I: study program Operations Management (OM)
- Category II: study program Industrial Engineering (IE)
- Category III: study program Engineering Management (EM)
- Category IV: Study program in the area of Business Management (BM), which has some of the sub-areas of operations management in a module or major of study (for example, Quality Management).

In order to answer to posed questions we asked the following questions: Are the subjects from OM more represented as obligatory or optional subjects? What is the percentage in the total number of optional subjects of OM subjects? Is there a difference in the intensity and representation of subjects in the program? What is the percentage of participations of subjects in OM per years of study? What is the percentage of participation of number of hours in the total amount of classes?

At the initial stage in this study, following the list of subtopics of OM provided by Correa (2008), we considered it appropriate to perform an analysis of the characteristics of the courses recorded, in which we analysed following aspects:

- (1) Capacities (accredited)
- (2) Obligatory/Elective courses
- (3) Academic year in which course is taught

### **2.2 Survey in secondary schools**

In order to achieve an objective result, survey in secondary schools was conducted as a descriptive survey research, following the guidelines provided by Forza (2004).

The methodology applied was based on hypothesis testing, adapted for our case. The purpose of the interviews in secondary schools was to reply to the following questions:

- Recognition of OM field in secondary schools?
- Which field is usually interconnected with OM?

The population of the participants were students in secondary schools, and the target group were students of the graduation year. The sample of collected data is up to 1,2% of the total number of students of final year of secondary school in Serbia (SRB) and up to 3,5 % in Former Yugoslav Republic of Macedonia (Macedonia, MK).

The questionnaire consisted of 13 questions divided in the following categories: information about the participant, information about degree of interest for the studies, information about research about OM. The testing of the questionnaire was conducted during the education fair in one of the Belgrade municipalities, and the corrections of several questions were entered. One of the examples of corrections was for students in the field of municipality to enter the municipality where they live in, not the municipality where the secondary school is located. This change allowed us to get a clearer picture of the demographic structure of the participants.

The collection of data was realized by direct questionnaires with students in the secondary schools with moderation. In order to get a higher turnout of participants, we announced the time of the testing to the school managers. The campaign of gathering information lasted 10 months.

As obligatory criteria for relevance we set the principle that participants have to enter replies to the following questions: municipality of the participant, gender, secondary school type, question about recognition of the notion of OM, question about the recognition of a notion similar to OM. The questionnaires which did not include this information were discarded as irrelevant, which is a percentage of 11% (SRB) and 8% (MK) of total number. The feeding and processing of information was conducted by the SPSS programme for statistical interpretation. Owing to the characteristics of our study, classical tools of descriptive statistics (mean, mode, standard deviation, coefficients of variation, frequency distribution, contingency tables, etc) were employed. In addition, comparison of gained results from two countries was realized using Chi-square test.

### **3. RESULTS AND DISCUSSION**

Survey results are presented in following categories: results of comparison between program categories, results of survey in secondary schools.

#### **3.1 Results of academic program comparison**

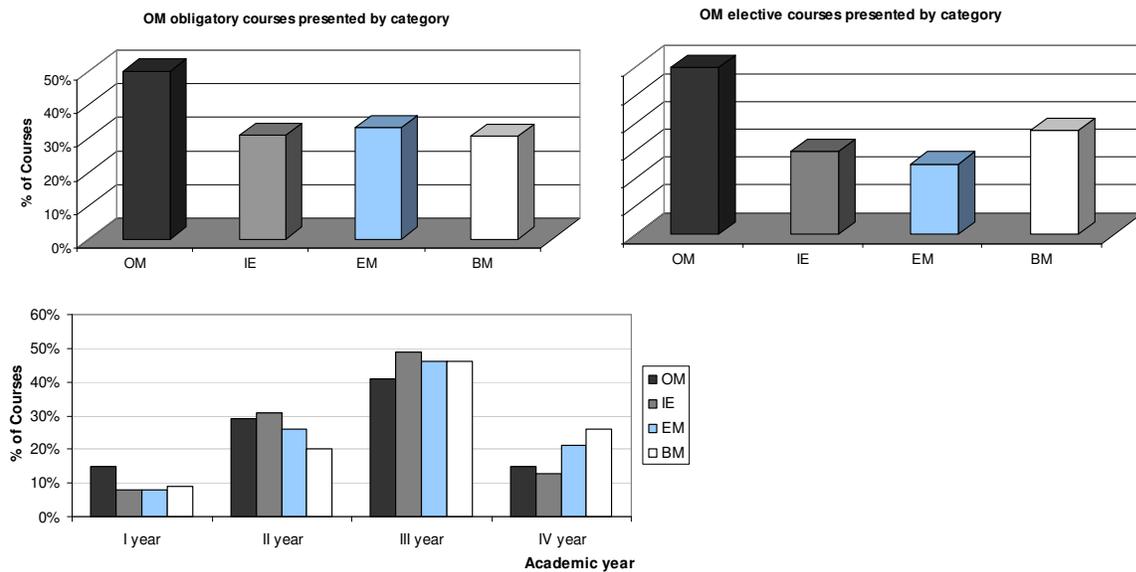
According to data presented in table 1 (number of OM courses by type and by category), OM program does not exist in academic offer in Macedonia. Courses in domain of operations management are provided only within IE and IM study programs. This results discover the problem or the inability to compare the observed categories.

**Table 1.** OM academic program offer sample data

	Operations Management (OM)		Industrial Engineering (IE)		Engineering Management (EM)		Business Management (BM)	
	SRB	MK	SRB	MK	SRB	MK	SRB	MK
Number of universities	2	0	4	2	4	1	4	0
Number of faculties	2	0	4	2	5	1	4	0
Total number of identified courses in the field of OM	71	0	62	20	76	15	52	0

However, in Serbia OM courses are equally arranged and usually positioned in the later academic years. In comparison of researched categories of programs considering content and representation of OM courses in program, results discover the essential difference between OM studying programs and other programs. Obligatory and selective courses from OM field participate in much higher rate in OM program than in others.

**Picture 1.** Overall characteristics of OM courses taught in analyzed categories in Serbia



Although research indicates a significant difference in the structure of the observed program categories of program, participation of the OM study program of 11% in academic offering, observed at the level of the Western Balkans, can not clearly indicate that difference. Moreover, the study program "drowns in a sea of engineering programs".

### 3.2 Results of survey in secondary schools

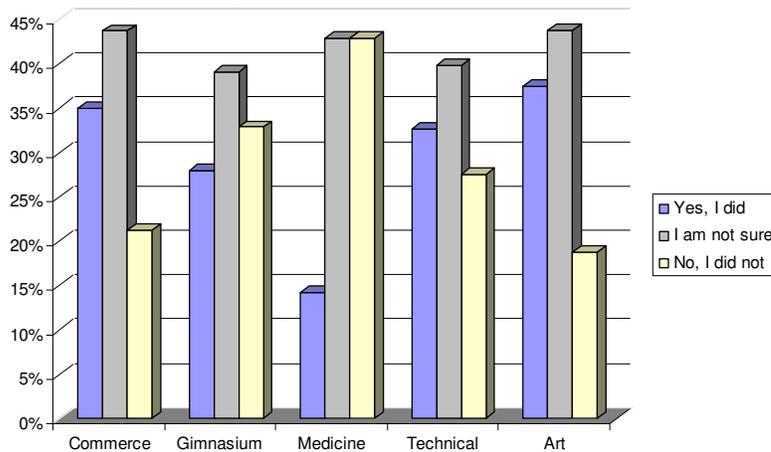
Results of survey in secondary school will be presented and analysed as results on two major questions: Have future students heard about the term OM? What is their first association when they hear the term operations management?

Table 2. Sample data for survey in secondary schools

Data	Number (SRB)	Number (MK)
Number of local municipalities	174	84
Number of local municipalities in which survey was realised	53	18
Number of secondary schools	586	111
Number of secondary schools in which survey was realised	93	30
Number of questionnaires	963	1054
Number of non-respondent answers	50	83
Number of respondent answers	913	971

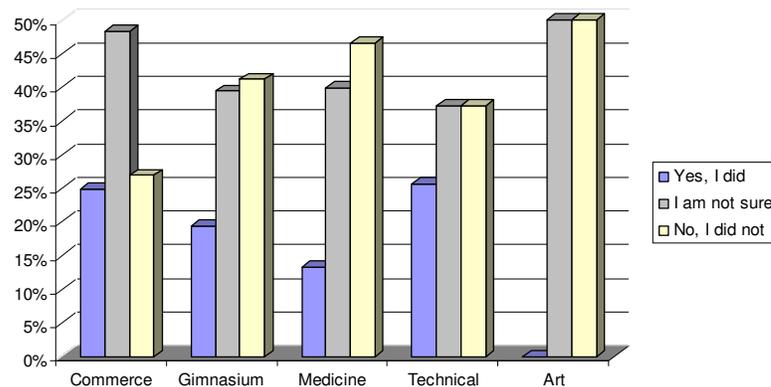
Results in response to first question show that a total 69% of respondents in Serbia did not know or were not sure if they heard about the term OM (42% answered “I am not sure”, 27% answered „I did not“). In Macedonia, results show that a total of 78% of respondents did not know or were not sure if they heard about the term.

Picture 2. Responses to question „Have you heard about the term OM?“ in Serbia



In addition, we performed Chi-square test and received following results: Pearson Chi-Square=16,862, df=10 and P=0,077. According to these results it can be concluded that students’ responses to the question: „Have you heard about the term OM?“ are not different regardless to the type of the school where they study.

Picture 3. Responses to question „Have you heard about the term OM?“ in Macedonia

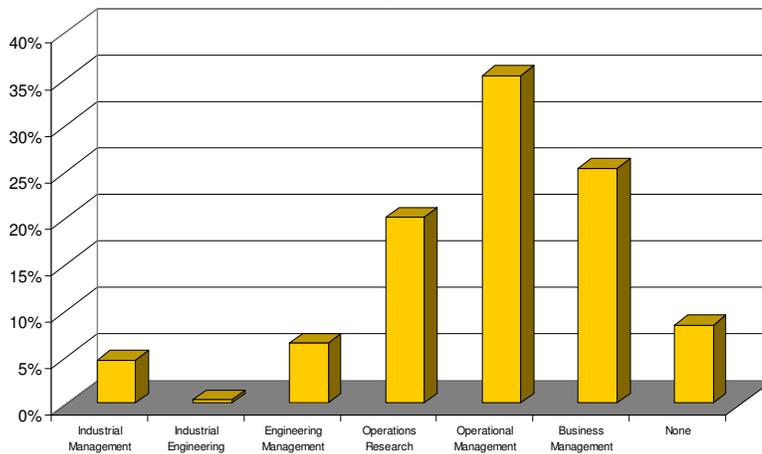


We performed Chi-square test and received following results: Pearson Chi-Square=17,906, df=8 and P=0,022. According to these results we concluded that there is significant difference between students in different schools. More precisely, students' responses to the question: „Have you heard about the term OM?“ are different regardless to the type of the school where they study.

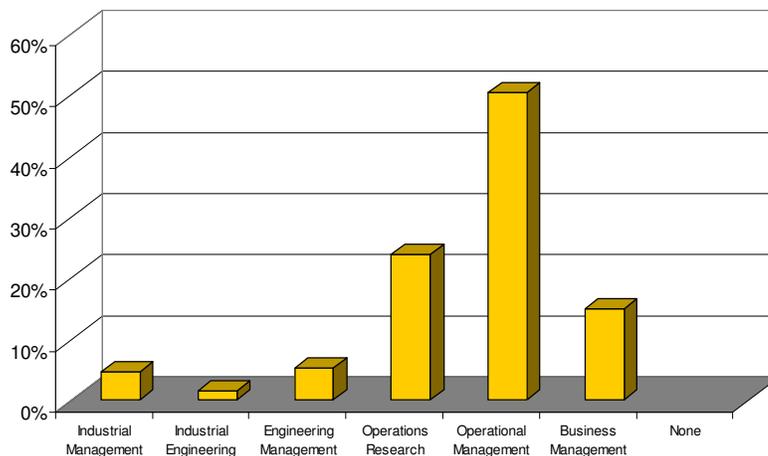
Results in response to second question show that students make difference between categories of OM and categories EM and IE. The problem on regional level is that students do not make difference between operational (executive) management and operations management, that 21% of them operations management sees as a quantitative science such as of operations research, and that 19% of students see operations management as „just one“ area of business management.

We also wanted to research if there is a difference between the students in Serbia and students in Macedonia regardless to the first association when they hear the term Operations Management. According to the results from our test (Pearson Chi-Square=58,449, df=6 and P=0,01), it can be concluded that there is a difference between the student in Serbia and Macedonia.

**Picture 4.** Responses to question „What is your first association when you hear the term OM?“ in Serbia



**Picture 5.** Responses to question „What is your first association when you hear the term OM?“ in Macedonia



#### 4. CONCLUSION

An obstacle to a more significant application of OM practice, as well as a higher number of enrolled students lies in the problem of knowledge transfer in the subject area. The problem of knowledge transfer of OM in education lies in the fact that the concept of OM is unrecognizable to the wider population. The research results point out that there is a core difference between four researched categories of academic programmes, and at the same time, there is no clear differentiation of the subject areas of studies among student population and students in secondary schools.

It is necessary, during the promotions of OM study program in region, to make a clear distinction between IE, EM and BM studies and make a precise division of the areas of OM and the professions that come out of these areas. It is necessary to precise that quantitative methods, as well as operations research are just a part of the area, due to fear of too many mathematical models. At the same time, it is of great value to explain that OM is equally applied in production, as well as the services sector.

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