

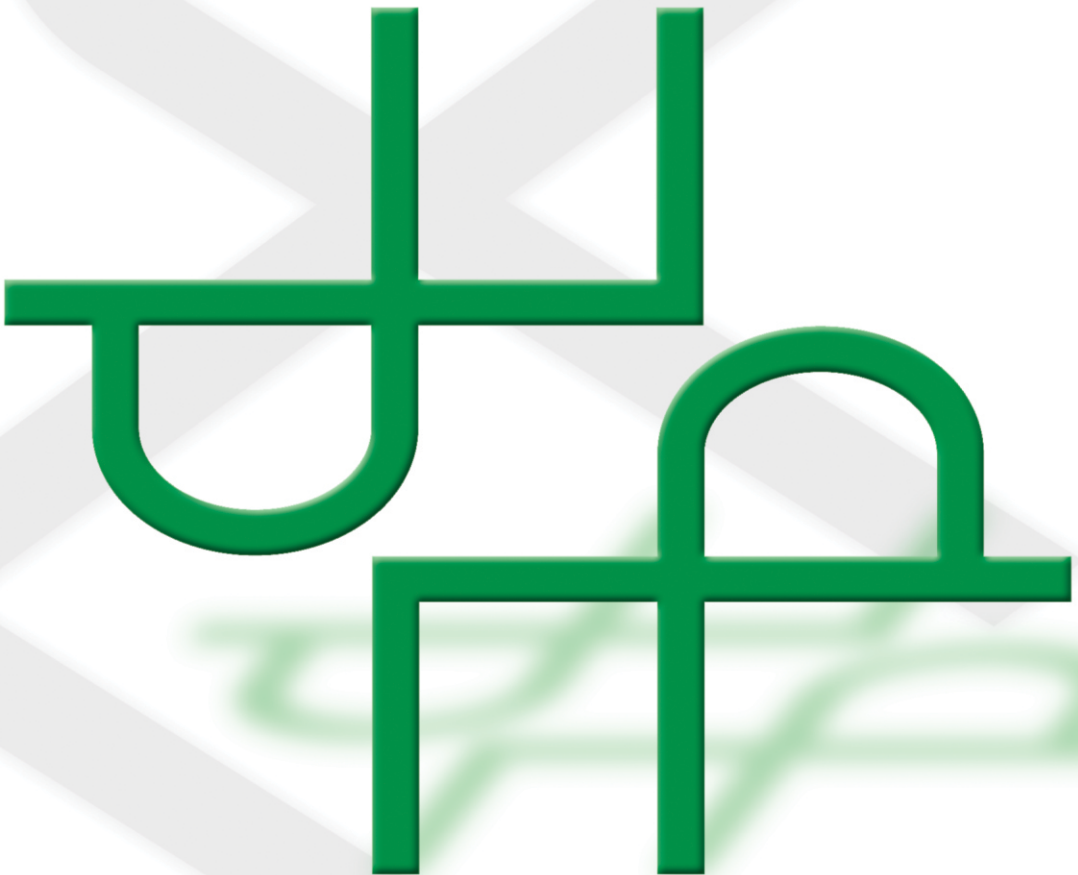
ISSN 0350-137X

UDK: 338 (497,1)

# ЕКОНОМИКА

# ЕКОНОМИКА

4



LXIV

NIŠ, 2018

МЕЂУНАРОДНИ ЧАСОПИС  
ЗА ЕКОНОМСКУ ТЕОРИЈУ И ПРАКСУ И ДРУШТВЕНА ПИТАЊА



# ЕКОНОМИКА

Часопис излази четири пута годишње

Година LXIV, X-XII 2018, број 4

ИЗДАВАЧ: Друштво економиста “Економика” Ниш

СУИЗДАВАЧИ: Економски факултет у Приштини, Институт за економику пољопривреде - Београд, Факултет за менаџмент - Сремски Карловци, Друштво економиста Ниша, Факултет за примењени менаџмент економију и финансије МЕФ - Београд

## ГЛАВНИ И ОДГОВОРНИ УРЕДНИК:

Проф. др Драгољуб Симоновић

## ЗАМЕНИК ГЛАВНОГ И ОДГОВОРНОГ УРЕДНИКА

Доц. др Зоран Симоновић

## ИЗВРШНИ УРЕДНИЦИ:

Проф. др Бојан Крстић, Ниш (Србија)  
Проф. др Благоје Пауновић, Београд (Србија)  
Проф. др Славомир Милетић, Приштина (Србија)  
Проф. др Драган Момировић, Београд (Србија)  
Проф. др Александар Грубор, Суботица (Србија)

Проф. др Јонел Субић, Београд (Србија)  
Проф. др Бобан Стојановић, Ниш (Србија)  
Доц. др Никола Ђурчић, Београд (Србија)  
Проф. др Зоран Јеротијевић, Београд (Србија)  
Др Владимир Радивојевић, Ниш (Србија)

## РЕДАКЦИЈСКИ КОЛЕГИЈУМ

Академик Зоран Лакић, Подгорица (Црна Гора)  
Академик Љубиша Папић, Чачак (Србија)  
Др Александар Ђурић, Београд (Србија)  
Др Рајмунд Мирдала, Кошице (Словачка)  
Др Грег Рингер, Јудин (САД)  
Др Марија Павлова, Велико Трново (Бугарска)  
Др Андреј Жан-Василе, Плоешти (Румунија)  
Др Јуриј Књазев, Москва (Русија)  
Др Андрес Карион Гарциа, Валенсија, (Шпанија)  
Др Рената Краковска, Варшава (Пољска)  
Др Љубинка Јоксимовић, Београд (Србија)  
Др Александру Неделеа, Сучева (Руманија)  
Др Набиева У.Н., Махачкала (Русија)  
Др Слободан Цветановић, Ниш (Србија)  
Др Збигњев Пашек, Краков (Пољска)  
Др Боривоје Прокоповић, Ниш (Србија)  
Др Тадеуш Грабински, Краков (Пољска)  
Др Јанко Радуловић, Подгорица (Црна Гора)  
Др Паоло Цесар Чагас Родригес (Бразил)  
Др Крис Пател, Сиднеј (Аустралија)  
Др Андреј Арјамов, Москва (Русија)  
Др Ливију Думитраску, Плоешти (Румунија)  
Др Срећко Милачић, Косовска Митровица (Србија)

Др Милан Амброж, Ново Место (Словенија)  
Др Марко Колаковић, Загреб (Хрватска)  
Др Дејан Јакшић, Суботица (Србија)  
Др Дино Мартелато, Венеција (Италија)  
Др Драго Цвијановић, Врњачка Бања (Србија)  
Др Ајше Умит Гокдениз, Истанбул (Турска)  
Др Иван Чарота, Минск (Белорусија)  
Др Милица Вујичић, Нови Пазар (Србија)  
Др Чи Вей Су, Кингдао, (Кина)  
Др Чор Фон Танг, Пенанг (Малезија)  
Др Драгутин Шипка, Бања Лука (Р. Српска)  
Др Дејан Петровић, Београд (Србија)  
Др Весна Стојановић Алексић, Крагујевац (Србија)  
Др Марија Станкова, Благоевград, (Бугарска)  
Др Андриела Витић-Џетковић, Котор (Црна Гора)  
Др Bishwajit Bhattacharjee, Каримгањ (Индија)  
Др Драган Михајловић, Зајечар (Србија)  
Др Томислав Брзаковић, Београд (Србија)  
Др Милош Крстић, Ниш, (Србија)  
Др Горан Квргић, Сремски Карловци (Србија)  
Др Алиаксеи Букау, Минск (Белорусија)  
Др Снежана Живковић, Ниш (Србија)  
Др Снежана Ђекић, Ниш (Србија)

## ИЗДАВАЧКИ САВЕТ

Др Гордана Мрдак, Врање (Србија)  
Др Душан Здравковић, Ниш(Србија)  
Мр Бранислав Јованчић, Ниш(Србија)  
Др Живорад Глигоријевић, Ниш (Србија)  
Др Софија Лихова, Кијев (Украјина)  
Др Рајко Буквић, Београд (Србија)  
Др Петар Веселиновић, Крагујевац (Србија)  
Др Иван Ђурић, Хале (Немачка)

Мр Наталиа Глаголева, Белгород (Русија)  
Др Весна Јанковић-Милић, Ниш (Србија)  
Др Братислав Прокоповић, Лесковац (Србија)  
Др Миријана Кнежевић, Крагујевац (Србија)  
Др Александар Костић, Косовска Митровица (Србија)  
Др Соња Јовановић, Ниш (Србија)  
Др Данијела Деспотовић, Крагујевац (Србија)

1. Часопис “Економика” покренут је јула 1954. године и под називом “ Нишки привредни гласник” излазио је до јуна 1957. године, а као “Привредни гласник” до краја 1969. године. Назив “Наука и пракса” носио је закључно са бројем 1/1973. год. када добија назив “Економика” који и данас има.

2. Часопис су покренули Друштво економиста Ниша и Друштво инжењера и техничара Ниша (остало као издавач до краја 1964. године). Удружење књиговођа постаје издавач почев од броја 6-7/1958. године. Економски факултет у Нишу на основу своје одлуке броја 04-2021 од 26.12.1991. године постао је суиздавач “Економике”. Такође и Економски факултет у Приштини постао је суиздавач од 1992. године. Почев од 1992. године суиздавач “Економике” је и Друштво за маркетинг региона Ниш. Као суиздавач “Економике” фигурирали су у току 1990-1996. године и Фонд за научни рад општине Ниш, Завод за просторно и урбанистичко планирање Ниш и Корпорација Винер Брокер Ниш.

3. Републички секретариат за информације СР Србије својим Решењем бр. 651-126/73-02 од 27. новембра 1974. године усвојио је захтев “Економике” за упис у Регистар новина. Скупштина Друштва економиста Ниша на седници од 24. априла 1990. године статутарном одлуком потврдила је да “Економика” има статус правног лица. На седници Скупштине Друштва економиста Ниш од 11. новембра 1999. године донета је одлука да “Економика” отвори посебан жиро-рачун.

4. Према Мишљењу Републичког секретариата за културу СР Србије бр. 413-516/73-02 од 10. јула 1973. године и Министарства за науку и технологију Републике Србије бр. 541-03-363/94-02 од 30. јуна 1994. године “Економика” има статус научног и ранг националног часописа “Економика” је поћев од 1995. добила статус међународног економског часописа.

5. УРЕДНИЦИ: др Јован Петровић (1954-1958), Миодраг Филиповић (1958-1962), Благоје Матић (1962-1964), др Драгољуб Стојиљковић (1964-1967), др Миодраг Николић (1967-1973), др Драгољуб Симоновић (1973-1984), др Миодраг Јовановић (1984-3-4/1988) и др Драгољуб Симоновић (1990-до данас).

**ЧАСОПИС ЈЕ ИНДЕКСИРАН У СЛЕДЕЋИМ БАЗАМА:**

ERIN Plus	Ulrichs web	ProQuest
Index Copernicus	EconPapers	EZB
EBSCO host	CABI	CNKI
J-Gate	ECONLIT	CIEEOL
SSRN	DOAJ	
RePEc	SHERPA / ROMEO	

Лектор за енглески језик

**ВЛАДИМИР ИВАНОВИЋ**

Компјутерска обрада текста и графике:

**МИЛАН Д. РАНЂЕЛОВИЋ**

Ликовна опрема:

**ПЕТАР ОГЃАНОВИЋ, ДРАГАН МОМЧИЛОВИЋ**

Адреса:

“Економика” Друштво економиста

18000 Ниш, Максима Горког 5/36

Телефон Редакције: +381 (0)18 4245 763; 211 443

е-маил: zoki@medianis.net; ekonomika@sbb.rs WEB: <http://www.ekonomika.org.rs>

Жиро рачун: динарска 160-19452-17

Штампа:

“MEDIVEST”

18000 Ниш

Тираж: 300 примерака

INTERNATIONAL JOURNAL  
FOR ECONOMIC THEORY AND PRACTICE AND SOCIAL ISSUES



# ЕКОНОМИКА

The Journal is issued four times a year.

Year LXIV, X-XII 2018, Vol. 4

PUBLISHER: Society of Economists "Ekonomika", Nis

COPUBLISHERS: Faculty of Economics - Pristina, Institute of agricultural economics - Belgrade, Faculty of management - Sremski Karlovci, Economic Association of Nis, Faculty of Applied Economics and Management Finance MEF - Belgrade

EDITOR-IN-CHIEF:

Prof. Dragoljub Simonovic, Ph.D

ASSISTANT EDITORS-IN-CHIEF:

Zoran Simonovic, Ph.D

EXECUTIVE EDITORS:

Prof. Bojan Krstic, Ph.D, Nis (Serbia)

Prof. Blagoje Paunovic, Ph.D, Belgrade (Serbia)

Prof. Slavomir Miletic, Ph.D, Pristina (Serbia)

Prof. Dragan Momirovic, Ph.D, Belgrade (Serbia)

Prof. Aleksandar Grubor, Ph.D, Subotica (Serbia)

Prof. Jonel Subic Ph.D, Belgrade (Serbia)

Prof. Boban Stojanović, Ph.D, Nis (Serbia)

Nikola Curcic, Ph.D, Belgrade (Serbia)

Prof. Zoran Jerotijević, Ph.D, Beograd (Srbija)

Vladimir Radivojevic, Ph.D, Nis (Serbia)

## EDITORIAL BOARD

Academician Zoran Lacic, Podgorica (Montenegro)

Academician Ljubisa Papic, Ph.D, Cacak (Serbia)

Aleksandar Duric, Ph.D, Belgrade (Serbia)

Greg Ringer, Ph.D, Eugene, OR (USA)

Rajmund Mirdala, Ph.D, Kosice (Slovakia)

Mariya Pavlova, Ph.D, Veliko Trnovo (Bulgaria)

Andrei Jean-Vasile, Ph.D, Ploiesti (Romania)

Jurij Knjazev, Ph.D, Moskva (Russia)

Andrés Carrión García, Ph.D, Valencia (Spain)

Renata Krakowska Ph.D, Warsaw (Poland)

Ljubinka Joksimovic, Ph.D, Belgrade (Srbija)

Alexandru Nedelea, Ph.D, Suceva (Romania)

Nabieva U.N., Ph.D, Mahackala (Russia)

Slobodan Cvetanovic, Ph.D, Nis (Serbia)

Chi Wei Su, Ph.D, Qingdao (China)

Zbigniew Paszek, Ph.D, Krakow (Poland)

Borivoje Prokopovic, Ph.D, Nis (Serbia)

Tadeusz Grabinski, Ph.D, Krakow (Poland)

Janko Radulovic Ph.D, Podgorica (Montenegro)

Paulo Cesar Chagas Rodrigues, Campus Avaré, (Brazil)

Andrey Aryamov, Ph.D, Moskva (Russia)

Liviu Dumitrascu, Ph.D, Ploiesti (Romania)

Srecko Milacic, Ph.D, K. Mitrovica (Serbia)

Milan Ambrož Ph.D, Novo Mesto (Slovenia)

Marko Kolakovic, Zagreb (Croatia)

Dejan Jaksic, Ph.D, Subotica (Serbia)

Dino Martello, Ph.D, Venice (Italy)

Drago Cvijanovic, Ph.D, Vrnjačka Banja (Serbia)

Ayşe Ümit Gökdeniz, Ph.D Istanbul (Turkey)

Ivan Carota, Ph.D, Minsk (Belarus)

Milica Vujicic, Ph.D, Novi Pazar (Serbia),

Chor Foon Tang, Ph.D, Penang, (Malaysia)

Dragutin Sipka, Ph.D, Banja Luka (Republika Srpska)

Dejan Petrovic, Ph.D, Belgrade (Serbia)

Vesna Stojanovic Aleksic, Ph.D, Kragujevac (Serbia)

Mariya Stankova Ph.D, Blagoevgrad, (Bulgaria)

Andriela Vitic-Cetkovic Ph.D, Kotor (Montenegro)

Chris Patel, Ph.D, Sydney (Australia)

Bishwajit Bhattacharjee Ph.D, Karimganj, (India)

Dragan Mihajlovic, Ph.D, Zajecar (Serbia)

Tomislav Brzakovic, Ph.D, Belgrade (Serbia)

Milos Krstic, Ph.D, Nis, (Serbia)

Goran Kvrpic, Ph.D, Sremski Karlovci (Serbia)

Aliaksei Bykau, Ph.D, Minsk (Belarus)

Snezana Zivkovic, Ph.D, Nis, (Serbia)

Snezana Djekic, Ph.D Nis (Serbia)

## PUBLISHING COUNCIL

Dusan Zdravkovic, Ph.D, Nis (Serbia)

Branislav Jovancic, MSc, Nis (Serbia)

Zivorad Gligorijevic, Ph.D, Nis (Serbia)

Sofja Lihova, Ph.D, Kiev (Ukraine)

Rajko Bukvic, Belgrade (Serbia)

Sonja Jovanovic, Ph.D, Niš (Serbia)

Petar Veselinovic, Ph.D, Kragujevac (Serbia)

Ivan Djuric, Ph.D, Halle (Germany)

Gordana Mrdak, Ph.D, Vranje (Serbia)

Natalia Glagoleva, MSc, Belgorod (Russia)

Vesna Jankovic-Milic, Ph.D, Niš (Serbia)

Bratislav Prokopovic, Ph.D, Leskovac (Serbia)

Mirjana Knezevic, Ph.D, Kragujevac (Serbia)

Aleksandar Kostic, Ph.D, K. Mitrovica (Serbia)

Danijela Despotovic, Ph.D, Kragujevac (Serbia)

1. The journal EKONOMIKA was initiated in July 1954. It was published as "Nis Economic Messenger" till June, 1957 and as "The Economic Messenger" till the end of 1969. The title "Science and Practice" it had till the issue 1/1973 when it changed its name into EKONOMIKA as it entitled today.

2. The Journal was initiated by the Society of Economists of Nis and the Society of Engineers and Technicians of Nis (the latter remained as the publisher till the end of 1964). The Society of Accountants became its publisher starting from the issue no. 6-7/1958. The Faculty of Economics, Nis, on the basis of its Resolution No. 04-2021 from December 26, 1991, became the co-publisher of EKONOMIKA. Likewise, the Faculty of Economics of Pristina became the co-publisher since in 1992. Starting from 1992, the co-publisher of EKONOMIKA has been the Society for Marketing of the Region of Nis. Other co-publishers of EKONOMIKA included, in the period 1990-1996, the Foundation for Scientific Work of the Municipality of Nis, the Institute for Spatial and Urban Planning of Nis and the Corporation Winner Broker, Nis.

3. The Republic Secretariat for Information of the Socialist Republic of Serbia, by its Resolution No. 651-126/73-02 from November, 27, 1974, approved of EKONOMIKA's requirement to be introduced into the Press Register. The Assembly of the Society of Economists of Nis, at its session on April 24, 1990, by its statutory resolution, confirmed the legal status of EKONOMIKA. At the session of the Assembly of the Society of Economists, Nis, on November 11, 1999, the resolution was adopted the EKONOMIKA was to open its own bank account.

4. According to the Opinion of the Republic Secretariat for Culture of the Socialist Republic of Serbia No. 413-516/73-02 from July 10, 1973 and the Ministry for Science and Technology of the Republic of Serbia No. 541-03-363/94-02 from June 30, 1994, EKONOMIKA has the status of a scientific and national journal. Starting from 1995, EKONOMIKA has been having the status of international economic journal.

5. EDITORS: dr Jovan Petrovic (1954-1958). Miodrag Filipovic (1958-1962), Blagoje Matic (1962-1964), dr Dragoljub Stojiljkovic (1964-1967), dr Miodrag Nikolic (1967-1973), dr Dragoljub Simonovic (1973-1984), dr Miodrag Jovanovic (1984-3-4/1988) i dr Dragoljub Simonovic (1990-till the present day).

THE JOURNAL IS INDEXED IN THE FOLLOWING BASES:

ERIH Plus	Ulrichs web	ProQuest
Index Copernicus	EconPapers	EZB
EBSCO host	CABI	CNKI
J-Gate	ECONLIT	CEEOL
SSRN	DOAJ	
RePEc	SHERPA / ROMEO	

Lector

VLADIMIR IVANOVIĆ

Prepress:

MILAN D. RANDJELOVIĆ

Cover:

PETAR OGNJANOVIĆ, DRAGAN MOMČILOVIĆ

Address:

"EKONOMIKA", Society of Economists

18000 Nis, Maksima Gorkog 5/36

Phone: +381 (0)18 4245 763; 211 443

e-mail: zoki@medianis.net; ekonomika@sbb.rs WEB: <http://www.ekonomika.org.rs>

Bank Account: 160-19452-17

Printed by:

"MEDIVEST"

18000 Niš

Copies: 300



ИЗДАТЕЛЬ: Общество экономистов „Экономика” Ниша.

СУИЗДАТЕЛИ: Экономический факультете в Приштине, Институт экономики сельского хозяйства в Белград, Факултет за пословне студије и право - Београд, Факултет управления - Сремски Карловци, Ассоциация экономистов Ниша, Факултет прикладной экономики и управления финансами MEF - Белград.

**ГЛАВНЫЙ И ОТВЕТСТВЕННЫЙ РЕДАКТОР**  
Проф. д.н. Драголюб Симонович

**ЗАМЕСТИТЕЛЬ ПОМОЩНИК ГЛАВНОГО И ОТВЕТСТВЕННОГО  
РЕДАКТОРА**  
Д.н. Зоран Симонович

### ИСПОЛНИТЕЛЬНЫЕ РЕДАКТОРЫ

Проф. д.н. Бойан Крстич, Ниш (Сербия)  
Проф.д.н. Благойе Паунович, Белград (Сербия)  
Проф. д.н. Славомир Милетич, Приштина (Сербия)  
Проф. д.н. Драган Момирович, Белград (Сербия)  
Проф. д.н. Александар Грубор, Суботица (Сербия)

Проф. д.н. Йонел Субич, Белград (Сербия)  
Проф. д.н. Бобан Стојанович, Ниш (Сербия)  
д.н. Никола Чурчич, Београд (Сербия)  
Проф. д.н. Зоран Јеротијевић, Белград (Сербия)  
д.н. Владимир Радивојевић, Ниш (Сербия)

### РЕДАКЦИОННАЯ КОЛЛЕГИЯ

Академик Зоран Лакич, Подгорица(Черногория)  
Академик Любиша Папич, Чачак (Сербия)  
д.н. Александар Джурич, Белград (Сербия)  
д.н. Раймунд Мирдала, Кошице (Словакия)  
д.н. Грег Рингер, Јудин (США)  
д.н. Мария Павлова, Велико Търново (Болгария)  
д.н. Андрей Жан-Васильев, Плоешти (Румыния)  
д.н. Юурий Князев, Москва (Россия)  
д.н. Андрес Каррион Гарсиа, Валенсия, (Испания)  
д.н. Рената Краковска, Варшава (Польша)  
д.н. Любинка Йокисимович, Белград (Сербия)  
д.н. Александру Неделеа, Сучева (Румыния)  
д.н. Набиева У.Н., Махачкала (Россия)  
д.н. Слободан Цветанович, Ниш (Сербия)  
д.н. Збигниев Пашек, Краков (Польша)  
д.н. Боривойе Прокопович, Ниш (Сербия)  
д.н. Тадеуш Грабински, Краков (Польша)  
д.н. Јанко Радулович, Подгорица (Чернагория)  
д.н. Паоло Цесар Чагас Родригес (Бразилия)  
д.н. Крис Пател, Сиднеј (Австралия)  
д.н. Андрей Арямов, Москва (Россия)  
д.н. Ливну Думитрасцу, Плоешти (Романия)  
д.н. Сречко Милачич, Косовска Митровица (Сербия)

д.н. Милан Амброж, Ново Место (Словения)  
д.н. Марко Колакович, Загреб, (Хорватия)  
д.н. Дејан Јакшич, Суботица (Сербия)  
д.н. Дино Мартелато, Венеция (Италия)  
д.н. Драго Цвијанович, Врњачка Баниа (Сербия)  
д.н. Ајше Умит Гокдениз, Станбул (Турция)  
д.н. Иван Чарота, Минск (Беларусь)  
д.н. Милица Вуйчич, Нови Пазар (Сербия)  
д.н. Чи Вей Су, Кингдао, (Китай)  
д.н. Чор Фон Танг, Пенанг (Малайзия)  
д.н. Драгутин Шипка, Бања Лука (Р. Сербскај)  
д.н. Дејан Петровић, Белград (Сербия)  
д.н. Весна Стојановић Алексић, Крагујевац (Сербия)  
д.н. Мария Станкова, Благоевград, (Болгария)  
д.н. Андриела Витич-Цеткович, Котор (Чернагория)  
д.н. Vishwajit Bhattacharjee, Каримгань (Индия)  
д.н. Драган Михајлович, Зајечар (Сербия)  
д.н. Томислав Брзакович, Белград (Сербия)  
д.н. Милош Крстич, Ниш, (Сербия)  
д.н. Горан Квргич, С. Карловци (Сербия)  
д.н. Алиаксен Букау, Минск (Беларусь)  
д.н. Снежана Живкович, Ниш, (Сербия)  
д.н.Снежана Джекич, Ниш (Сербия)

### СОВЕТ ИЗДАТЕЛЕЙ

д.н. Гордана Мрдак, Врање (Сербия)  
д.н. Душан Здравкович, Ниш(Сербия)  
к.н. Бранислав Йованчич Ниш(Сербя)  
д.н. Живорад Глигорјевич,Ниш (Сербия)  
д.н Софија Лихова, Кијев (Украина)  
д.н. Рајко Буквич, Белград (Сербия)  
д.н. Петар Веселинович. Крагујевац (Сербия)  
д.н. Иван Джурич, Хале, (Германия)

к.н. Наталиа Глаголева, Белгород (Россия)  
д.н. Весна Јанкович-Милич, Ниш (Сербия)  
д.н. Братислав Прокопович, Лесковац (Сербия)  
д.н Миријана Кнежевич, Крагујевац (Сербия)  
д.н. Александар Костич, Косовска Митровица (Сербия)  
д.н. Соња Јованович, Ниш (Сербия)  
д.н. Данијела Деспотович, Крагујевац (Сербия)

1. Журнал „Экономика” начал издаваться с июля 1954 года и под названием „Нишский хозяйственный вестник” выходил до июня 1957 года, а как „Хозяйственный вестник” - до конца 1969 года. Название „Наука и практика” носил заключительно с № 1/1973 г., когда и получил название „Экономика”, которое имеет и сейчас.

2. Журнал основали Общество экономистов Ниша и Общество инженеров и техников Ниша (оставались издателями до конца 1964 года). Объединение бухгалтеров становится издателем начиная с № 6 - 7 / 1958 года. Экономический факультет в Нише на основании своего Решения № 04 - 2021 от 26.12.1991 года стал соиздателем „Экономики”. Также и Экономический факультет в Приштине стал соиздателем с 1992 года. Начиная с 1992 года соиздателем „Экономики” становится Общество маркетинга региона г. Ниша. Как соиздатели „Экономики” в течении 1990 - 1996 года фигурировали Фонд по научным работам, общины Ниш, Институт урбанистического планирования Ниша и Корпорация Winner Broker Ниш.

3. Республиканский секретариат по информации СР Сербии своим Решением №651-126/73-02 от 27 ноября 1974 года принял заявление „Экономики” о входе в состав Регистра газет. Собрание Общества экономистов г. Ниша на заседании от 24 апреля 1990 г. Уставным решением подтвердил, что „Экономика” имеет статус правового лица. На заседании Собрания Общества экономистов г.Ниша от 11 ноября 1999 г. принято решение об открытии „Экономикой,” отдельного расчетного счета.

4. Согласно мнению Республиканского секретариата по культуре СР Сербии №413-516/73-02 от июля 1973 г. и Министерства науки и технологии Республики Сербии №541-03-363/94-02 от 30 июня 1994 г. „Экономика” имеет статус научного и ранг национального журнала. С начала 1995 года „Экономика” получила статус международного экономического журнала.

5. СОСТАВИТЕЛИ: д.н. Йован Петрович (1954-1956), Миодраг Филиппович (1958-1962), Благое Митич (1962-1964), д.н. Драголюб Стойилькович (1964-67), д.н. Миодраг Николич (1967-1973), д.н. Драголюб Симонович (1973-1984), д.н. Миодраг Йованович (1984 - 3-4/1988) и д.н. Драголюб Симонович (1990 и в настоящее время).

**ЖУРНАЛ ИНДЕКСИРУЕТСЯ В СЛЕДУЮЩИХ ОСНОВАНИЙ:**

ERIH Plus	Ulrichs web	ProQuest
Index Copernicus	EconPapers	EZB
EBSCO host	CABI	CNKI
J-Gate	ECONLIT	CEEOL
SSRN	DOAJ	
RePEc	SHERPA / ROMEO	

Английский редактор  
ВЛАДИМИР ИВАНОВИЋ

Компьютерная обработка текста и графика:  
МИЛАН Д. РАНЂЕЛОВИЋ

Худ.оформление:  
ПЕТАР ОГНЯНОВИЧ, ДРАГАН МОМЧИЛОВИЧ

Адрес:  
„Экономика” Друштво економиста  
18000 Ниш, Максима Горког 5/36

Телефон редакции +381 (0)18 4245 763; 211 443  
e-mail: zoki@medianis.net; ekonomika@sbb.rs WEB: <http://www.ekonomika.org.rs>

Расчотный счет: 160-19452-17

Печать:  
„MEDIVEST”  
18000 Ниш  
Тираж: 300

# САДРЖАЈ / CONTENT

## ОРИГИНАЛНИ НАУЧНИ РАДОВИ / ORIGINAL SCIENTIFIC ARTICLE

<b>Nebojša Zakić, Slavko Božilović, Ivan Šijaković</b>	
ANALYSIS AND UPGRADING OF VALUE CHAIN .....	1
АНАЛИЗА И УНАПРЕЂЕЊЕ ЛАНЦА ВРЕДНОСТИ .....	1
<b>Slobodan Cvetanović, Danijela Despotović, Gordana Milovanović</b>	
FOREIGN DIRECT INVESTMENTS AS A SOURCE OF FINANCING OF ECONOMIC DEVELOPMENT OF WESTERN BALKAN COUNTRIES .....	17
СТРАНЕ ДИРЕКТНЕ ИНВЕСТИЦИЈЕ КАО ИЗВОР ФИНАНСИРАЊА ЕКОНОМСКОГ РАЗВОЈА ЗЕМАЉА ЗАПАДНОГ БАЛКАНА .....	17
<b>Marica Dumitrasco</b>	
INNOVATION COMPETITIVENESS OF THE COUNTRY IN GLOBAL TRADE LANDSCAPE: THE CASE OF REPUBLIC OF MOLDOVA .....	27
ИНОВАТИВНОСТ ЗЕМЉЕ У ГЛОБАЛНОЈ ТРГОВИНИ: СЛУЧАЈ РЕПУБЛИКЕ МОЛДАВИЈЕ .....	28
<b>Vladimir Mičić, Ljubodrag Savić</b>	
SUSTAINABLE DEVELOPMENT OF THE SERBIAN MANUFACTURING INDUSTRY .....	47
ОДРЖИВИ РАЗВОЈ СРПСКЕ ПРЕРАЂИВАЧКЕ ИНДУСТРИЈЕ .....	47
<b>Vesna Sekulic, Milica Pavlovic</b>	
CORPORATE SOCIAL RESPONSIBILITY IN RELATIONS WITH SOCIAL COMMUNITY: DETERMINANTS, DEVELOPMENT, MANAGEMENT ASPECTS .....	59
ДРУШТВЕНА ОДГОВОРНОСТ КОМПАНИЈА У ОДНОСИМА СА ДРУШТВЕНОМ ЗАЈЕДНИЦОМ: КАРАКТЕРИСТИКЕ, РАЗВОЈ, УПРАВЉАЧКИ АСПЕКТИ .....	59
<b>Lana Nastić, Marko Jeločnik, Jonel Subić</b>	
CONTRIBUTION MARGIN IN SILAGE MAZE PRODUCTION .....	71
МАРЖА ПОКРИЋА У ПРОИЗВОДЊИ СИЛАЖНОГ КУКУРУЗА .....	71
<b>ПРЕГЛЕДНИ ЧЛАНЦИ / SCIENTIFIC REVIEW ARTICLE</b>	
<b>Predrag Vuković</b>	
THE FORMATION AND PROMOTION OF RURAL TOURIST PRODUCT IN THE REPUBLIC OF SERBIA .....	81



ФОРМИРАЊЕ И ПРОМОЦИЈА РУРАЛНОГ ТУРИСТИЧКОГ ПРОИЗВОДА У РЕПУБЛИЦИ СРБИЈИ .....	81
<b>Zaklina Spalevic, Milos Ilic, Vladimir Savija</b> THE USE OF DRONES IN AGRICULTURE - ICT POLICY, LEGAL AND ECONOMICAL ASPECTS .....	93
ИНФОРМАТИЧКА, ПРАВНА И ЕКОНОМСКА КАРАКТЕРИЗАЦИЈА УПОТРЕБЕ ДРОНОВА У ПОЉОПРИВРЕДИ .....	93
<b>Jasmina Smigic Miladinovic</b> BITCOIN - ITS CONDITION AND TENDENCIES .....	109
БИТКОИН - СТАЊЕ И ТРЕНДОВИ .....	109
<b>Đorđe Ćuzović</b> SOVEREIGN WEALTH FUNDS INVESTMENT STRATEGIES .....	121
СТРАТЕГИЈЕ ИНВЕСТИРАЊА НАЦИОНАЛНИХ ФОНДОВА БОГАТСТВА .....	121
<b>Vladimir Dragojlović, Branko Mihailović, Srđan Novaković</b> MARKETING ACTIVITIES FOR THE PURPOSE OF MARKETING CULTURE DEVELOPMENT IN EDUCATION AND EDUCATIONAL INSTITUTIONS .....	135
МАРКЕТИНГ АКТИВНОСТИ У ФУНКЦИЈИ РАЗВОЈА МАРКЕТИНШКЕ КУЛТУРЕ У ОБРАЗОВНО-ВАСПИТНИМ ИНСТИТУЦИЈАМА .....	135

## ПРИКАЗ / REVIEW ARTICLE

<b>Biljana Ilić, Nina Pavićević</b> RANKING THE ECONOMIC - ENVIRONMENTAL TOURISM DEVELOPMENT PROJECTS APPLYING THE MULTIPLE CRITERIA DECISION MAKING - CASE STUDY OF GAMZIGRAD SPA Society of Economists „Ekonomika“, Niš (Monograph), 2018 .....	147
ИЗБОР ЕКОНОМСКО - ЕКОЛОШКИХ РАЗВОЈНИХ ПРАВАЦА ТУРИЗМА ПРИМЕНОМ МЕТОДА ВИШЕКРИТЕРИЈУМСКОГ ОДЛУЧИВАЊА – СТУДИЈА СЛУЧАЈА ГАМЗИГРАДСКА БАЊА Друштво економиста „Економика“, Ниш (Монографија), 2018 .....	147

## IN MEMORIAM

<b>Бобан Стојановић</b> ПРОФ. ДР ИВАН СТОЈАНОВИЋ .....	151
<b>Боривоје Б. Прокоповић</b> АКАДЕМИК НИКОЛА КЉУСЕВ (1928-2008) .....	153

Nebojša Zakić<sup>1</sup>  
Slavko Božilović<sup>2</sup>  
Ivan Šijaković<sup>3</sup>  
University “Union - Nikola Tesla“,  
Belgrade, Serbia

ORIGINAL SCIENTIFIC ARTICLE  
doi:10.5937/ekonomika1804001Z  
Received: November, 04, 2018  
Accepted: December, 05, 2018

## ANALYSIS AND UPGRADING OF VALUE CHAIN

### Abstract

*The contemporary concept of value chains has evolved from many disciplines and directions by creating a complex and multidisciplinary body of knowledge. The value chains consist of structural and dynamic components of a system. The structural components refer to all participants within a chain that, through market-focused collaboration, execute a sequence of activities that add value. The dynamic components relate to management and relationships among participants, and the ability of the value chain to remain competitive by improving the system. The main activities of a value chain analysis are: end-market analysis, value chain mapping, the analysis of network structure and governance, as well as economic analysis. The results of the analysis are the input for the upgrading strategies. Types of upgrading in value chains are: the upgrading of a product, process, functional and intersectoral upgrading. The paper focuses on the value chains in agribusiness and especially to small agricultural producers.*

**Key words:** value chains, value chain components, value chain analysis, value chain upgrading, agribusiness

**JEL classification:** L16, L23, M11, Q19.

## АНАЛИЗА И УНАПРЕЂЕЊЕ ЛАНЦА ВРЕДНОСТИ

### Апстракт

*Савремени концепт ланца вредности је еволуирао из многих дисциплина и праваца креирајући комплексно и мултидисциплинарно тело знања. Ланце вредности чине структурне и динамичке компоненте система. Структурне компоненте се односе на све учеснике унутар ланца који кроз тржишно фокусирану сарадњу извршавају секвенцу активности које додају вредност. Динамичке компоненте се односе на управљање и релације међу учесницима, и способности ланца вредности да остане компетитиван унапређујући систем. Главне активности анализе ланца вредности су: анализа крајњег тржишта, мапирање ланца вредности, анализа мрежне структуре и структуре управљања, и економска анализа. Резултати анализе су улаз за стратегије унапређења. Типови унапређења у ланцима вредности су: унапређење*

<sup>1</sup> nebojsa.z@fpb.edu.rs

<sup>2</sup> rektor@unionnikolatesla.edu.rs

<sup>3</sup> sijakovici@gmail.com

*производа, процеса, функционално и интерсекторско унапређење. У раду је нагласак на ланце вредности у агробизнису и посебно на мале пољопривредне произвођаче.*

**Кључне речи:** ланци вредности, компоненте ланца вредности, анализа ланца вредности, унапређење ланца вредности, агробизнис

## Introduction

The concept of value chains is a systemic approach that according to Silva & de Souza Filho (2007) has evolved from many directions, schools and disciplines (economics, management, engineering, operational research, etc.). Evolution of the value chain according to Fasse et al. (2009) has contributed to French filière concept, developed as an analytical tool to explore ways to organise a system of agricultural production in countries under the French colonial system. The Filière concept paid special attention to the fact that local production systems are linked to the processing industry, trade, exports and final consumption.

The term commodity chains originated from the world system theory of Wallerstein, which was later jointly developed by him and Hopkins. According to these authors, commodity chains are understood as a network of working and production processes whose end result is delivered goods (Hopkins & Wallerstein, 1986). Raikes et al. (2000) state that the contribution of this concept was what served as the basis for the development of a global supply chain, whose main representative is Gereffi with a number of other authors.

During the eighties and nineties, a process approach was developed that involved systematic defining and managing processes, as well as their interaction, in order to achieve the desired results (ISO 9001: 2015). According to one of the definitions (Melan, 1992), the process is viewed as a limited set of interrelated activities that provides a higher value output than the input through one or more transformations. At the same time, the concept of supply chain management was being developed, which included managing the total product flows, as well as the flows of information and money between participants (Buddress, 2014). The focus of supply chains is to integrate the process of producers and suppliers, improve efficiency and reduce losses (Pessoa & Trababo, 2017).

Porter (1985) develops the concept of value chains arguing that the value for customers is accumulated along the chain of activities all the way to the final product or service. Porter identifies two types of activities: (1) primary activities - directly contribute to adding value to a product or service, and (2) support activities - have an indirect effect on the product or service. Shank & Govindarajan (1993) represent a value chain observing the company as a part of the overall chain of processes that create value for the customer/user. Value chains begin with suppliers processes that create value by providing basic raw materials and components, proceed with the processes that create value for different classes of customers and sellers all the way to the end consumer, and end with the processes of removal and further recycling of materials. Value creation is observed from the point of view of the chain as a whole, including value chains of related entities (Walas-Trebacz, 2018).

Gereffi (1994) develops the concept of global commodity chains as inter-organisational networks linked to international markets. The author observes four dimensions of the model: (1) the input-output structure, (2) the covered territory, (3) the institutional aspect, and (4) the management structure. The input-output structure and the covered territory are used in the description of the organisational and territorial division of labour and values, and the institutional aspect sets the scene by defining global market conditions (Gibbon, 2001). A crucial dimension is the governance structure that relates to power relations, institutional mechanisms and interorganisational relationships.

The approach of global value chains was the natural development of previous concepts and models. According to Sturgeon (2009), regional, national and local value chains are embedded in the same approach, that is, the approach is equally good for all spatial scales. Value chains have evolved from globalisation, crossed the continental boundaries and became very complex. The concept of global value chains can be associated with increased fragmentation of production across multiple countries, the specialisation of countries in tasks and business functions and the role of networks, global suppliers and global customers (Backer & Miroudot, 2013).

### Value chain components

Value chains are defined as the full range of activities needed to carry the product from the original concept to the end consumer (Kaplinsky & Morris, 2001). These activities can be carried out by one company or divided among many participants. Miller & da Silva (2007) define value chains as a set of participants (private, public, including service providers) and sequences of value-adding activities involved in bringing a product from production to an end consumer.

In agribusiness, value chains can be very complex, including all the processes and actors needed to deliver products and reach consumers. The actors in a value chain in agribusiness are companies that supply farmers with inputs, agricultural producers (small farmers, agricultural organisations), carriers, processors, wholesalers (including exporters and importers), retail organisations, consumers and other stakeholders. Value chains can connect farmers with other participants and end-users in the local environment, across the country, the region or the world (Zakić et al., 2014).

A value chain consists of structural and dynamic components (Dunn, 2012). The structural components of the model include all the companies and other stakeholders involved in the value chain and the vertical and horizontal links between them, the end markets whose demand defines the opportunities that are driven by the value chain, the support markets that offer products and services to support business functions through the value chain and the environment that enables the business within which participants act.

The term end-market indicates where the final transactions in a value chain are made. End markets can be local, national, regional and global. An agricultural product can be sold at a rural market; in city centres in retail chain stores that have purchased a product from local retailers; in neighbouring countries in regional retail chains that have purchased the product from the exporter; or in distant foreign markets in global retail chains. The end markets provide opportunities and a set of parameters for economic growth, determine the characteristics of final products, and end-market demands induce quality and standards.

Lazarini et al. (2001) introduce the concept of a network chain that is established as a set of networks that consist of horizontal connections between firms within a particular industry, in such a way that these networks or levels are sequentially arranged based on vertical links between firms at different levels.

Vertical links connect companies at different levels of a value chain from input suppliers and manufacturers, to retail organisations and end users. Vertical links also represent the means of the transfer of learning, information, as well as business, financial and technical services from one company to another along a value chain. The ability of a company within the industry to supply customers with a product or provide services that meet all customer requirements depends on the ability of the chain to provide information, knowledge and skills, resources and benefits to all stakeholders in the value chain.

Horizontal links in a value chain are long-term cooperative arrangements among firms that include interdependence, trust and resource sharing in order to achieve common goals. With the evolution of cooperative arrangements, horizontal links are becoming more and more important (Sumner et al., 2013). Horizontal links can help reduce transaction costs, create economies of scale, contribute to the growth of the efficiency of the industry, enable sharing of knowledge, skills and resources, encourage collective learning, improve product and service quality, facilitate risk sharing while increasing the potential for innovation (USAID, 2009a).

Support markets include firms and other organisations that provide products and services to all stakeholders involved in the value chain. Support markets include sector-specific markets (e.g. supply of specialised equipment), different types of business services (e.g. consultants), financial services (e.g. loans) and information technology (e.g. an information system that provides access to market information).

The business environment consists of all formal and informal rules that define the context within which decisions are made (Dunn, 2012). The business environment consists of many elements: laws, policies, national and international standards, international trade arrangements, norms and customs, business culture and local expectations, etc. Business environments can be local, regional, national or global.

Dynamic elements of a value chain correspond to the developmental features of the market system. Various core processes from the input of raw materials to the final consumption of end products can be identified in the value chain. The core processes will vary depending on the characteristics of the chain being analysed. Power issues in relationships between value chain companies shape intentions that lead behaviour and affect the benefits that businesses have from participating in the chain. Company-level upgrading indicate what companies do to increase competitiveness through product development, the process of redesigning, market position improvement, and so on. Learning and innovation are the key to creating and maintaining competitive advantage.

According to Dunn (2012), among the dynamic elements with important implications for the implementation of a value chain, the following are distinguished: value chain management, relationships between enterprises and upgradings.

Value chain management refers to the power and ability to realise control along the chain. Gereffi et al. (2005) introduce the typology of the global value chain governance structures based on three factors: (1) the complexity of transactions, (2) the codification of information, and (3) the ability of the supplier. Depending on whether these factors are high or low, in practice, five types of value chain governance have been identified (Gereffi et al., 2005):

- Market - includes transactions that are relatively simple; information about product specifications is easy to transfer and manufacturers are able to realise products with minimal input of buyers. The price is the central governance mechanism.
- Modular value chains - the product requires chain companies to undertake complex transactions that are relatively easy to codify. It is common for suppliers in these chains to realise products according to customers' preferences (Sturgeon & Gereffi, 2008).
- Relational value chains - buyer-seller interactions are based on mutual reliance, which is regulated through reputation, social closeness, spatial proximity, and the like. Interactions are complex, making the need to increase explicit coordination.
- Captive value chains - small suppliers are dependent on large, dominant customers and face significant replacement costs in the event of a change in customers. In these networks there is a high degree of power and control of leading companies.
- Hierarchy - characterised by vertical integration and management control within the company that independently realises its products. This is usually the case where product specifications cannot be codified, products are complex or competent suppliers cannot be found.

Relations among stakeholders in a value chain that support the chain competitiveness (and healthy competition) are mutually co-operative and allow free information transfer and incentives to improve. Horizontal co-operation can include formal and informal arrangements. Formal organisations of members provide services that include collective production and marketing activities, as well as supply of input components, financial services, technology, education, shared resources management. There are various forms of these formal organisational arrangements including co-operatives, associations and clusters.

Vertical cooperation refers to the methods of linking that coordinate all stages from production to sale (Frank & Henderson, 1992). On the continuum from market exchange to complete vertical integration, the mechanisms of vertical co-operation can take different forms. Vertical cooperation offers many benefits by enabling the transfer of learning, information and services among firms along the chain. Small farmers are vertically connected to a wide range of market participants. The nature of vertical links often determines the benefits of distribution along the value chain and creates stimuli or limitations for improvements and innovations.

From the perspective of small agricultural producers, various forms of co-operation can bring many benefits, including greater control over production, cost savings, strengthening their negotiating position, developing knowledge (from production, marketing, etc.), improving social capital, and so on. (Balint, 2004; de Roest et al., 2018, Rivera et al., 2018).

Company-level upgrading refers to the changes that participants in a value chain make to enhance their competitiveness. Upgradings require access to information/knowledge, technology and finance. Investments are necessary to increase added value. Improving and developing products, processes, marketing and organisations are a

foundation for maintaining competitiveness, enabling businesses to satisfy the market by introducing innovations. For participants in the value chain, it is essential that learning and innovation flow through a value chain in order to optimise returns on investment. Learning and innovating in a systemic sense are closely related to stimuli that encourage or discourage the transmission and absorption of new knowledge and skills, and the types of mechanisms that are established to influence their transfer.

## Value chain analysis

Value chain analysis is a process for understanding the system factors and the conditions under which the value chain and participants in the chain can achieve a higher level of performance (USAID, 2009b). The purpose of the value chain analysis is to better understand the system and identify strategies for improvement (Stein & Barron, 2017).

There are many ways to analyse and evaluate value chains, as well as different levels of value chain analysis from micro to global levels (Gereffi & Kaplinsky, 2001). The analysis may result from the research of secondary information, such as data from governments, statistical institutes and business branches, or from field research by different participants through interviews and questionnaires. The data can also be derived from participatory market assessments and market observations. The analysis requires the mapping of a value chain, various detailed research and analysis, checking findings with stakeholders, and recommendations for future actions. Results of the value chain analysis serve to establish a vision and strategy for upgrading. The analysis uses a number of tools and techniques that can help in the diagnosis of conditions, interpretation of data and taking further steps.

Value chain analysis has become a part of more robust projects and models of value chain development initiatives designed to intervene in markets so as to create conditions that are more suitable for small farmers. These models are often created by global and national organisations (UNIDO, ILO, USAID, GIZ/GTZ, etc.) The inclusion of small-scale farmers in value chains provides opportunities for access to larger and richer markets, greater stability and income security (a stable market and predetermined prices), better access to inputs, increased productivity and overall revenue growth. However, there are limitations that limit the competitiveness of small farmers and prevent them from participating in value chains (Fernandez-Stark & Banber, 2012). Larger and richer markets are looking for much more in terms of business knowledge, efficiency, quality standards and security than local markets. In order to participate in these markets it is necessary for small farmers to carry out regular deliveries of products of the required quality and quantity which requires the access to land, inputs, technology, knowledge, organisation, capacity, and infrastructure that may be missing from some groups of small farmers (Devaux, 2017).

The value chain analysis consists of the series of different methods. An end-market analysis and value chain mapping are essential methods based on which further qualitative and quantitative analyses follow. After constructing maps (diagrams) of chains, their quantification is carried out, the static and dynamic components of the chain are researched and analysed. Depending on the goals and needs of the analysis, it can

be very complex, including various specialised studies. A value chain analysis can be understood as an iterative process. The need for a deeper analysis in a certain segment (in the next iteration) is often created as new ideas and requirements are created based on the previous analyses. One of the most demanding segments of analysis involves an analysis of economic performance.

The end markets are the starting point for analysing a value chain. Identifying market potential and specific market opportunities are basic tasks in every market-oriented approach. The analysis examines each existing or potential market to determine what is needed to compete in that market and what benefits and risks can be expected for each participant in the chain. The key elements of the research are (GTZ, 2007; UNIDO, 2009): market specificities and marketing opportunities for identified products - demand for certain types of products, size and market dynamics, seasonal consumption, prices and customer requirements; competitors that exist on the market - data on competitors, their products, links in global value chains, factors of competitive advantage; prevailing conditions in terms of market access - existing physical infrastructure (communications, roads, warehouses, logistics, etc.), distribution channels, the power of market participants, standards, customs and non-tariff barriers, etc.

The value chain as a whole depends on the end market and the consumer, and therefore a deep understanding of the end market is in the interest of all stakeholders involved in the value chain. Since markets are dynamic, it is also necessary to identify trends in these markets (Campbell & Downing, 2008).

Mapping a value chain is creating a visual presentation of connections between business entities in the chain, including other market players (Herr & Muzirra, 2009). Mapping is a fundamental part of the analysis, because it is very difficult to see relevant interdependencies or discuss opportunities for improvement without a visual presentation. According to Herr & Muzirra (2009), mapping has the following implications: it allows to illustrate and understand the flow of product movements through different stages to end consumer; serves to identify and categorise major market players in the chain; illustrates which support organisations are available and at what levels of the chain they concentrate their services; shows various market channels through which products and services reach the end customer; help companies to orient their activities, identify actors, supply channels, competitors, the weak links in the chain, and so on.

The output of the mapping process is many diagrams, which differ in accordance with their purpose (the diagram of the core processes, flows among actors, a network diagram illustrating different market channels, etc.). It is crucial to achieve the right degree of detail that provides enough information to make the diagram useful, but it is still easy to understand. After creating the necessary diagrams, the focus is on their quantification. Quantification depends largely on the availability and reliability of secondary data, especially statistical ones.

The analysis of a network structure and dynamic components of a value chain, primarily the form of governance and relations, is possible after mapping value chains. Network structure analysis differentiates horizontal and vertical links, emphasising that agents are interconnected to one another at the same level (horizontal connections) and with agents at other levels (vertical links). The qualitative analysis of vertical links includes a description of vertical links, the amount and quality of information and services that flow through different vertical links, the identification of weak or missing vertical



links, and so on. An analysis of horizontal links involves the description and purpose of these links, the balance between co-operation and competition, the identification of missing or inappropriate horizontal links, the level of trust between members performing similar functions, it can indicate the areas where negotiating power of small participants in the chain can increase, etc.

The structure of a network depends largely on the market channels chosen by different participants. Channel choices can be very limited by market access limits, such as supporting infrastructure to reach the market, the access to information (on demand, prices, fluctuations, etc.) and specific market demands, such as production in accordance with quality and safety standards. The ability of small farmers, entrepreneurs and companies to take part in market channels is closely related to market characteristics, the knowledge of the requirements and technological abilities of the producers (Trienekens, 2011).

Analyzing relationships among actors involves an analysis of co-operation and competence. Both of these categories can be effective or ineffective in different contexts. Co-operation is effective when actors can quickly identify and work together to meet important common interests. On the other hand, co-operation is ineffective when actors agree to achieve monopolistic control. Competition is effective when rivalries lead to improvement and innovation, on the contrary, competition is ineffective when it is based on price (rather than productivity), when one negotiator wants to achieve everything (at the expense of others), and so on. The relationship analysis should determine the extent to which existing relationships encourage learning and innovation, the degree of (non) confidence among participants, the motivation for establishing relationships, and others (USAID, 2009a).

Regarding the support market, the analysis should identify the possibilities for better access to services for the target audience in the value chain. The analysis includes a description of the service provided by the participants in the chain or by external entities, the identification of the restrictions for the provision of services, and the restriction of access to services to the participant in the value chain, the missing or the poor service to the participants in the chain, which significantly affects competitiveness.

The previous section lists the types of global value chain governance. The forms of governance can be changed as an economic branch evolves and matures, and the management patterns within a branch can vary according to the stage of the chain. According to Sturgeon (2009), power in the chain is a crucial issue in terms of value chain governance. The two basic types of companies within the chain are the leading companies and suppliers. Leading firms can be manufacturers or customers with little or no own production. Because they have ways to choose and change suppliers, these companies have the purchasing power. This power allows the leading company to explicitly coordinate chain activities and pressure suppliers to reduce costs, improve quality, apply specific processes, procure from certain suppliers, etc.

The second category is the power of suppliers. An extreme form of this power is a platform leadership where market and technological domination allows leaders to establish standards (for example, Intel). The more common in value chains is the softer form of power - the power of competence, arising from technical, service and other abilities that are rare, valuable and difficult to change and imitate (Palpaucer, 2000). Suppliers have the power of competence when their products and services are

seen as essential to the leading companies they serve. However, leading firms can use their purchasing power to limit the power of suppliers, as even the most competent and important suppliers base their success on future orders.

A part of the power in a value chain is shared by other stakeholders, such as government institutions and other involved stakeholders. Different authors emphasise the importance of the influence of institutions on value chains (Daviron & Ponte, 2005; Sturgeon, 2009). Institutions include the regulatory mechanisms of national states, but also intergovernmental institutions, such as the European Union and the World Trade Organisation. Some of the effects that global institutions have on global value chains can be related to the degree to which participants in developing countries can benefit from a value chain (Bair, 2005), or global agreements can affect participants so that certain participants, for example producers, get into a weaker position (Daviron & Ponte, 2005).

The analysis of economic performance and benchmarking of the competitors allows a value chain to position itself appropriately against the competitors, identify strategic and non-strategic activities, raise the awareness of the participants in the chain in relation to cost drivers, margins for price negotiations and value-added opportunities, and recommend appropriate actions. This analysis includes the analysis of the external environment and the analysis of economic parameters (UNIDO, 2009). The environmental analysis consists of: economic and social environment analysis - basic economic data on land, exports and imports, economic policy, government measures for the promotion and financing of industry; industrial environment analysis - affects the resulting value chain and competitors including various institutions and agencies (standardisation, certification, accreditation, metrology, consulting, etc.), and technological environment analysis including technical support systems that allow participants to acquire technologies, equipment, and production procedures, as well as exploit technological know-how.

The analysis of economic parameters includes: the analysis of production costs, value added analysis and benchmarking performance. The calculation of production costs in a value chain implies (GTZ, 2007): the aggregation of costs incurred by enterprises in each segment of the chain and linking data with functions in the value chain (here it is not about an enterprise, but a sequence of production, marketing and other operations within the value chain). This analysis is used to identify cost drivers at different stages of the chain and the potential to reduce costs. Added value represents the value generated during the production process. In order to achieve the added value generated by a specific chain, the costs of the purchased material, components and services must be deducted from the sales value. Benchmarking of a value chain is important, because it serves to evaluate the position of the value chain in relation to competitors. The key parameters used for comparison are unit costs of production, productivity, quality of the process, etc.

Calculating economic parameters is very complex. Different problems can arise in the analysis, especially in micro, small and medium-sized enterprises in terms of reliability, availability, regularity and homogeneity of accounting data. Therefore, this analysis is often based on cost estimates that must be carefully checked. Benchmarking analysis is also challenging in terms of data that are difficult to obtain. Solutions can be the engagement of experts for a particular industry or allowing the access to specialised data.

## Value chain upgrading

Growth and international competitiveness depend on the ability of society to improve businesses and industries. Upgrading refers to shifting from lower-value economic activities to those higher values within global value chains using local innovation capabilities to make improvements in processes, products, and functions (McDermott, 2005). Among the upgrading paths that farmers can choose from, there are quality upgrading, more efficient production, product and process innovation, non-technological innovations, horizontal co-operation (co-operatives, associations), the acquisition of certification schemes, reaching new markets, learning from leading companies through partnerships, etc.

Upgrading places a strong emphasis on innovation (technological and non-technological). Innovation is viewed in a relative context, how many actors innovate in comparison to competition. If the innovation rate is lower than the competitors' one, this results in a reduction in added value and market share (Kaplinsky & Morris, 2001). Therefore, in the context of global value chains, the upgrading is defined as innovation to increase added value (Giuliani et al., 2005).

According to Humphrey & Schmitz (2002), four types of upgrading were identified in value chains:

- Process upgrading, more efficient transformation of inputs into outputs by reorganisation of production systems or introduction of superior technology.
- Product upgrading, moving to more sophisticated production lines in terms of increasing unit value.
- Functional upgrading, the acquisition of new superior functions in the chain, and the increase in overall skill content or abandoning low value added functions to focus on those with higher added value.
- Intersectoral upgrading, the application of competencies acquired in a specific sector and moving horizontally to another sector.

Upgrading processes and products are the most common elements of success in value chains in developing countries, and this strongly contributes to exports. Usually it is started by process upgrading, followed by product upgrading, but there is no need to cease there. Functional and intersectoral upgradings enable businesses and countries to move towards activities and sectors with more added value. However, these upgradings are rarely occurring in developing countries, as manufacturers and other participants in these countries are mainly suppliers for partners in the chain of developed countries. This may mean that domestic businesses in developing countries only play a peripheral role within global value chains, while more value-added activities are controlled by the leading companies in the chain, multinational companies (McDermot & Corredoira, 2010).

Pananond (2015) points out that the strategic option for successful domestic businesses to move towards more value-added activities is that they also embark on the international arena. Domestic companies in manufacturing, trade and services should consider international expansion as part of their advancement trajectory. International expansion is becoming an essential alternative to overcoming the peripheral roles and constraints established by leading companies in global chains. Internationalisation and innovation are highly integrated strategic activities, innovations have direct effects on internationalisation, and the exit beyond local and national borders increases the need for innovation (Filipeti et al., 2013, Vukajlović & Ćurčić, 2016; Lamote & Colovic, 2018).

Trienekens (2011) also adds the upgrading of the network structure and management structure of a value chain. These upgradings relate to finding markets that offer opportunities for increasing added value and enhancing organisational arrangements that enable chains to create and take value from the market for different stakeholders in the chain. Here is an emphasis on non-technological innovations (organisational and social innovations and marketing innovations).

According to Stamm & von Drachenfels (2011), vertical value chain interventions tend to strengthen the dialogue between large enterprises that dominate a value chain and smaller businesses and entrepreneurs to identify opportunities for increasing participation in the value chain of small, local actors. Vertical relations in chains are often enhanced by transaction-specific investments of processors or retail chains and exporters in order to reduce the uncertainty of delivery and increase the quality and consistency of suppliers.

Horizontal value chain interventions focus on the access to technical, business and financial services, so that small farmers can more effectively participate in national, regional and global value chains, as well as on collective actions of participants (Stamm & von Drachenfels, 2011). Horizontal partner co-operation significantly improves the value chain. Small participants in a value chain (farmers, entrepreneurs, small businesses) can use complementary competencies, knowledge sharing, technologies and inputs, develop greater responsiveness to end-market requirements and achieve higher export levels as a result of horizontal co-operation. Lu et al. (2008) find that the crucial role for small farmers lies in social capital in the management of business transactions and the pursuit of marketing strategies (emphasising the importance of interpersonal confidence), achieving long-term business relationships and strengthening their negotiating power.

## Conclusion

Systemic approach sees value chains as systems with many activities and actors. A complex and multidisciplinary body of knowledge about value chains has evolved from many disciplines and directions (economics, management, engineering, operational research, etc.). Value chains are defined as a full range of activities that can be done by one company or divided among many different participants needed to carry the product from the original concept to an end consumer. Value chains in agribusiness are made up of a variety of different actors and processes that add value, carrying a product from production to the end consumer.

The conceptual value chain model includes structural and dynamic components of the system. This model is the basis for value chains analysis. Structural components are made by all the participants involved in a value chain, their horizontal and vertical links, the support markets and the business environment. Dynamic chain components are associated with the changing characteristics of the market system, including building the relationships between companies, the value chain management, and the implementation of promotion activities.

Value chain analysis is the process of linking the chain to its constituent parts in order to better understand its structure and functioning and identify strategies for improvement. The value chain analysis requires, inter alia, the research and analysis of the end-market, mapping the value chain, identifying participants at each chain level and identifying their functions and relationships (network structure), determining the structure of management and leadership in the chain, the economic analysis involving the identification of activities that add value

and allocating costs and determining the added value for each activity and benchmarking the competitors. Depending on the goals and needs of the analysis, the analysis can be very complex, including various specialised analyses and studies. In agribusiness, analysis can focus on individual actors, especially small agriculture producers, whose inclusion in value chains can significantly contribute to increasing their income and strengthening the competitive position.

By enhancing economic activity of lower values, they move towards higher value activities within value chains using local innovative capacities. Types of improvement in value chains are: product improvement, process, functional and intersectoral improvement. Improving processes and products are the most common elements of success in value chains in developing countries. However, it is necessary to go further with improvements, so that domestic companies and participants would not play a peripheral role in global value chains, which involves focusing on functions and activities with higher added value and international expansion.

## Reference

- Backer, K., & Miroudot, S. (2013). Mapping Global Value Chains. OECD Paper No. 159. Paris, France: OECD.
- Bair, J. (2005). Commodity Chains: Genealogy and Review. In: J. Bair (ed.) *Frontiers of Commodity Chain Research*. Palo Alto, US: Stanford University Press.
- Balint, B. (2004). Institutional factors influencing agricultural sales of the individual farmers in Romania. In: M. Petrick, P. Weingarten (eds.). *The role of agriculture in central and eastern European rural development: Engine of change or social baffle?* Halle, Germany: IAMO, 238-256.
- Buddress, L. (2014). Integration: Supply chain view. *Strategic Management: International Journal of Strategic Management and Decision Support Systems in Strategic Management*. 19(3), 3-9.
- da Silva, C. A., & de Souza Filho, H. M. (2007). Guidelines for rapid appraisals of agrifood chain performance in developing countries. Rome, Italy: Food and Agriculture Organization of the United Nations.
- Daviron, B., & Ponte, S. (2005). *The Coffee Paradox*. London, Great Britain: Zed Books.
- De Roest, K., Ferrari, P., & Knickel, K. (2018). Specialisation and economies of scale or diversification and economies of scope? Assessing different agricultural development pathways. *Journal of Rural Studies*, 59, 223-231.
- Devaux, A. (2011). Agricultural innovation and inclusive value-chain development: a review. *Journal of Agribusiness in Developing and Emerging Economies*, 8(1), 99-123.
- Dunn, E. G. (2012). *Facilitating systemic change in value chains: lessons learned for strengthening country system*. Washington DC, US: USAID.
- Fasse, A., Grote, U., & Winter, E. (2009). *Value chain analysis: Methodologies in context of environment and trade research*. Hannover Economic Papers. Hannover, Germany: Leibniz Universitat.

- Fernandez-Stark, K. & Bamber, P. (2013). Inclusion of Small and Medium Producers in the Value Chain. Durham, US: Duke Global Value Chain Centres.
- Filippetti, A., Frenz, M., Ietto-Gilies, G. (2013). The role of internationalisation as a determinant of innovation performance. An analysis of 42 countries. CIMR Research Working Paper Series. London, UK: Birkbeck University of London.
- Frank, S. D. & Henderson, D. R. (1992). Transaction costs as determinant of vertical coordination in the U.S. food industries. *American Journal of Agricultural Economics*, 74(4), 941-950.
- Gereffi, G., & Kaplinsky, R. (2001). The Value of Value Chains: Spreading the Gains from Globalisation. *IDS Bulletin*, 32(3).
- Gereffi, G. (1994). The Organisation of Buyer-driven Global Commodity chains: How US Retailers Shape Overseas Production Networks. In G. Gereffi & M. Korniewicz (eds.). *Commodity chains and Global Capitalism*. Westport, US: Praeger, 95-122.
- Gereffi, G., Humphrey, J., & Sturgeon, T. (2005). The governance of Global Value Chains. *Review of International Political Economy*, 12(1), 78-104.
- Gibbon, P. (2001). Upgrading Primary Production: A Global Commodity Chain Approach. *World Development*, 29(2), 345-363.
- Giuliani, E., Pietrobelli, C., & Rabelotti, R. (2005). Upgrading in Global Value Chains: Lessons from Latin American Clusters. *World Development*, 33(4), 549-573.
- GTZ (2007). *ValueLinks Manual*. Eschborn, Germany: Deutsche Gesellschaft für Technische Zusammenarbeit.
- Herr, M. L. & Muzira, T. J. (2009). *Value chain development for decent work*. Geneva: International Labour Office (ILO).
- Hopkins, T., Wallerstein, I. (1986). Commodity chains in the world economy prior to 1800. *Review (Fernand Brauder Center)*, 10(1), 157-170.
- Kaplinsky, R., Morris, M. (2001). *A Handbook for Value Chain Research*. Ottawa, Canada: International Development Research Center.
- Lamotte, O. & Colovic, A. (2013). Innovation and internalization of young entrepreneurial firms. *Le Management International entre local and global*, 18(3), 87-103.
- Lazarini S. G., Chaddad F. R., & M. L. Cook (2001). Integrating Supply Chain and Network Analysis: The Study of Netchains. *Journal on Chain and Network Science* 1(1): 7-22.
- Lu, H., Trienekens, J., Omta, O., Feng, S. (2008). The role of guanxi networks and contract in Chinese vegetable supply chains. *Journal on Chain and Network Science*, 7(2), 121-131.
- McDermot, G. A. & Corredoira, R. A. (2010). Network composition, collaborative ties, and upgrading in emerging market firms: lessons from the Argentine autoparts sector. *Journal of International Business Studies*, 41, 38-29.
- McDermott, G. A. (2005). *The Politics of Institutional Renovation and Competitive Upgrading: Lessons from the Transformation of the Argentine Wine Industry*. William Davidson Institute Paper Number 817.

- Melan, E. H. (1992). *Proces Management: Methods for improving products and service*. New York, US: McGraw-Hill.
- Miller, C., da Silva, C. (2007). Value chain financing in agriculture. *Enterprise development and microfinance*, 18(2-3), 95-108.
- Palpaucer, F. (2000). Competence-Based Strategies and Global Production Networks a Discussion of Current Changes and Their Implications for Employment. *Competetion and Change* 4(4), 1-55.
- Pananond, P. (2015). Motives for foreign direct investment: a view from emerging market multinationals. *The Multinational Business Review*, 23 (1), 77-86.
- Pessoa, M. V. P. & Trabasso, L. G. (2017). *The Lean Product Design and Development Journey*. Cham, Switzerland: Springer International Publishing.
- Porter, M. (1985). *Competitive Advantage: Creating and Sustaining Superior Performance*. New York, US: Free Press.
- Raikes, P. Jensen, M. F., Ponte, S. (2000). Global commodity chain analysis and French filiere approach: comparison and critique. *Economy and Society*, 29(3), 390-417.
- Rivera, M., Knickel, K., Diaz-Puente, J. M., Afonso, A. (2018). The role of social capital in agricultural and rural development: Lessons learnt from case studies in several countries. *Sociologia Rurals*, June 2018.
- Shank, J. K., & Govindarajan, V. (1993). *Strategic cost management*. Free Press, US: New York.
- SRPS ISO 9001:2015 *Sistemi menadžmenta kvalitetom – Zahtevi*. Beograd: Institut za standardizaciju Srbije.
- Stamm, A. & von Drachenfels, C. (2011). *Value chain development: Approaches and activities by seven UN agencies and opportunities for interagency cooperation*. Geneve, Switzerland: Labour Office.
- Stein, C., & Barron, J. (2017). *Mapping actors along value chains: Integrating visual network research and participatory statistics into value chain analysis*. CGIAR Research Program. Montpellier, France: CGIAR.
- Sturgeon, T. J. (2009). From Commodity Chains to Value Chains: Interdisciplinary theory Building in the Age of Globalization. In: J. Bair (ed.) *Frontiers of Commodity Chain Research*. Stanford, US: Stanford University Press.
- Sumner, J., McMurtry, J. J., Renglich, H. (2013). Leveraging the local: Cooperative food systems and the Local organic food co-ops network in Ontario, Canada. *Journal of Agriculture, Food Systems and Community Development*, 4(3), 47-60.
- Trienekens, J. H. (2011). Agricultural Value Chains in Developing Countries A Framework for Analysis. *International Food and Agribusiness Management Review*. 14 (2), 51-82.
- UNIDO (2009). *Agro-value chain analysis and development*. Vienna, Austria: United Nations Industrial Development Organization.
- USAID (2009a). *Global food security response*. Washington DC, US.
- USAID (2009b). *Value chain finance: Primer, diagnostic checklists and model scope of work*. Washington DC, US.

- Vukajlović, Đ. & Ćurčić, N. (2016). Ocena faktora konkurentnosti i inovativnosti u cilju ostvarivanja tržišnog učešća. *Ekonomija: teorija i praksa*, 8(3), 35-54.
- Wallas-Trebacz, J. (2018). Efficiency evaluation of the functioning of an enterprise's value chain as a criterion for the choice of a successful strategy of market competition. *Ekonomika*, 64(2), 9-22.
- Zakić, N., Vukotić, S., Cvijanović, D. (2014). Organisational models in agriculture with special reference to small farmers, *Economics of Agriculture/Ekonomika poljoprivrede*, 61(1), 225-239.





**Slobodan Cvetanović<sup>1</sup>**  
*University of Niš, Faculty of Economics*

ORIGINAL SCIENTIFIC ARTICLE  
doi:10.5937/ekonomika1804017C

**Danijela Despotović<sup>2</sup>**  
**Gordana Milovanović<sup>3</sup>**  
*University of Kragujevac, Faculty of Economics*

Received: August, 15, 2018  
Accepted: November, 05, 2018

## FOREIGN DIRECT INVESTMENTS AS A SOURCE OF FINANCING OF ECONOMIC DEVELOPMENT OF WESTERN BALKAN COUNTRIES

### Abstract

*The paper considers economic growth of five Western Balkan countries on the one hand, and on the other the affluence of direct foreign investments as one of external sources of growth in the period 2000-2017. The starting point was the attitude that due to insufficient domestic savings and engagement of foreign investments, those countries have to treat external sources of investment as a condition of permanent change of economic growth rate to a higher level, because it is obvious that after the economic crisis in 2009, the economic growth rates do not provide closure of developmental gap with EU countries. Therefore, foreign direct investments are the supplement to domestic accumulation. However, without disclaiming their benefits, it should be borne in mind that they cannot be substitution for domestic saving.*

**Keywords:** *economic growth, financing of development, savings, foreign investments, Western Balkans, Economic crisis*

**JEL classification:** *O11*

## СТРАНЕ ДИРЕКТНЕ ИНВЕСТИЦИЈЕ КАО ИЗВОР ФИНАНСИРАЊА ЕКОНОМСКОГ РАЗВОЈА ЗЕМАЉА ЗАПАДНОГ БАЛКАНА

### Апстракт

*У раду се сагледава економски раст пет земаља Западног Балкана, с једне, и прилив страних директних инвестиција, као један од екстерних извора природног развоја ових земаља, с друге стране, у периоду 2000-2017. Пошло се од става по коме, ове земље морају, због недовољне домаће штедње, да користе страни капитал као екстерни извор финансирања развоја и да он представља услов трајног превођења њихових стопа економског раста на виши ниво. Јер, евидентно је да стопе економског раста ових земаља након кризе из 2009. године не обезбеђују затварање развојног јаза за земаљама ЕУ. У том смислу, стране*

<sup>1</sup> slobodan.cvetanovic@eknfak.ni.ac.rs

<sup>2</sup> ddespotovic@kg.ac.rs

<sup>3</sup> gordanam@kg.ac.rs

*директне инвестиције представљају значајну допуну домаћој акумулацији. Међутим, не оспоравајући њихову корисност, ваља имати у виду да оне не могу бити трајни супститут за недовољну домаћу штедњу земаља Западног Балкана.*

***Кључне речи:** економски раст, финансирање развоја, штедња, стране директне инвестиције, Западни Балкан, економска криза.*

## Introduction

Complex issues of creation of sufficient amount of domestic savings and its efficient allocation into the most productive activities are in the focus of financing of economic development (Cvetanović & Mladenović, 2014).

Taken as a whole, market economies managed to put both domestic and foreign sources into operation of financing the quality economic growth in half-a-century long period which preceded the economic crisis in 2008. The issue of foreign direct investments (FDI) as a dominant external source of financing of development in contemporary conditions in Western Balkan countries (Albania, Bosnia and Herzegovina, Macedonia, Serbia, Montenegro and Croatia) is imposed *per se* before and after the outbreak of economic crisis in 2008 (Cvetanović & Despotović, 2014).

Besides theoretical review of the significance of FDI as an external source of accumulation and indisputable precondition of permanent change of economic growth to a higher level, the paper explicates empirical data on economic growth of Western Balkan countries in the period 2000-2017. The starting point was the attitude that the period 2000-2008 was characterised by economic and especially pronounced financial globalisation worldwide, the phenomena which had obvious but unequal influence on the structure of financing of economic development in certain countries. The process of financial globalisation led to the beginning of manifestation of financial crisis during 2008, which relatively shortly evolved into the economic crisis of global character. Since it is sufficiently long interval, the issue of relative evaluation of FDI as a source of financing of economic development of Western Balkan countries seems to be very interesting.

## Economic growth of Western Balkan countries in the period 2000-2017

In the observed period, 2000-2017, the economic growth of Western Balkan countries can be divided into two periods, the one before crisis and the one after the crisis in 2008. In the period 2001-2008 the countries in this region had the average economic growth rate of about 4.7%. The economic growth rate in 2009 was negative in all the observed countries except Albania, and amounted from -6.9% in Croatia (which is not considered due to its membership in EU in 2013) and -5.7% in Montenegro until -0.9 in Macedonia.

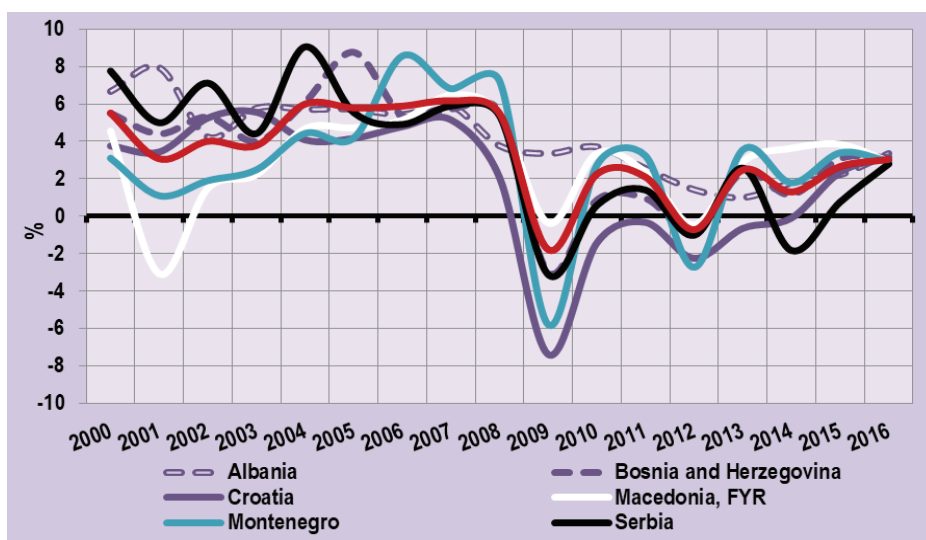
Table 1. Annual percentage growth rate of GDP

Country Year	Albania	BiH	Macedonia	Montenegro	Serbia	W e s t Balkan	Croatia
2000	6.67	5.50	4.55	3.10	7.76	5.5	3.76
2001	7.94	4.40	-3.07	1.10	4.99	3.1	3.43
2002	4.23	5.30	1.49	1.90	7.12	4.0	5.25
2003	5.77	4.00	2.22	2.48	4.42	3.8	5.56
2004	5.71	6.10	4.67	4.43	9.05	6.0	4.08
2005	5.72	8.76	4.72	4.18	5.54	5.8	4.16
2006	5.43	5.38	5.14	8.57	4.90	5.9	4.79
2007	5.90	5.73	6.47	6.81	5.89	6.2	5.15
2008	3.76	5.58	5.47	7.22	5.37	5.5	2.05
2009	3.35	-2.99	-0.36	-5.80	-3.12	-1.8	-7.38
2010	3.71	0.87	3.36	2.73	0.58	2.3	-1.42
2011	2.55	0.96	2.34	3.23	1.40	2.1	-0.33
2012	1.42	-0.82	-0.46	-2.72	-1.02	-0.7	-2.24
2013	1.00	2.35	2.93	3.55	2.57	2.5	-0.65
2014	1.77	1.15	3.63	1.78	-1.83	1.3	-0.10
2015	2.22	3.08	3.84	3.39	0.76	2.7	2.35
2016	3.35	3.14	2.92	2.95	2.80	3.0	3.17
2017	3.84	3.03	0.02	4.30	1.87	2.6	2.78

Source: World Development Indicators | Databank. (n.d.)

The dynamics of growth rate for the observed countries is illustrated by the following graph obtained by the data in Table 1.

Figure 1: Annual percentage growth rate of GDP 2000-2016



It can be noticed that the consequences of crisis were also felt during 2010, 2011 and 2012. Despite expectations that the crisis would mainly stay away from Western Balkan countries, since they were not much oriented towards export, the data show that they faced the deepest economic crisis after the collapse of SFR Yugoslavia (according of the diagram, it had the shape of double bottom crisis). A partial recovery was present in the period 2013-2015, when the average growth rate was about 2%. In the interval 2013-2017, only Serbia had negative growth rate of -1.83%. As an illustration, Croatia, which became the EU member in 2013 had negative economic growth rate in the whole period 2009-2014.

This time we will avoid the issue of low starting base in the calculation of chain indices as well as the fact that none of the analysed Western Balkan countries (except Albania) achieved the level of economic development in 1989. We want to concentrate on perception of flows of direct foreign investments as one of external sources of economic development.

### Foreign direct investments

FDI maintain the aim of foreign entrepreneurs to realise long-lasting interest which also implies managing the property in the observed country. In general, FDI includes the freedom of foundation of an enterprise and by a rule, national treatment on the markets of other countries. They are pronouncedly characterised by taking risks and are often concentrated on certain branches of goods and service production. Besides, permanent investment is followed by technological transfer in greatest number of cases, together with the transfer of management and sales skills (Madžar, 2016, 11). They are often decisions of transnational corporations, hence they can be a part of strategy of investment and selection of location of transactional enterprise.

There are a great number of motives in capital export. They are mostly interconnected, but it is possible to list the following as the most significant:

- Higher profit or some other form of income from the invested capital;
- Cheaper labour;
- Lower cost of raw materials and energy;
- Completion of production process, by which the production becomes less dependent from external factors;
- Opening new machinery abroad in order to expand the market for own product sale;
- Need to increase the placement of capital goods (machines, equipment, etc.) that leads to permission to loans for foreign buyers, which is a form of capital export (Dunning, Lundan & Sarianna, 2008).

Although there are globally the same motives that FDI tend to fulfil it should be mentioned that they all aspire to profit. FDI imply expansion of a parent company on foreign markets, with the principal motives as follows:

Motives oriented towards the offer – FDI tend to provide production resources, most often the investments on the relation between developed countries and developing countries in order to utilize cheap raw materials and labour.

Motives oriented towards the demand – FDI are motivated by major demand on other markets, usually the dynamics of investments between the developed countries.

Motives oriented towards the trade in which FDI are motivated by trade expansion.

Speaking of the property own by foreign companies, FDI bearers, the inspiring lever implies the so-called untouchable goods that primarily include intellectual property, consisting of technology and technological procedures, product brand as well as management experience and professional capacity of human capital. Namely, in changeable and unpredictable environment where companies search for the way to gain competitive advantage, the knowledge owed by an organisation becomes one of decisive factors in market strive for predominance, in the transition from industrial society to the society of knowledge.

FDI of two or more companies which perform successive stages of transformation to a new enterprise by joining technological unity of connected operations and work processes in organisation model of vertical integration provide foreign companies with the advantages of international specialisation and economy of scope. The most pronounced example are oil companies whose branches send raw oil to the other branches which process it, sending later thus refined oil to the those that sell it. Unlike the model of vertical integration, foreign direct investments also support the model of horizontal integration, when the similar activities are displaced in different countries.

Too strict foreign trade policy may also influence the attraction of FDI. High customs taxes can be sufficient motive for foreign companies to invest in production for local market, thus avoiding strict protective policy of the country (Vadlamannati & Tamazian, 2009; Cvetanović, Despotović & Mladenović, 2018).

FDI may be motivated by the care of possible exhaustion of strategic sources of supply in their own countries.

Specific FDI motives are in cheap production factors, especially when intensive work activities are in question (e.g. low wages in textile industry).

Basic classification of FDI includes two different groups:

- Greenfield investments and
- Purchase of existing plants and enterprises and overtaking their control (Cvetanović & Mladenović, 2014)

The advantage of purchases is in gaining time and also avoidance of numerous possible problems related to the functioning of a new enterprise. The division of foreign direct investments that is often found in economic literature is the one speaking of horizontal, vertical and conglomerate FDI.

Horizontal FDI take place when an enterprise dislocates production of certain parts in foreign units. They occur by purchase of control share blocks of the enterprise which produces the same product, which results in the right to manage the company; thus a completely new enterprise is established by combining with a foreign company in the same field of production.

Vertical FDI are the form of production or some other activity organised at different locations abroad. In principle, they originate from the previously explained manner of foundation of horizontal FDI. Positive characteristics of this form of FDI are related to synchronization of a greater number of stages in the process of creation of a newly created value. Thanks to the indicated synchronization it is easier in vertical integration to solve the problems of reaction to the oscillations of offer and supply of necessary components used in the production process. However, this type of direct

foreign investments has certain shortcomings, mainly due to the problems that arise from insufficiently good management coordination of activities at various stages of production dislocated in different countries.

In real life, conglomerate type of FDI is significantly rarely found. Their basic logic is that by diversification of production machineries in different countries, the business risk is minimized and better possibilities for realization of desirable mass of profit are created.

The most significant determinants of FDI are relative difference in income and maximization of profit in a long period, the presence on the market, availability of resources, expectations related to increase of demand and political stability (Jovanović, 2006, 556; Minović.& Erić 2016).

The stimuli for locating FDI in certain geographical areas are the approach to increasingly developed national and international markets and stable macroeconomic environment. Stable, predictable and transparent legal situation has also an encouraging effect on foreign direct investments. This is due to simple reason that the risks are thus reduced while the profit increases. Namely, there are global regulations which control the regime of world exchange within World Trade Organisation, while no such rules are present related to FDI. The regulatory framework of FDI includes about 1600 of bilateral agreements on investments and a certain number of regional agreements.

Key motives for foreign investment are production aimed at provision of resources, provision of markets, increased efficiency and acquisition of strategic advantages.

Speaking of production aimed at provision of resources, the primary motive of foreign investment is provision of resources necessary for production at lower prices in comparison to those in the counties of parent companies that invest abroad. By following the flow of FDI in time, it is possible to conclude that raw materials were first promoted as resources, then natural materials and agricultural products. Low labour cost is also a factor that can motivate companies for foreign investments in certain circumstances. And finally, in the manufacturing conditions that are restricted by achievements of new economy, technological and managing knowledge can be a motive for investment abroad.

Provision of market as a motive of foreign direct investments is an especially significant moment when the export of products and services is no longer possible i.e. is not any more economically profitable for most diverse reasons.

The motives of foreign direct investments are frequently classified as subjective, strategic and economic.

Subjective motives of business abroad are classified into four categories:

- The invitation from high and respectable position can be the motive for taking business venture;
- Foreign investment for fear of loss of market;
- Follow-up of other companies on the areas that are attractive and interesting and
- Pressure of competitiveness on domestic market can be a motive for investment on the market of competition.

Strategic motives are related to:

- Provision of resources;
- Achievement of better efficiency;
- Gaining strategic resources;
- Ensuring the market (Cvetanović & Mladenović, 2014)

Motive for provision of resources at lower cost in comparison to the risk of investment in domestic country is a decisive stimulus when deciding about foreign direct investment. In this case, by a rule, the production based on cheap input is exported into domestic country of the investor, in order to improve competitive abilities on the markets which it supplies. Speaking of foreign direct investments, in order to achieve higher efficiency the motives and advantages are related to the economy of scope, diversification of production and risk decrease (Mencinger, 2003).

The FDI motivated by maintaining of the existing markets are by a rule aimed to the destinations where the goods were previously exported. Thus the objective of the newly founded affiliation is the continuation of servicing the local market.

Economic motives are primarily the effects of economy of scope, marketing and management experience, financial potential, technological advantages etc.

Two types of FDI oriented towards higher efficiency are distinguished in the literature:

- Bidding for labour-intensive activities in insufficiently developed, and technologically intensive in developed market economies and
- Locating branches in the countries of approximately the same level of development, when the basic motive of foreign investment is in the advantages of economy of scale, diversifications of products and differences in taste (Cvetanović & Mladenović, 2014).

The significance of foreign direct investment aimed at acquisition of strategic advantages in current conditions of economic activities is increasingly pronounced. This is comprehensible, bearing in mind the trends in economic globalisation on the one hand, and development of technologically and scientifically intensive domains of manufacturing on the other (Carkovic & Levine, 2005).

The total amount of FDI Inward flows in the observed Western Balkan countries amounted 70.75 billion dollars. For comparison, the amount of FDI in Croatia was 34.3 billion dollars in the same period.

*Table 2. FDI Inward flows in observed countries by years  
(US Dollars at current prices in millions)*

Country Year	Albania	BiH	Montenegro	*Serbia	Macedonia	W.Balkan	Croatia
2000	144	146		52	215	557	993
2001	206	119		177	447	950	1,011
2002	133	265		563	0	961	958
2003	177	381		1,516	113	2,188	1,792
2004	346	511		1,024	324	2,204	1,270
2005	264	613		2,078	96	3,051	1,786
2006	324	766		4,878	433	6,401	3,291
2007	659	1,819		5,340	693	8,511	4,633
2008	974	1,002	960	3,972	586	7,494	5,317
2009	996	250	1,527	2,896	201	5,871	3,059
2010	1,051	406	760	1,686	213	4,116	1,155



2011	876	497	558	4,932	479	7,342	1,692
2012	855	395	620	1,299	143	3,312	1,504
2013	1,266	276	447	2,053	335	4,377	958
2014	1,110	529	497	1,996	272	4,404	2,870
2015	945	270	699	2,347	240	4,502	270
2016	1,124	285	226	2,299	397	4,331	1,745
Total:	11,452	8,531	6,296	39,107	5,186	70,570	34,303

\* 2000 - 2007 Serbia and Montenegro

Source: Foreign direct investment flows and stock. (n.d.)

Under the influence of global financial and economic crisis in Serbia, and in the whole region of Western Balkans in 2009, and especially in 2010, FDI drastically fell, which can be seen from the data in the Table 3.

In the period 2000-2006, the amount of FDI per capita shows pro-cyclic character. Thus in 2000, it amounted 49 dollars expressed in purchasing power summary for Western Balkan countries, while in 2006 it was 656 dollars, which was the greatest amount in the analysed period of eighteen years. In 2016, the FDI per capita in Western Balkan countries was 225 dollars. In Croatia it was 224 (in 2000), 1224 (in 2006) and 413 dollars (in 2016).

Table 3. FDI Inward flows in observed countries by years  
(US Dollars per capita at current prices)

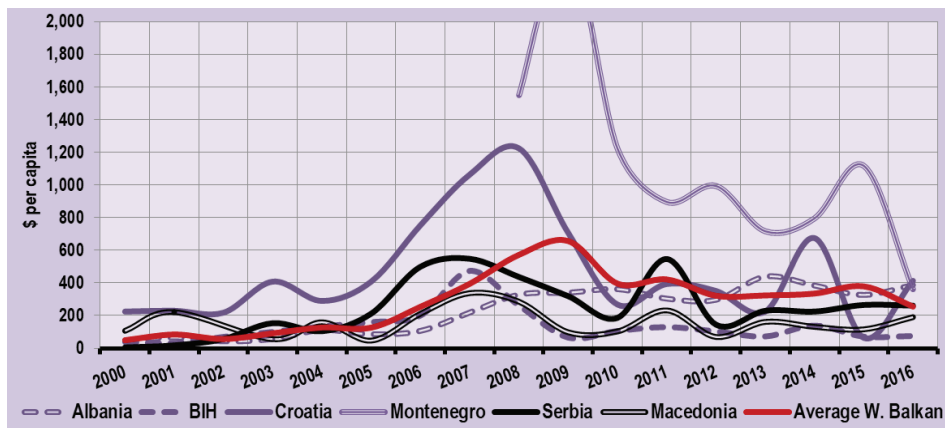
Country Year	Albania	BiH	Montenegro	*Serbia	Macedonia	W.Balkan	Croatia
2000	46	39		5	107	49	224
2001	66	31		18	221	84	229
2002	43	70		57		56	218
2003	57	100		153	56	91	408
2004	111	134		104	159	127	290
2005	86	160		212	47	126	408
2006	106	200		499	211	254	753
2007	219	474		548	338	394	1,063
2008	328	261	1,550	436	285	572	1,224
2009	340	65	2,460	319	98	656	706
2010	362	106	1,223	186	103	396	268
2011	304	130	896	547	232	421	393
2012	297	103	993	145	69	321	351
2013	439	72	716	230	162	324	224
2014	384	139	795	224	131	335	674
2015	326	71	1,117	265	116	379	64
2016	387	75	361	261	191	255	413

\* 2000 - 2007 Serbia and Montenegro

Source: Foreign direct investment flows and stock. (n.d.)

The flow of foreign direct investments in the observed countries in the period 2000-2006 is illustrated in the following graph, obtained from the data in Table 3.

Figure 3: FDI Inward flows in observed countries by years (US Dollars per capita)



### FDI u % gross investments in fixed capital

Valuable information on the importance of FDI in financing economic development of a country is obtained by their participation on the structure of Gross Fixed Capital Formation. From the data presented in Table 4 it is clearly seen that this participation is considerable, and in Western Balkan countries as a whole it ranged between 13.5% in 2000 and 40.8% in 2009 on average.

Table 4. FDI Inward flows in observed countries by years (% of Gross Fixed Capital Formation)

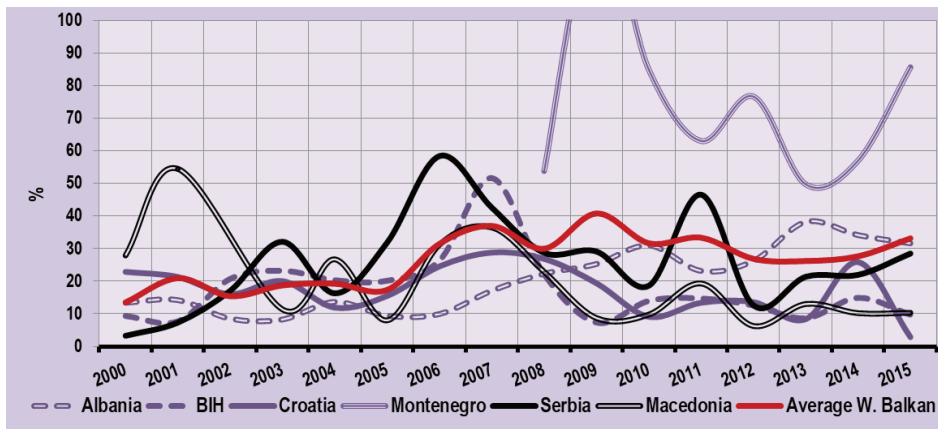
Country Year	Albania	BIH	Montenegro	*Serbia	Macedonia	W.Balkan	Croatia
2000	13.4	9.3		3.3	27.9	13.5	22.9
2001	14.2	7.7		7.3	54.5	20.9	21.3
2002	8.5	20.7		17.1		15.4	16.0
2003	8.2	23.2		32.1	11.3	18.7	20.0
2004	13.7	20.3		16.3	26.7	19.2	11.9
2005	9.4	20.1		31.9	8.0	17.4	15.5
2006	9.9	26.4		58.4	31.2	31.5	24.6
2007	17.1	51.6		42.6	36.5	36.9	28.8
2008	22.3	22.1	53.8	28.7	22.9	30.0	26.9
2009	25.3	7.3	133.5	29.1	8.7	40.8	19.4
2010	31.0	13.9	84.9	18.6	9.8	31.6	9.1

Country Year	Albania	BIH	Montenegro	*Serbia	Macedonia	W.Balkan	Croatia
2011	23.1	14.7	63.0	46.5	19.3	33.3	13.4
2012	26.2	12.6	76.6	12.6	6.3	26.9	13.6
2013	38.2	8.6	49.7	21.4	13.0	26.2	8.4
2014	34.1	14.9	57.0	22.0	10.2	27.6	25.9
2015	31.6	9.7	85.6	28.5	10.3	33.1	2.8
2016							

\* 2000 - 2007 Serbia and Montenegro

Source: Foreign direct investment flows and stock. (n.d.)

Figure 4: FDI Inward flows in observed countries by years  
(% of Gross Fixed Capital Formation)



## Conclusion

One of characteristic features of contemporary world economy is the increasing presence and significance of FDI. These investments provide flows of trade, capital, labour, technology, thus becoming one of basic drivers of globalization and key developmental factor of many countries. From the previously mentioned reasons, the Western Balkan countries consider the attraction of foreign capital in the form of FDI one of basic priorities of their development. According to the research conducted in this paper, in the period 2000-2016, Western Balkan countries had total affluence of FDI of about 70.5 billion US Dollars at current prices, which can be regarded insufficient as a whole, since this amount is only twice higher than affluence of FDI in Croatia. Under the influence of global financial and economic crisis in 2009 and especially in 2010, FDI drastically reduced in the Western Balkan countries.

Due to insufficient domestic savings, the Western Balkan countries have to treat the engagement of foreign capital as the condition of permanent rise of economic growth rate to a higher level. In addition, they are the bearers of a great number of technological and

organisational innovations. However, without denying their usefulness, one should bear in mind that they cannot substitute domestic savings. Since world economic history does not know the economic development of any country without domestic savings, it is not realistic to expect FDI to be a key source of financing in the Western Balkan countries.

## References

- Carkovic, M., & Levine, R. (2005). “Does Foreign Direct Investment Accelerate Economic Growth?“, in Moran et al. (eds.), *Does Foreign Direct Investment Promote Development?*, Washington DC, Institute for International Economics, pp. 195-220.
- Cvetanović, S., & Mladenović, I. (2014). *Ekonomija kapitala i finansiranje razvoja*. Niš: Sopstveno izdanje.
- Cvetanović, S., & Despotović, D. (2014). *Funding Sources for the Development of Western Balkan Countries 2001-2012*. *Ekonomika*, (3).
- Cvetanović, S., Despotović, D., & Mladenović, I. (2018). *Ekonomski rast zemalja Zapadnog Balkana : Nizak kvalitet i neizgrađenost institucija kao nedostajući faktor*. U: *Institucionalne promene kao determinanta privrednog razvoja Republike Srbije*. Ekonomski fakultet Kragujevac, str. 83-98.
- Dunning, John H., Lundan, & Sarianna M. (2008). *Multinational Enterprises and the Global Economy*, Second Edition, Cheltenham, UK, Edward Elgar Publishing Limited.
- Foreign direct investment flows and stock. (n.d.). Retrieved from <http://unctadstat.unctad.org/wds/ReportFolders/reportFolders.aspx>. UNCTAD
- Jovanović, M. (2006). *Evropska ekonomska integracija*, Ekonomski fakultet, Beograd, str. 556.
- Madžar, Lj. (2016). *Strane investicije u ekonomskoj politici Srbije, Strane direktne investicije i privredni rast u Srbiji*, Beograd: Ekonomski fakultet u Beogradu, str. 11-34.
- Mencinger, J. (2003). “Does foreign direct investment always enhance economic growth?“, *Kyklos*, Vol. 56, No. 4, pp. 491-508.
- Minović, J., & Erić, D. (2016). “Impact of Political Risk on Frontier Capital Market“, *Engineering Economics*, Vol. 27, No. 2, pp. 151-162.
- Vadlamannati, K. C., & Tamazian, A. (2009). Growth effects of FDI in 80 developing economies: the role of policy reforms and institutional constraints. *Journal of Economic Policy Reform*, 12(4), 299-322.
- World Development Indicators | DataBank. (n.d.). Retrieved July 12, 2018, from <http://databank.worldbank.org/data/source/world-development-indicators>. World Bank
- The author’s biographical sketch:



**Marica Dumitrasco<sup>1</sup>**  
*Research Institute of the University  
of Bucharest (Romania).*

ORIGINAL SCIENTIFIC ARTICLE  
doi:10.5937/ekonomika1804027D  
Received: November, 12, 2018  
Accepted: December, 10, 2018

## INNOVATION COMPETITIVENESS OF THE COUNTRY IN GLOBAL TRADE LANDSCAPE: THE CASE OF REPUBLIC OF MOLDOVA

### Abstract

*The study highlights the importance of interaction between innovation, competitiveness and foreign trade. This study found the innovation competitiveness of a country is the main determinant for successful integration of country in the Global Value Chains (GVC). The purpose of research is to study the most problematic factors that affecting the innovation competitiveness of the Moldovan economy. The study is based on the analysis of the Republic of Moldova's score and position in international indicators and rankings in correlation with the methodology of the World Economic Forum. The values of innovation, business sophistication and technological readiness factors of competitiveness between Moldova and South-Eastern Europe countries are analyzed in the paper. The study identified that the Republic of Moldova and Serbia recorded low indicators of the innovation and sophistication competitiveness in comparison with other countries of Southeast Europe. At the same time economy of Moldova follows the EU economies on the technological readiness, overcoming the Albanian and Serbian economy in the last years. The study showed that the need to raise the competitiveness by attracting foreign direct investments into research and development, information communication technologies as well as the high-value manufacturing and tradable sectors and by fully and efficiently implementing public institution reform, has become not only important but also urgent because the country is to be capable to strengthen the economic benefits that many countries have reached in past years. The results of study can be used in process of implementation of public administration reform, the elaboration of the National Program of science and innovation of the Republic of Moldova, the improving of governance the research and development in country.*

**Keywords:** regional economic integration, Global Value Chains, competitiveness, innovation, sophistication, technological readiness.

**JEL classification:** F 01, F14, F20, O32, O33, O57

---

<sup>1</sup> mdumitrasco@gmail.com

## ИНОВАТИВНОСТ ЗЕМЉЕ У ГЛОБАЛНОЈ ТРГОВИНИ: СЛУЧАЈ РЕПУБЛИКЕ МОЛДАВИЈЕ

### Апстракт

Студија осветљава значај интеракције између иновативности, конкурентности и спољне трговине. Ова студија је утврдила да је иновативност земље главна детерминанта успешне интеграције земље у глобалне ланце вредности. Циљ студије је проучавање најпроблематичнијих фактора који утичу на иновативност молдавске привреде. Студија је заснована на анализи резултата и ранга индикатора Светског економског форума Републике Молдавије. У раду се анализирају резултати стубова „Иновативност“, „Софистицираност пословања“ и „Технолошка спремност“ Молдавије и земаља југоисточне Европе. Студија је показала да Република Молдавија и Србија имају ниске показатеље иновативности и софистицираности у односу на остале земљама југоисточне Европе. У исто време, привреда Молдавије прати привреде ЕУ према достигнутом нивоу стуба „Технолошка спремност“, премашујући, албанску и српску привреду у последњих неколико година. Студија је показала да је потреба да се повећа конкурентност земље подстицањем мултинационалних компанија да улажу у науку, информационо-комуникационе технологије, као и у развој нових производа са високом додатном вредношћу постала не само важна, већ такође и хитна јер би земља била у стању да ојача економске користи које су многе земље постигле у протеклим годинама. Резултати истраживања могу да послуже креаторима јавних политика у процесу имплементације реформе јавне управе, израде Националног програма науке и иновација Републике Молдавије, унапређења управљања истраживањем и развојем.

### Introduction

The important links between innovation, competitiveness and external trade have been the subject of an ongoing debate that has attracted considerable attention from both researchers and decision makers. The globalization has intensified the competition between countries. On the one hand, it is widely accepted that innovation is a key to competitiveness in the modern economy. On the other hand, factors and conditions that influence the innovative behavior and performance are largely the same as those which determine the ability of firms to compete.

Since 2010, for emerging economies and commodity-exporting economies in particular, GDP per capita has become more closely correlated with the Global Competitiveness Index's technological readiness, business sophistication, and innovation pillars than it is with the infrastructure, health and primary education, and market-related pillars (goods markets efficiency, financial market development, and labor market efficiency). (Global Competitiveness Report, 2016-2017)

In economic literature is accentuated that innovations are combined with the openness of the economy and economic integration. An open, trading economy generates incentives to innovate and invest in new technologies because firms are exposed to competition and new ideas and can benefit from the technology transfer that comes from

imports and foreign investment. At the same time, firms can benefit from larger markets abroad (Bustos, 2011; Cassiman et al., 2010).

In this regard it should be noted, that the liberal trade policy of the Republic of Moldova is based on the multilateral and bilateral agreements within neighbor countries between which the Foreign Trade Agreement between RM and EU, Central European Free Trade Agreement (CEFTA) embracing the Southeast Europe countries not members of EU.

In this context, economic integration of the Republic of Moldova by using the potential of trade agreements will contribute to the growth of competitiveness of economy based on the knowledge and integrated into regional value chains.

This paper includes the study of the influence of global trade on the development of national economics, taking a special attention on emerging economies, and the records of the innovational competitiveness of the Moldovan economy, based on the corresponding methodology.

## **1. Impact of global trade on the development of national economics**

The liberalization of foreign trade of goods is one of the main consequences of globalization, which reflects a continuous growth trend of the interdependence of the countries of the world.

A number of reputable international institutions, including the World Bank, the International Monetary Fund, the World Trade Organization, who are promoting free trade, adhere to the point of view that globalization is capable of accelerating the growth processes of the economy (IMF, WB, and WTO, 2017). It was demonstrated by the examples of number advanced and developing economies in the second part of the 20th century. But this relation is not automatic. It is the true the same that not all developing countries can benefit from the priorities of liberalization of foreign trade could be explained by their slow integration into the world technology renewed economy, not the application of trade supporting policies etc.

Despite arguments that seem undeniable, one of more disputable national trade policy topics in the period of post-World II of creation GATT/WTO till the early 1990s were that every country that is actively involved in globalization processes, in addition to obvious benefits, has many difficulties and complicated issues overcome. They caused, by the high competition on international markets, with the result that companies that are not competitive and adapted to the requirements of the day, and last but not least - those in developing countries and economies in the transition phase risk be eliminated from the market.

Agreements GATT and WTO uphold strict rules, but they contain and exceptions. It gives the rules elasticity, but WTO rules are applied with even greater flexibility. Although under agreements there is a ban on import quotas and approved binding tariff levels, GATT also allows anti-dumping and countervailing duties, subsidies as well as safeguard measures and includes an escape clause. Thanking them governments have easy access to all measures that can limit trade. So, the governments of many countries found it inappropriate to increase competition in a number of industries that play an important



role in ensuring food security and national security of their own countries. This is why both developed and developing countries resorted to selective bans or restrictions on the import of goods. These measures increase the circulation costs of imported goods, which make them less competitive than domestic ones or create uncertain conditions in the import mechanism of these goods. To be mentioned that the last surge of protectionism took place in the first decade of the 21 century and was explained by post-crisis consequences of economic shock of 2008-2009 periods. According to researchers, it didn't result in much protectionism because of contemporary developed shock absorbers mechanisms (Bown, 2001; Douglas & Kevin, 2011). Although still, trade protectionism is restricting the race of growth of world trade.

Since the early 2000s then WTO has achieved remarkable results in the liberalization of customs tariffs, their role, as internal market protection tools, logically diminished.

In accordance with trade management concept applied in the past century, simultaneously with the reduction of tariff barriers, the following trend was also manifested: increasing the use of different non-tariff limitations in foreign trade.

By the accepted definition in international trade practice, non-tariff barriers to trade are considered to be any measures taken by governments but different to tariffs that help to limit trade-offs between countries.

Compared with tariff barriers, non-tariff measures (NTMs) are often more difficult to detect. They are usually “hidden” in rules and practices that in fact can have a perfectly legitimate objective, but the economic effects of non-tariff barriers (NTBs) can be substantial in both positive and negative sense. The main reasons for the frequent application and use of these measures were generated by the domestic policies of each country. Trade negotiations between countries were driven mainly by the granting of market access “concessions”. Consequently, countries diminished NTMs only when their partners weakened theirs.

At present high non-tariff barriers to trade in some key areas of the global economy are remain restricting trade.

Many experimental studies approved that regulatory NTMs are more predominate for agricultural trade than for non- agricultural.

Recent researches confirm also that developed countries more applied regulatory NTMs than developing ones. In contrast, tariff measures, which are more probably to constrain trade directly, are more widespread among low-income countries. (IMF, WB & WTO, 2017, p.12)

Thanks to liberalization of customs tariffs, reducing of trade barriers as well as transport and communications costs has been changing global trade picture.

Latest trade facilitation which can be determinate as “the simplification, standardization, and harmonization of procedures and associated information flows required to move goods from seller to buyer and to make payment” (UNECE, 2012) - has appeared as a key topic in agenda the world trading system.

As it is mentioned in WTO report 2015: “While trade agreements in the past were about “negative” integration – countries lowering tariff and non-tariff barriers – the WTO Trade Facilitation Agreement (TFA) is about positive integration – countries working together to simplify processes, share information, and cooperate on regulatory and policy goals” (WTO, 2015, p.32).

Last decades in the economic literature dedicated of trade topics have discussed the importance of trade liberalization for organizing the production of goods and adding value across different countries that consistently led to the appearance of global value chains (GVC).

Under value chains according to M. Porter(1985) who primarily described this concept is understanding the division a firm into the discrete activities it performs in designing, producing, marketing, and distributing its product. This concept was used by him as the main tool for diagnosing competitive advantages by disaggregating the firm in the activities underlying the competitive advantage and identifying links between activities that are central to the competitive advantage and also explaining how coalitions with other firms can replace performance inside the chain.

Value chains have started in framework mainly of one country, then expanded to neighboring countries, have developed at the global level in the early 2000s. In global trade landscape where partners' exports depend on imports and where their connection to the world market is as effective as their link to any other link in the value chain, countries have a greater motivation to work together in order to reduce trade barriers, harmonize standards, costume procedure etc.

A number of recent studies contain important findings related to countries and firm's position in GVC.

The approach of international organizations is based on country and sector-level analyses to fragmentation of production. Several international organizations have developed a range of WEB simulation tools that allow estimating the value-added portion of a country's exports, among which are: Market Analysis Tools of International Trade Center (ITC) of the World Trade Organization and the United Nations, the Trade in Value Added (TiVA) instrument, developed by OECD for the comparative analysis of GVC integration across countries of different levels of development. It was demonstrated that export competitiveness presupposes import openness because foreign inputs lead to the domestic value-added portion of a country's exports.

In contrast with international organizations in many case studies have been emphasized that firm- and sector-level analysis is central to GVC approaches to fragmentation of production. It is also accentuated that unlike the value-added trade, there is no single, accepted standard among GVC economists on how to conceptualize, determine and estimate the value or its distribution among firms (Dallas, 2014).

Based at the analysis of the experimental findings, in the economic literature regarding this phenomenon is concluded, that since the early 1990s GVCs have become a strong driver of productivity and manufacturing exports and they are covering a wide range of goods from labor-intensive activity to high technology (IMF, WB & WTO, 2017, p.8; OECD, 2018).

In this context was approved that countries' and firms' benefits do not rely on the kind of activity develop, but on the value generated for the economy, which can come from any type of activity in the framework of the chain (Lopez, 2016, p.10). So, countries' and firms' position are based on their competitive advantages and measure of effectiveness within the chain.

In the era of increasingly developing GVCs, innovation, and technology transfer are also seen as important sources of more sustained competitive advantage based on intangible assets rather than labor costs (Nolan & Pilat, 2016).

Many studies emphasis positive correlation between the signing deeper agreements and GVC- related trade (Mattoo, Mulabdic & Ruta, 2017; Osnago, Rocha & Ruta, 2017).

EU membership countries are included into the group of countries with the deepest agreements. It should be noted that Agreement between Republic of Moldova and EU members is one of deepest. It covers 44 provisions in comparison with about 25 on average provisions in force in 2015, according to World Bank database documents. (Hofmann, Osnago & Ruta, 2017)

In this context, recent FTA between of Republic of Moldova and EU gives advantages domestic firms, taking in the attention the possibility for extension their activities in international networks of production and first of all in the EU.

In a country's research is mentioned that the valorification of this potential of FTA will allow to Moldova to overcome the disadvantages of the small country market by the creation of narrow specialization profiles in the production of many times greater than the needs of the domestic market, and even at all unrelated to them. Absorbing the innovations and technology transfer, thanks engagement in GVC, will conduce to overcome such deficiencies of domestic production as the insufficient competitiveness of Moldovan exports at the external markets as well as the failure to suggest a wide enough assortment of final consumption goods to them. (Dumitrasco, 2016)

In economic literature to complementary to above mentioned in the example of country's research emphasize following opportunities for developing countries from adhering to GVC. They can more rapidly than was possible in the previous industrialization period to integrate into the global economy by using their comparative advantage to concentrate on a specific production process or task. (Kowalski et al., 2015). They can also create more job opportunities becoming a part of GVCs (UNCTAD, 2013).

In many research regarding developing countries is mentioned that they are entering in GVC at the assembly and production stage and are mainly engaged in low-income global value chains. In context, GVC researchers pointed out the limitations of developing countries in upgrading within fragmented production chains, especially taking in attention such factor of production as labor. Milberg and Winkler find that offshoring reduces employment and raises income inequality between countries and allows firms in developing countries to bring down domestic investment and focus on finance and short-run stock movements (Milberg & Winkler, 2013). Development is associated with “upgrading” in global value chains, but this is not sufficient for improved wages or labor standards.

To be mentioned that for the rethinking of upgrading in global value chains is using the concept of “smile curve”. It was first introduced by Shih on the example of the personal computer industry who noticed that at each end of the curve obtain higher value added to the product than in the middle (Shih, 1996). Therefore, at one end are concentrated preproduction activities such as R&D, while on the other postproduction such as marketing. Both tend to obtain a higher share of final product and are situating in developed countries. In contrast, manufacturing or assembly activities in developing countries tend to be located in the middle of the curve that corresponds to lower value-added share.

At present, the significance of GVCs for the CEFTA economies of Southeast Europe region is limited, because “they are only weakly to moderately integrated into international trade” (CEFTA Investment Report, 2017).

In the country's research also was demonstrated that goods from Moldova are insufficiently penetrated in income value chains. They mostly are related to items with a low value-added share that provided in the customs regime of inward processing trade with few European countries. The advantage of geographical approximation to Europe one of the main manufacturing hubs around of which is organized the GVC activity is practically unused by Moldova (Dumitrasco, 2016; Dumitrasco, 2017).

OECD study (2015) paid attention to the necessary the adoption of economic policies that can help developing countries improve their competitiveness for integration in GVC.

## 2. Methodological background and objectives of the research

Innovation competitiveness of a country is the main determinant for successful integration of countries in the GVC, as can be concluded from analysis of literature review.

The study is based on the analysis of the Republic of Moldova's score and position in international indicators and rankings in correlation with the methodology of the World Economic Forum. Understanding the factors of competitiveness in framework of this methodology is arising from theories of specialization and the division of labor to neoclassical theories emphasis on investment in physical capital and infrastructure, and, later, to interest in other mechanisms such as education and training, technological progress, macroeconomic stability, good governance, firm sophistication, and market efficiency (Global Competitiveness Report, 2014-2015). All listed facilitate integration of country in the value chains.

Although researchers pay a special attention to the analysis of indicators included in sub index “Innovation and sophistication factors” (Krstić & Krstić, 2015), first of all will be specified most critical indicators of Global Competitiveness Index for economy of Republic of Moldova, taking in consideration interconnection between 12 pillars of competitiveness as well as the actual level of economic development of country.

In Global Competitiveness Report (2011-2012) is mentioned: “While all of these factors are likely to be important for competitiveness and growth, they are not mutually exclusive—two or more of them can be significant at the same time”.

In this context, in line with innovation and sophistication factors, the technological readiness indicator closely associated with the innovation competitiveness of the country is included in the analysis.

For the purpose of research, it is important to compare the score of indicators covered by sub index “Innovation and sophistication factors” with indicators of other two sub-indexes.

Analysis below embraces indicators included in the World Economic Forum the Global Competitiveness reports from 2011 to 2017; their average scores there it was applicable as well as growth rates of indicators of innovation and business sophistication and technological readiness competitiveness of Moldovan economy calculated by the author for the mentioned period.

It should be noted that in accordance with the methodology applied, for the economies which are measured in the overall GCI below 50, any individual performance measured above 51, are considered advantages (Global Competitiveness Report, 2011-2012, p. 90).

The growing interest of Moldovan government to the country's score and position in international indicators and rankings was manifested recently by the introduction of their mandatory monitoring in all key ministers as well as the elaboration of amelioration proposals (Government decision Nr.297 from 30 March 2018). It is explained by the importance of country's score and position for the decisions of foreign investors. So, our research should have applied character. For completeness, the analysis is supplemented by an analysis of national statistics.

Based on the methodology, there are following objectives of the study:

- Establishing the key domains for the improvement of country's competitiveness,
- Determining the most problematic factors that affecting the innovation and business sophistication factors competitiveness of the Moldovan economy, taking into attention the necessity of adopting the urgent economic policy measures,

- Comparing the values of innovation, business sophistication and technological readiness factors of competitiveness between Moldova and South-Eastern Europe countries, with the scope of the estimation the convergence within countries.

### 3. Records of the innovational competitiveness of the Moldovan economy

According to the stage of development, the economy of Moldova balanced between factor-driven and efficiency-driven in framework analyzed period 2011-2017. It was classified as efficiency-driven in the period 2013-2015. While in the remaining years it was classified as the factor-driven economy. Although the low progress was demonstrated by Moldovan economy, the pillars included in sub index “Basic requirements” (4.2 average score) are ranking higher than those in sub index “Efficiency enhancers” (3.7) as well as in sub index “Innovation and sophistication factors” (2.9) (Table 1)

Table 1 Most critical indicators of Global Competitiveness Index for the economy of Republic of Moldova

Subindex and pillars	Year	2011	2012	2013	2014	2015	2016	2017	Average score
Basic requirements – total, from which:	score	4.1	4.2	4.2	4.3	4.3	4.1	4.2	4.2
	rank	102	93	97	90	89	101	95	
<b>Institutions</b>	score	3.4	3.4	3.2	3.2	3.2	3.1	3.2	3.2
	rank	106	110	122	121	123	128	119	
A. Efficiency enhancers - total, from which:	score	3.6	3.7	3.7	3.8	3.8	3.7	3.7	3.7
	rank	103	99	102	88	94	102	94	
<b>Financial market development</b>	score	3.6	3.6	3.6	3.7	3.3	3	3.1	3.4
	rank	105	104	105	100	115	129	124	
B. Innovation and sophistication factors – total, from which:	score	2.9	2.9	2.9	2.9	2.9	2.9	3	2.9
	rank	127	131	133	129	128	131	124	
<b>Business sophistication</b>	score	3.3	3.3	3.3	3.4	3.3	3.2	3.4	3.3
	rank	117	120	125	124	127	127	120	
<b>Innovation</b>	score	2.4	2.4	2.4	2.5	2.6	2.5	2.6	2.5
	rank	128	135	138	131	130	133	128	

Source: *Elaborated by the author at the WEF, the Global Competitiveness Report, 2011-2012 to 2017-2018*

It can be also observed that only on the groups of basic requirements and efficiency enhancers, the country was placed above the hundredth position during some years.

In the framework of subindexes, the lowest score is obtained by indicators of innovation pillar (2.5 average value), the institution’s pillar (3.2), the financial market development (3.4) and the business sophistication pillar (3.3).

To be mentioned that in the sub index “Innovation and sophistication factors” both pillars grouped in it were mentioned as critical taking attention their equal weight within sub index, besides the values reached.

Despite the growing scores at the end in comparison with the beginning analyzed period, the annual indicators of the innovational competitiveness show very little progress. The best position occupied by country is the 128 place or is among the last ten countries included in the list.

Although the business sophistication indicators are classified higher than innovational once, they demonstrate a moderate performance the same, with the position in the latest twenty countries in the world.

The scores and ranks of Institutions and financial market development pillars testify the regress of indicators of competitiveness in recent years in comparison with the beginning of the period.

Moldova’s situation in Southeast Europe, along with the eastern border of the European Union, is stipulated its participation in the initiatives on the regional level that are aimed at making the region more competitive on the global landscape as well as reaching greater matching between countries.

In this context, the comparative analysis below covers Moldova and six countries of Southeast Europe region with the point of view their innovation environment competitiveness as well as the technological readiness.

It should be noted that economy of Republic of Moldova was behind the countries of Southeast Europe in terms of the factors of innovation and sophistication competitiveness during analyzed period (Table 2).

Table 2 Evolution of the innovation and sophistication factors competitiveness of some Southeast Europe countries for the period 2011-2017

Countries	Year	2011	2012	2013	2014	2015	2016	2017	Average score
Moldova	score	2.9	2.9	2.9	2.9	2.9	2.9	3	2.9
	rank	127	131	133	129	128	131	124	
Romania	score	3.2	3.2	3.3	3.5	3.5	3.3	3.3	3.3
	rank	99	106	103	78	89	100	107	
Bulgaria	score	3.2	3.3	3.3	3.3	3.4	3.6	3.6	3,4
	rank	96	97	108	106	94	71	73	
Albania	score	3.2	3.1	3.1	3.2	3.2	3.3	3.6	3.2
	rank	102	113	119	114	115	106	76	
Croatia	score	3.4	3.4	3.5	3.5	3.4	3.4	3.4	3.4
	rank	82	83	80	87	90	92	99	
Serbia	score	3.0	3.0	3,0	3.1	3.0	3.1	3.3	3.1
	rank	118	124	125	121	125	120	104	
Montenegro	score	3.6	3.6	3.6	3.5	3.4	3.4	3.4	3.5
	rank	59	69	70	77	86	98	92	

Source: Elaborated by the author at the WEF, the Global Competitiveness Report, 2011-2012 to 2017-2018

It can be observed also that the factors of competitiveness were estimated with annual score 2.9 in the framework of the observed period with the exception 2017 year (3.0), that notes absent of the progress practically in innovation and business sophistication sphere.

Similar, Serbia has demonstrated low innovation and sophistication competitiveness in comparison with countries of the region (Krstić & Krstić, 2018). Indicators of competitiveness have fluctuated between 3.0-3.1 score with the exception of the 2017 year (3.3).

Untypically Montenegro exceeded the countries members of EU included in the analysis of innovation and sophistication competitiveness, obtaining the highest average score -3.5. Although the records indicate a decrease of competitiveness the corresponding factors at the end of analyzed period comparing the beginning.

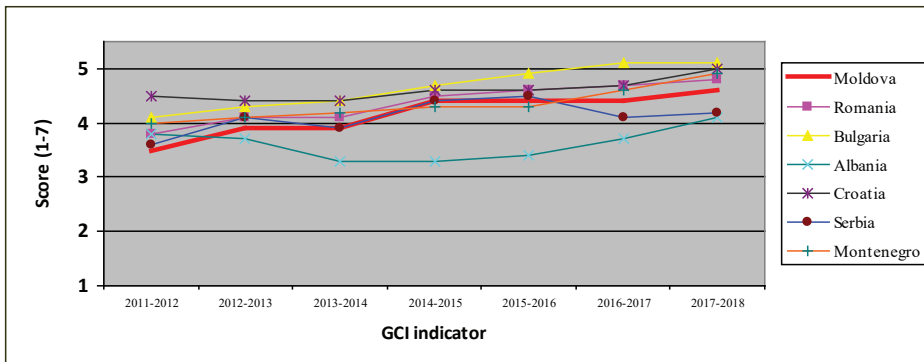
Croatia has insignificant changes in its factors of innovation and sophistication competitiveness, achieved the average score – 3.4.

The economies of Bulgaria and Albania have a favorable tend to increase their competitiveness in the relevant indicators.

There are no big breaks in the innovation competitiveness of the Southeast Europe countries in general. In 2017 all countries were classified in score diapason between 3.0 and 3.6.

In contrast, the evolution of technological readiness of the Southeast Europe countries shows the persistent competitiveness gaps between countries as measured by the GCI indicator (Figure 1).

Figure 1 Dynamics of the technological readiness of some Southeast Europe countries for the period 2011-2017



Source: Elaborated by the author at the WEF, the Global Competitiveness Report, 2011-2012 to 2017-2018

It can be observed also that in the top of technological readiness competitiveness is an economy of Bulgaria that obtained the score of 5.1 in both 2016 and 2017 years but in the bottom of Albania that received the score 3.7 and 4.1 respectively. In plus beginning with 2014, all analyzed economies have received the score more than 4 items, excepting the Albanian economy.

It is important to emphasize that Bulgaria has had the competitive advantage in technological readiness (2013-2015) and Croatia (2013-2017). Both were ranking higher than the fiftieth place in technological readiness in the mentioned periods while their economies were ranked lower than fiftieth positions in the overall GCI.

Economies of Moldova and Serbia have demonstrated the similar records in 2013-2015 years in technological readiness, following the Romanian economy.

It should be noted that Moldova has overcome the Albanian economy as well the Serbian economy on the technological readiness of competitiveness in the last years. There is the lack of convergence within countries regarding on the technological readiness of competitiveness.

In the following analysis, the factors of innovation, business sophistication and technological readiness competitiveness of the Moldovan economy are studied in detail.

In the framework of business sophistication pillar, the factors of state of cluster development have demonstrated the catastrophic values occupying the latest positions in the world in the period 2014-2016 years, but in the rest years, one of the last places (Table 3).

Table 3 Factors of innovation, sophistication and technological readiness competitiveness of the Moldovan economy and their growth rate for the period 2011-2017

Factors	2011		2012		2013		2014		2015		2016		2017		Growth rate, % based on the GCI indicators
	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	
<b>Business sophistication pillar</b>															
Local supplier quantity	4	127	3.9	130	3.9	127	3.9	123	3.7	126	3.6	128	3.8	121	-0.85
Local supplier quality	3.8	117	3.8	117	3.8	115	3.8	113	3.7	115	3.7	113	3.9	100	0.4
State of cluster development	2.4	132	2.4	140	2.3	147	2.4	144	2.3	140	2.3	138	2.6	134	1.3
Nature of competitive advantage	2.9	109	3	106	2.8	127	2.6	131	2.6	130	2.4	130	2.4	126	-3.1
Value chain breadth	3.3	92	3.1	109	3.2	118	3.4	105	3.5	97	3.3	115	3.3	110	0
Control of international distribution	3.7	98	3.6	106	3.7	110	3.7	108	3.3	112	2.9	124	3	120	-3.4
Production process sophistication	2.8	122	2.8	121	2.9	125	3.1	122	3.1	114	3.1	113	3.2	106	2.3
Extent of marketing	3.4	111	3.5	108	3.7	105	3.8	90	3.9	103	3.9	117	4	109	2.7
Willingness to delegate authority	3.1	114	3.3	100	3.4	108	3.4	100	3.4	100	3.4	99	3.9	105	3.9
<b>R&amp;D Innovation pillar</b>															
Capacity for innovation	2.6	107	2.5	122	2.7	134	3.0	128	3.4	115	3.5	124	3.4	119	4.6
Quality of scientific research institutions	2.7	122	2.4	133	2.6	132	2.7	121	2.7	124	2.8	125	2.9	115	1.2



Company spending on R&D	2.1	137	2.1	140	2.1	142	2.3	135	2.3	135	2.2	135	2.4	135	2.3
University-industry collaboration in R&D	2.7	124	2.8	124	2.7	129	2.7	124	2.7	123	2.5	133	2.7	121	0
Government procurement of advanced technology products	2.6	132	2.6	136	2.5	139	2.7	127	2.5	134	2.2	136	2.5	130	-0.65
Availability of scientists and engineers	3.3	122	3.2	131	3.1	131	3.1	128	2.9	132	2.9	131	3.1	120	-1.04
Utility patent granted applications/million population	0	90	0.7	69	0.4	81	0.8	73	1.2	67	0.7	77	0.9	72	N/a
Technological readiness pillar															
Availability of latest technologies	4.3	112	4.1	118	4.1	116	4.3	96	4.4	92	4.3	95	4.4	88	0.38
Firm-level technology absorption	3.9	126	4	128	4	124	4.1	109	4.1	109	4	112	4	106	0.42
FDI and technology transfer	4.1	103	4.1	103	4.1	109	4.2	97	4	99	3.9	100	4	98	-0.41
Internet users % pop.	40	62	38	74	43.1	77	48.8	70	46.6	74	49.8	79	49	71	N/a
Fixed-broadband Internet subscriptions /100 pop.	7.5	61	9.9	58	11.9	52	13.4	52	14.7	52	15.5	56	16.3	54	N/a
Internet bandwidth kb/s/user	14	38	91.1	15	94	23	115.8	23	152.4	18	194.9	16	144.1	34	N/a
Mobile-broadband subscriptions /100 pop.	-	-	3.5	92	5.1	97	47.2	42	49.4	59	51.9	70	55.5	75	N/a

*Source: WEF, the Global Competitiveness Report, 2011-2012 to 2017-2018*

It speaks about the weak the horizontal inter-firm cooperation in the framework of the geographically approximate regions and the ineffective support by the public institutions the cluster development. Notwithstanding the growth of the state of cluster development (1.3 % annually), the initial comparison base was very low. So, current growth rates are not sufficient for intensify of the production process.

An attention is also drawn to the low values of the factors of nature of competitive advantage, which tend to decrease with significant average annual decline (-3.1%). In context to be mentioned that the cheap labor force is the basis of competitive advantage of the country. At present, the lack of skilled workforce, linked to current and future market demands, is transformed into a one of a key obstacle to the development of small and medium business for the Republic of Moldova.

Scores of the indicators of the local suppliers' quantity and quality were correlated between themselves by supporting a relatively high growth of the production process sophistication of firms (2.3% annually) and extent of marketing (2.74% per year). The quality of individual firm's operations and strategies is characterized also by the willingness to delegate the authority by senior management to subordinates had the highest growth rate (3.9% annually) between the factors of business sophistication pillar. Moldova's firms do not expand its participation in value chains (0% annual growth). The country is placed lower than hundredth (2012-2017) at the bottom of GVC. In plus, the control of international distribution is decreasing in the small economy of Moldova with significant average annual decline (-3.4%).

The country is lagging quite far behind in terms of innovation factors as well as business sophistication. Utility patent granted applications have the highest rating between of factors of innovation pillar (seventy-second place in 2017).

Innovation capacity is assessed as significantly increasing (4.57%) supported by the average annual company spending on R&D – 2.25%. At the same time, the initial reference base was very low. The best score for capacity for innovation was one hundred seventh (2011). The best position of the Republic of Moldova on the company spending on R&D was one hundred thirty-fifth rank (2014-2017), that is one of the latest places in the world. University-industry collaboration in R&D is not expanded (0% annual growth). Quality of scientific research institutions is changed slowly (1.2 % per year). Government procurement of advanced technology products fall in average (-0.65% per year). Availability of scientists and engineers also tends to decline (-1.4% annually).

Whereas indicators of technological readiness pillar are ranking the highest in front of business sophistication and innovation pillars they are developed unevenly.

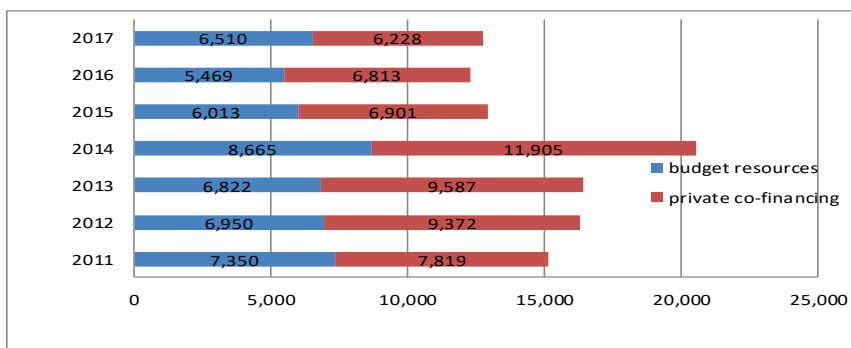
On the one side, Moldova had the competitive advantage in the Internet bandwidth, ranking higher than the fiftieth place (the best – the fifteen in 2012), taking into attention that economy was ranked lower than fiftieth positions in the overall GCI during the analyzed period. Fixed-broadband internet subscriptions should be considered as the upgrading factor with the best rank fifty-second in 2013-2015 years. Also, it has room for improvement.

On the other side, the highest rank of the firm-level technology absorption was one hundred sixth grade as well as the availability of latest technologies – eighty-eight, both obtained in 2017. They show a similar very low average annual growth. The first mentioned factor – 0.42%, but the second one - 0.38%.

Finally, FDI and technology transfer is characterized by an average annual deterioration (-0.41). At present, there is not only a general shortage of export-oriented FDI in higher-technology industries but the weak correlation between them (Dumitrasco, 2015).

There is in decline the financing of the projects the technology transfer from internal sources of the country in the last years in compare with 2011-2014 (Figure 2).

Figure2. Dynamic of financing of the projects the technology transfers in the years 2011-2017, thousand Moldovan lei



*Source: Elaborated by the author based on the Report on the activity of Supreme Council for Science and Technological Development and the main scientific results obtained in the sphere of science and innovation in 2017*

In period 2011-2017 the Agency for Innovation and Technology Transfer of the Academy of Sciences of Moldova managed the innovation and technology transfer projects, financed from the state budget and private sources in proportion 50% to 50% of the total cost of the project. The mandatory condition for the implementation of the innovation and technology transfer projects was the implementation of a new innovation or technology for the Republic of Moldova. Innovation and technology transfer projects is a tool to stimulate innovation in SMEs by partially taking over the risks of this innovation by the government authority. At the same time, innovation and technology transfer projects represent a form of transmission of new technologies from the research institutions to the innovation firms, their multiplication, and application at the level of industry, having as affect the development of domestic innovation firms by producing new competitive products on the internal and the external markets.

Reducing of financing of the projects the technology transfer is explained by the limitation of resources from the state budget as well as difficulty to find co-financing from the side of the private firm because of the low university-industry collaboration in R&D, as it was mentioned earlier.

## Conclusion

This study showed that the Republic of Moldova has disadvantageous indicators of innovation and business sophistication competitiveness.

The areas of business sophistication and innovation are characterized by a low availability of scientists and engineers, and university-industry collaboration in R&D, an unfavorable situation in the government procurement of advanced technology products as well as insufficient company spending on R&D and quality of scientific research institutions.

At the same times, some indicators dealing with quality of individual firm's operations and strategies have demonstrated the growth rates, including production process sophistication, the success of companies in using of marketing; capacity to commercialize new products; company spending on R&D; firm-level technology absorption; willingness to delegate the authority. The study found also while efforts by the firms have tended to arise, they are not supported enough by the measures of state policy regarding the quality of a country's overall business networks. First of all it concerns to the government support of the cluster development (latest positions in the world in 2014-2016), the expanding of participation in value chains (0% annual growth), the quantity of local suppliers (-0.85% annual average fall); government procurement of advanced technology products (-0.65% annual average decline).

Nature of competitive advantage based on the cheap labor force enters into the stage of disappearance. In plus, the availability of scientists and engineers also tends to decline. Hence it should be adopted necessary measures of state politics in the field of education and the labor market.

The study found the low level of FDI inflows into the higher-value manufacturing and tradable sectors, that tend to decline. While internal sources of the country from the state budget and domestic firms are limited. To change this situation for the better is also required the state intervention.

So, the competitiveness of the economy of Moldova is largely predetermined by the development of state institutions and the financial market which study found between one of the most problematic indicators.

In contrast, access to Information communication technologies (ICT) is relatively high in Moldova. About 50% of populations are the Internet users. According to Internet bandwidth, Moldova has a competitive advantage. Fixed-broadband internet subscriptions also demonstrate high records.

The advanced ICT services may attract future FDI, as several foreign companies are already successful in these sectors in the economy of the Republic of Moldova. The country should also use the entering' opportunities: either through joining existing value chains or by finding niches in the ICT services.

In the regional aspect study displayed that the economy of Serbia has demonstrated similar Moldova's records in technological readiness as well as they are comparable in the factors of innovation, business sophistication competitiveness.

Finally, the study identified that the Republic of Moldova has lowest indicators of the innovation and sophistication competitiveness in comparison with other countries of Southeast Europe, but the economy of Moldova follows the EU economies on the technological readiness.

## References

- Bown, C. (2001). *The Great Recession and Import Protection: The Role of Temporary Trade Barriers*. Washington, The World Bank.
- Bustos, P. (2011). Trade Liberalization, Exports and Technology Upgrading: Evidence on the impact of MERCOSUR on Argentinian Firms. *American Economic Review*, 101 (1): 304-340.
- Cassiman, B., Golovko, E., & Martínez-Ros, E. (2010). Innovation, exports, and productivity. *International Journal of Industrial Organization*, 28: 372-376.
- CEFTA Investment Report (2017), prepared by Gabor Hunya, Senior Expert at the Vienna Institute for International Studies, within the framework of the CEFTA Secretariat Project CPF III: 2016-10: Technical Assistance for the Preparation of CEFTA Investment Report
- Douglas, A., & Kevin H. O'Rourke NBER Working Paper No. 17598 (November 2011) *Coping with Shocks and Shifts: The Multilateral Trading System in Historical Perspective*, available at: <http://www.nber.org/papers/w17598.pdf>
- Dumitrasco, M. (2015). Overview of Approach Based on Links Between Trade Exchange and Innovation. In B. Krstic & Z. Paszek (Eds.), *The determinants of competitiveness* (pp. 71-75). Nis, Serbia: Faculty of economics.
- Dumitrasco, M. (2016, June). Engagement of the Republic of Moldova in external fragmentation of production in framework Paper presented at the conference: "Europe adrift. From unity in diversity to diversity without unity", University Petrol-Gaze, Romania.
- Dumitrasco, M. (2017). Involvement of local products of technological intensity in external fragmentation of production: the case of the Republic of Moldova. In B. Krstic & Z. Paszek (Eds.), *Improving micro and macro competitiveness - problems and possible solutions* (pp. 201-221). University of Niš, Serbia: Faculty of economics

- Government decision Nr. 297 from 30 March 2018, "On completing of some Government decisions"
- Hofmann, C., Osnago, A., Ruta, M. (2017). Horizontal depth: a new database on the content of preferential trade agreements. Washington, World Bank Group.
- Kowalski, P. et al. (2015). Participation of Developing Countries in Global Value Chains: Implications for Trade and Trade-Related Policies. Paris, OECD Publishing.
- Krstić, B., & Krstić, M. (2015). Determinants of national economy competitiveness of Balkan countries – benchmarking study. In B. Krstic & Z. Paszek (Eds.), Competitiveness of enterprises and national economies (pp. 1-17), Niš, Serbia: Faculty of Economics.
- Krstić, B., & Krstić, M. (2015). A science as the determinant of competitiveness of countries – benchmarking study. In B. Krstic (Ed.), Enhancing the Efficiency and Competitiveness of Enterprises and National Economies - problems, factors, determinants, strategies and solutions (pp. 1-25), Niš, Serbia: Faculty of Economics.
- Lopez, G. (2016). Using Foreign Factors to Enhance Domestic Export Performance: A Focus on Southeast Asia. Paris, OECD Publishing.
- Making Trade an Engine of Growth for All the Case for Trade and for Policies to Facilitate Adjustment. Report prepared by the staff of International Monetary Fund, World Bank, and World Trade Organization, for discussion at the meeting of G20 SHERPAS, March 23–24, 2017 Frankfurt, Germany
- Mark, D. (2014). Governed Trade: Global Value Chains, Firms and the Heterogeneity of Trade in an Era of Fragmented Production. *Review of International Political Economy*, 22 (5):875-909.
- Mattoo, A., Mulabdic A., & Ruta, M. (2017). Trade Creation and Trade Diversion in Deep Agreements. Washington, World Bank
- Milberg, W., & Winkler, D. (2013). Outsourcing Economics: Global Value Chains in Capitalist Development. Cambridge, Cambridge University Press.
- Nolan, A., & Pilat, D. (2016). Benefitting from the Next Product revolution. Paris, OECD Insights.
- OECD (2015) Inclusive Global Value Chains Policy options in trade and complementary areas for GVC integration by small and medium enterprises and low-income developing countries OECD and World Bank Group. Report prepared for submission to G20 Trade Ministers Meeting Istanbul, Turkey, 6 October 2015
- OECD (2018) Productivity and Jobs in a Globalised World (How) Can All Regions Benefit?, DOI: <http://dx.doi.org/10.1787/9789264293137-en>
- Osnago, A., Rocha, N., & Ruta, M. (2017). Deep Trade Agreements and Global Value Chains, Washington, World Bank.
- Porter, M.E. (1985). *Competitive Advantage*. New York, Free Press.

- Report on the activity of Supreme Council for Science and Technological Development and the main scientific results obtained in the sphere of science and innovation in 2017. Available at: <http://www.asm.md/administrator/fisiere/rapoarte/f176.pdf>
- Shih, S. (1996). *Me-Too is Not My Style: Challenge Difficulties, Break through Bottlenecks, Create Values*. Taipei, The Acer Foundation.
- Schwab, K. (2012). *The Global Competitiveness Report 2011–2012*. Geneva, World Economic Forum.
- Schwab, K. (2013). *The Global Competitiveness Report 2012–2013*. Geneva, World Economic Forum.
- Schwab, K. (2014). *The Global Competitiveness Report 2013–2014*. Geneva, World Economic Forum.
- Schwab, K. (2015). *The Global Competitiveness Report 2014–2015*. Geneva, World Economic Forum.
- Schwab, K. (2016). *The Global Competitiveness Report 2015–2016*. Geneva, World Economic Forum.
- Schwab, K. (2017). *The Global Competitiveness Report 2016–2017*. Geneva, World Economic Forum.
- Trade Facilitation Implementation Guide: United Nations Economic Commission for Europe (UNECE, 2012). Retrieved March 20, 2018 from <http://tfig.unece.org/details.html>
- UNCTAD (2013, advance unedited version) *Global Value Chains And Development (Investment and value added. Trade in the global economy)*. A preliminary analysis.
- WTO (2015) *Speeding up trade: benefits and challenges of implementing the WTO Trade Facilitation Agreement*.



Vladimir Mičić<sup>1</sup>  
Faculty of Economics, University of Kragujevac

ORIGINAL SCIENTIFIC ARTICLE  
doi:10.5937/ekonomika1804045M

Ljubodrag Savić<sup>2</sup>  
Faculty of Economics, Belgrade University

Received: October, 18, 2018  
Accepted: November, 05, 2018

## SUSTAINABLE DEVELOPMENT OF THE SERBIAN MANUFACTURING INDUSTRY<sup>3</sup>

### Abstract

*Structural changes are crucial for sustainable industrial development. The aim of the paper is to point out that structural changes in the Serbian manufacturing industry should be accompanied by growth in production specialization and the share of high-technology products in order to increase competitiveness. For the analysis of structural changes, a comparative method is used, to analyze production specialization, industrial sector specialization index, and for the analysis of competitiveness, the revealed comparative advantage index. The manufacturing industry is the most important sector of the Serbian economy, and, despite growth, specialization in this field is not high, which affects the lack of comparative advantages and uncompetitiveness of this sector on the EU market. The paper can be of assistance to industrial policy makers, in order to determine the best path to sustainable industrial development, using the benefits of production specialization.*

**Key words:** *structural changes, specialization, competitiveness, sustainable development*

**JEL classification:** *L16, O14, Q01*

## ОДРЖИВИ РАЗВОЈ СРПСКЕ ПРЕРАЂИВАЧКЕ ИНДУСТРИЈЕ

### Апстракт

*Структурне промене су кључне за одрживи индустријски развој. Циљ рада је да укаже да би структурне промене српске прерађивачке индустрије требале да буду праћене растом производне специјализације и учешћа производа са највишим нивоом технолошке интензивности, како би дошло до раста конкурентности. За потребе анализе структурних промена користи се компаративни метод, за анализу производне специјализације индекс специјализације индустријског сектора, а за анализу конкурентности индекс откривених компаративних предности. Прерађивачка индустрија је најважнији сектор економије Србије*

<sup>1</sup> micicv@kg.ac.rs

<sup>2</sup> ljubas@ekof.bg.ac.rs

<sup>3</sup> This paper is the result of research on the Project No. 179065 which is funded by the Ministry of Education, Science, and Technological Development of the Republic of Serbia.



*у коме и поред раста специјализација није висока, што утиче да овај сектор не остварује компаративне предности и није конкурентан на тржишту ЕУ. Рад је може бити од помоћи креаторима индустријске политике, како би се одредио најбољи пут ка одрживом индустријском развоју, користећи предности производне специјализације.*

**Кључне речи:** *структурне промене, специјализација, конкурентност, одрживи развој*

## Introduction

Sustainable industrial development emphasizes the role of industrialization as a long-term driver of development, and encompasses inclusion, improvement of competitiveness, and environmental protection (UNIDO, 2015, p. 8). Sustainable industrial development requires structural changes, i.e. the ability to continuously generate new, more dynamic activities with higher productivity and, therefore, competitiveness. The perspective of structural change often emphasizes desirability and control of the direction of change.

To control the direction of structural change, industrial policy is very important, the one that includes any type of intervention seeking to improve the business environment or to change the structure of economic activity towards industries and technologies that are expected to provide better growth prospects than would occur in the absence of such an intervention (Warwick 2013, p. 14). Industrial policy is also important for the growth of production and export specialization in the manufacturing industry (Boeheim, Michael, et al., 2005, p. 6.) The manufacturing industry has been a driver of economic development in developing countries (Szirmai, 2012, p. 417), and, today, the role of this sector does not decrease, but rather increases (Haraguchi, Cheng & Smeets, 2017, p. 293).

Industrial development is accompanied by changes in economic activities both between and within sectors, which determines specialization and competitiveness (Romano & Traù, 2017, p. 35). The growth of production and export specialization of the manufacturing industry in developing countries leads to productivity and competitiveness growth and their ability to compete on the global market. For small developing economies, as in the case of Serbia, competitiveness of the manufacturing industry is essential for sustainable economic development.

Therefore, the research subject in this paper is the connection between structural changes in the manufacturing industry production specialization of Serbia and the new EU member states, especially in conditions when the EU's industrial policy focuses on digitization and development of new industries in the future. The aim of the paper is to show that structural changes of the Serbian manufacturing industry should be accompanied by growth in production specialization and the share of high-technology products in order to increase its competitiveness.

The starting hypothesis in the paper is that there is a connection between structural changes, production specialization, and competitiveness of the manufacturing industry of Serbia and new EU member states. In addition to Serbia, the EU member states will

be analyzed, with special emphasis on new members from Central and Eastern Europe (CEE), having representative manufacturing sector within the respective economies and being similar in size.

## Theoretical background

Economic theory states that the structure of the manufacturing industry is very important for developing countries' economic development, as some activities have a higher level of productivity and growth rates, and especially because the products of this sector represent a significant part of export. It is also underlined that economic development is more successful if it is narrower production specialization and export (UNIDO, 2015, p.77). Experience shows that production specialization in small economies is an important factor of structural change and a strategy for sustainable economic development (Foster-McGregor, Kaba & Szirmai, 2015, p. 2). Production specialization is accompanied by export specialization, and export plays an important role in promoting economic development of small economies (Krugman, Obstfeld & Melitz 2012, pp. 40). Changes in the level of specialization give data on the potential, volatility, and length of growth, level and growth of productivity, competitiveness, and export. Countries specialize, vertically or horizontally, on the basis of comparative advantages, available factors and resources, labour costs and productivity (Aiginger & Rossi-Hansberg, 2006, pp. 255-266).

Economic theorists have no single opinion on the place and role of production specialization (Mičić, Savić, & Radičić, 2018, p. 82). On the one hand, it is considered that specialization increases productivity, competitiveness, and export, and, on the other hand, that diversification and a wider range of production activities provide more opportunities and make the manufacturing industry more capable of using the effects of technological innovation, networking, and spillover of labour productivity growth from this sector into other sectors. Also, countries with a high level of specialization are less capable of sustaining growth in the long run, and, in some cases, to deal with external shocks successfully. Therefore, it is emphasized that at lower levels of GDP per capita diversification reduces instability and makes economic growth higher and longlasting. Countries with high GDP per capita have more benefits from specialization.

The diversity of results exists in empirical research as well (Russ, 2015, pp. 63-73; UNIDO, 2015, pp. 28-29, Kaulich, 2012; Imbs & Wacziarg, 2003, pp. 63-86). Studies examine the existence of a positive link between the level of production specialization and the level of GDP per capita. They analyze whether the ratio takes the form of the letters U or L. Some studies show the existence of the curve U for production, some for export, and some show that diversification continues at a high level of GDP per capita. In different countries, other than those in which the manufacturing industry is highly sophisticated, industrial development requires specialization and concentration (Hausmann & Rodrik, 2003, p. 610).

Research on production specialization in EU member states, especially new ones, shows its growth, that the level of specialization and the size of the manufacturing industry are not linked, that smaller countries have a higher level of specialization, and vice versa. Research shows that EU members whose industrial policy is focused

on creating a more diversified production structure and productive production activities achieve better economic performance and a higher level of competitiveness (Russ, 2015; Mičić, Savić & Radičić, 2018, pp. 88-90).

Today, the EU is primarily focused on sustainable production and employment growth, and, with that in mind, it seeks to exploit the opportunities of globalization and digitization in order to achieve faster productivity and competitiveness growth. Therefore, it encourages technological innovation and controls structural changes through different policies and the involvement of stakeholders in strategic partnerships (Bachtler, 2017, p. 1). Digital and other advanced technology influences the EU's application of industrial policy measures in order to fully utilize the possibilities of digitization, which is crucial for the growth of competitiveness of the manufacturing industry.

Under conditions of the knowledge economy in the EU, smart production specialization is also gaining in importance, which stimulates and accelerates structural changes in the manufacturing industry and affects its productivity growth. It is a concept that deals with vertical intervention and selection of preferred production activities that will receive priority and be favored, through concentration of resources. Smart specialization is based on the implementation of smart state policies, i.e. innovative, industrial, and educational policies (Foray, 2013, pp. 1-15). Thus, smart production specialization represents a strategic approach to the economic development of the EU through targeted support and investment in knowledge, research, technological development, and key industrial priorities (Clar, 2015, p. 1291). This concept of production specialization is particularly important for the development of Industry 4.0, which provides important opportunities for developing countries to move towards inclusive and sustainable industrial development faster (UNIDO, 2017, p. 2).

The growth of competitiveness of the manufacturing industry is putting pressure on innovation, in particular using Industry 4.0-related technology. It promotes integration into global value chains, affects productivity growth, and increases efficiency of energy and resource use. It is particularly important for the growth of competitiveness of developing countries and fast-growing economies that fall into the middle income “trap” (UNIDO, 2017, p. 34). The failure of transition to knowledge and innovation leads them to deindustrialization. Engaging in global value chains by increasing the speed of technological change and new innovation puts pressure on middle-income countries to improve their productive capacity. Pressure will be even greater since digitization leads to reorientation of global production and trade to developed countries (Bachtler, 2017, p. 49).

The growth of production and export specialization in the manufacturing industry of developing countries leads to productivity growth and their ability to compete on the international market in the export of similar industry products from other countries. For small manufacturing industries, export competitiveness is essential for the promotion of sustainable economic growth and development and survival in the global economy (UNIDO, 2017, p. 4). The competitiveness of the manufacturing industry is its ability to produce and export competitive products. It directly affects its production and export capacity, which then affects the total and per capita value added. An important aspect is the level of technological development and the quality of export, which depend on the intensity of industrialization and structural changes (UNIDO, 2017, p. 36).

It is important to point out that the competitiveness of the manufacturing industry covers a large number of factors, from production costs, through technological

innovation, product quality and differentiation, exchange rates, to non-price factors of structural competitiveness. A comparative advantage is used to determine the patterns and trends of production and export specialization, as well as where one country achieves competitiveness. It is a fact that countries differ in terms of labor productivity in different industries, producing and exporting products in which they are relatively more productive and more efficient (Krugman et al. 2012, pp. 40-48). It is also certain that it is very difficult to precisely measure competitiveness due to the lack of data on the costs of factors affecting it (Balassa, 1965, p. 99).

## Methodology and hypotheses

In this paper, a comparative method will be used to show the trends of structural changes in Serbia and selected EU members, by years in the period 2010-2017. The trends relate to the share of the manufacturing industry in the creation of total value added, as well as on production and export of high-tech products. This method will also show a trend in the specialization and competitiveness of the manufacturing industry.

The method of quantitative analysis will be used to measure the relative sector specialization of the manufacturing industry. The research uses a number of indicators of relative production specialization (Palan, 2010, p. 1, Saboniene, 2009, p. 51, Aiginger, 2000, p. 84, Balassa, 1965, p. 99). Even though there are some limitations (European Commission, DGEI, 2011, p.106), to analyze production specialization of the manufacturing industry, the industrial sector specialization index  $S$  will be used in this paper. It is calculated as follows:

$$S_{i,j} = \frac{\frac{GVA_{i,j}}{\sum_j GVA_{i,j}}}{\frac{GVA_{EU,j}}{\sum_j GVA_{EU,j}}}$$

Where:  $S_{i,j}$  – industrial sector specialization index, GVA – gross value added;  $i$  – country,  $j$  – manufacturing sector.

The specialization index compares the share of the GVA of the manufacturing industry in the total GVA of the observed economy with the share of GVA of EU industry in the total GVA of the EU economy. Value of 1 for the manufacturing industry shows the same share in that sector in the observed country and the EU. When the index value is above (below) 1, it indicates specialization (no specialization) of the observed country. The higher indicator value means the higher level of specialization of the manufacturing industry in relation to the EU average.

Starting from the relative production specialization within the quantitative analysis, the revealed comparative advantage (RCA) index of the manufacturing industry will also be used. It shows the comparative advantages and export performance of a particular activity, is known as the Balassa index, and is defined using the data on export and import (Balassa, 1965, p. 99). In this paper, one of the RCA index modifications will be used, which is calculated as follows:

$$RCA \log_{10} = \frac{\frac{X_{i,j}}{X_{i,EU}}}{\frac{\sum X_j}{\sum X_{EU}}}$$

Where RCA – revealed comparative advantage index,  $X_{ij}$  – manufacturing industry export of country j,  $X_{i,EU}$  – manufacturing industry export of the EU,  $X_j$  – total export of country j, and  $X_{EU}$  – total EU export.

The positive value and level of RCA indicate the level of comparative advantage of the manufacturing industry of the observed country, while the negative values of RCA indicate disadvantages. The intensity of changes in the RCA index by one in the logarithmic scale indicates a tenfold increase in competitiveness and export in relation to the observed export market.

The paper should confirm the hypothesis on the connection between structural changes, production specialization, and competitiveness of the manufacturing industry of Serbia and new EU member states. In order to verify the hypothesis, the following auxiliary hypotheses will be tested:

H1: Production specialization in the Serbian manufacturing industry and EU member states from CEE is above the EU average.

H2: The manufacturing sector of EU members from the CEE region has comparative advantages.

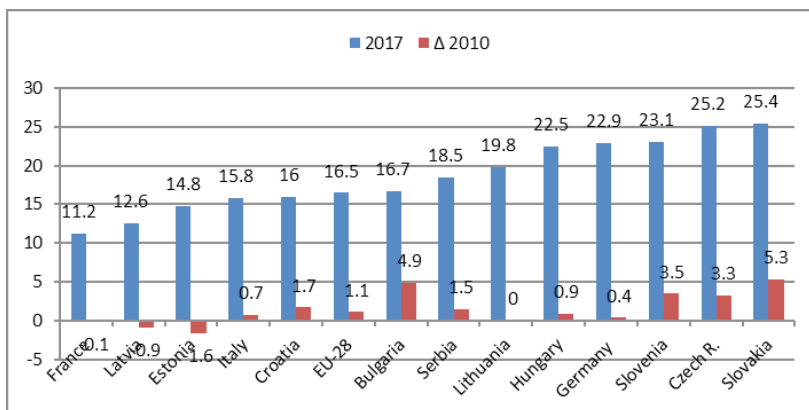
H3: The growth of production specialization of the EU’s manufacturing industries in the CEE is accompanied by the growth of comparative advantages.

The survey uses the Eurostat data. The scope of the manufacturing sector is defined according to the NACE classification, while the analysis of export of this sector is at the highest level of data aggregation of the Standard International Trade Classification (Revision 4) and includes groups 5 to 8.

## Discussion of research results

The share of the manufacturing industry of Serbia of 18.5% in the creation of the total GVA in 2017 is above the EU-28 average (16.5%). In some CEE members, the share is over 20% (Graph 1).

Graph 1. Gross value added of the manufacturing sector



Source: Authors' calculation based on Eurostat data

The process of transition, as well as the effects of economic crisis and recession, have led to a change in the significance and relative role of this sector. Deindustrialization is characteristic of old and developed EU members, but also the CEE transition economies. Nevertheless, most member countries record slowdown in decline and growing share of this sector, and the EU is striving to build a strong industrial base because a strong industry plays an important role in innovation, productivity growth, competitiveness, and sustainability of the EU economy growth. For this purpose, members are pursuing an industrial policy that encourages investment in the development of smart, technologically innovative, competitive, and sustainable industries. It is predominantly horizontal, but partly also vertical industrial policy, which is to accelerate structural changes, develop a business environment suitable for industry development. The manufacturing sector in Serbia recorded growth of 1.5 percentage points in 2017 compared to 2010, which is good considering that, in the longer term, it also faced decline in the share of GVA as a result of inefficient structural changes. Growth is the result of the inflow of foreign capital and increased investment activity.

Table 1 shows the values and changes in the value of the manufacturing sector S index in the period 2010-2017. The calculated values of the S index are higher in most of the observed CEE countries compared to the EU-28 average, while Latvia, Estonia, and Croatia record the lack of specialization in the manufacturing industry. The manufacturing sector of Serbia records the S index value slightly above one, which is above the EU-28 average, but below the level of the new CEE member countries observed. This, except for Latvia, Estonia, and Croatia, confirms an auxiliary H1. This deviates from the usual practice that small economies have a higher degree of specialization. The change of specialization points to growth of specialization of the EU member states' manufacturing sector, in accordance with their comparative advantages and efforts to implement strategic documents and defined directions of development and industrial policy. In Serbia, the level of specialization in the manufacturing sector is not at a sufficiently high level compared to its industrial development phase, as confirmed by previous research (Mičić, Savić & Radičić, 2018, p. 88).

Table 1. Industrial sector specialization index

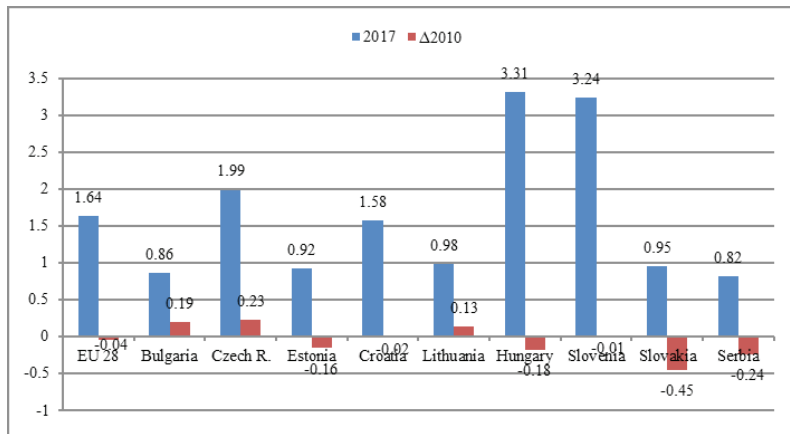
	2010	2011	2012	2013	2014	2015	2016	2017	Δ2010
EU 28	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	0,00
Czech R.	1,42	1,56	1,58	1,58	1,67	1,56	1,56	1,53	0,11
Hungary	1,40	1,43	1,40	1,42	1,45	1,50	1,40	1,36	-0,04
Slovakia	1,31	1,38	1,54	1,65	1,62	1,59	1,59	1,54	0,23
Slovenia	1,27	1,27	1,35	1,41	1,48	1,38	1,38	1,40	0,13
Estonia	1,06	1,01	1,01	0,97	1,01	0,92	0,91	0,90	-0,17
Latvia	0,88	0,84	0,83	0,82	0,77	0,72	0,75	0,76	-0,11
Lithuania	1,29	1,31	1,40	1,29	1,27	1,21	1,15	1,20	-0,09
Bulgaria	0,77	0,81	0,90	0,82	0,87	0,89	0,85	1,01	0,25
Croatia	0,93	0,94	0,97	0,95	0,99	0,99	1,01	0,97	0,04
Serbia	1,10	1,12	1,24	1,22	1,19	1,10	1,11	1,12	0,02

Source: Authors' calculation based on Eurostat data

The big disadvantage is the fact that, at the time of Industry 4.0 development in the Serbian manufacturing industry, Production of computers, electronic, and optical

products and Production of pharmaceutical products, as high-tech areas with the highest level of productivity and the creation of GVA participate with less than 1% and are twice lower than the EU-28 average (Graph 2). The largest share of propulsive high technology areas is in the manufacturing sectors of Slovakia, the Czech Republic, and Slovenia, which have the highest value of production specialization.

Graph 2. Gross value added of high-tech areas in the manufacturing sector, in %



Source: Authors' calculation based on Eurostat data

Negative values of RCA for the Serbian manufacturing sector show uncompetitiveness on the EU market. Positive values of RCA index show that the manufacturing industries of the CEE countries have comparative advantages, thus confirming the auxiliary H2. The growth of RCA since 2010 shows rise, and decline fall in the competitive position. The highest level of competitiveness is in the manufacturing industry of the Czech Republic, Slovakia, Slovenia, and Hungary, and the lowest level in Croatia and Bulgaria. In addition to these two countries, all other CEE countries observed show a relatively stable trend of growth and insignificant RCA oscillations, in line with changes in levels and growth of specialization in this sector in the observed EU member states, which confirms the auxiliary H3.

Table 2. RCA

	2010	2011	2012	2013	2014	2015	2016	2017	Δ2010
Bulgaria	0,35	0,48	0,48	0,41	0,41	0,54	0,45	0,45	0,09
Czech R.	0,66	0,69	0,70	0,70	0,72	0,72	0,73	0,73	0,06
Estonia	0,48	0,37	0,37	0,37	0,37	0,54	0,43	0,30	-0,18
Croatia	0,30	0,30	0,30	0,30	0,22	0,37	0,43	0,30	0,00
Latvia	0,30	0,40	0,40	0,48	0,48	0,48	0,48	0,40	0,10
Lithuania	0,24	0,35	0,30	0,34	0,38	0,48	0,48	0,38	0,14
Hungary	0,61	0,61	0,64	0,65	0,66	0,67	0,64	0,65	0,04
Slovenia	0,62	0,62	0,60	0,62	0,64	0,64	0,66	0,68	0,06
Slovakia	0,67	0,66	0,65	0,67	0,66	0,70	0,66	0,65	-0,02
Serbia	-0,07	-0,07	-0,07	-0,07	-0,07	-0,07	-0,25	-0,22	-0,18

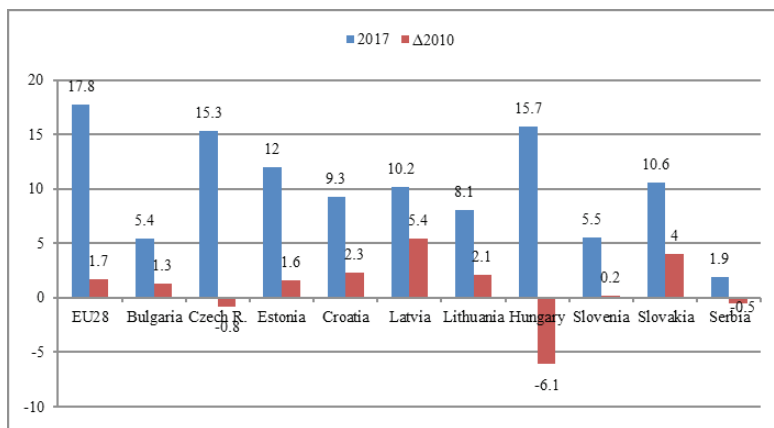
Source: Authors' calculation based on Eurostat data

Table 2 shows values and changes in the value of RCA. The negative values of RCA in the manufacturing sector of Serbia are the consequence of the fact that Serbia is not a member of the EU, that the integration of CEE countries has affected production and trade convergence, which makes it difficult to export to this market due to numerous limitations, but it is even more important that the Serbian manufacturing industry does not have high production and export of technologically intensive products in order to be more competitive in relation to CEE member countries on this market.

The level of competitiveness and export potential is also shown by the relative ratio of RCA of the two industries in the same year. The EU CEE countries with similar RCA have a higher potential for mutual and intra-industrial trade. Relative RCA ratio in two consecutive years shows a change in the manufacturing industry competitiveness of the observed country. Those with RCA growth throughout the period are changing not only in quantitative terms, but also in qualitative terms, and knowledge and innovation in these countries are increasingly becoming competitiveness factors.

Graph 3 shows the share of export of high-tech products in the total export of the manufacturing industry. In the Serbian export structure, high-tech products account for less than 2% and record a decline in share in the period 2010-2017.

Graph 3. Export of high-tech products, in %.



Source: Authors' calculation based on Eurostat data

This is significantly less than the EU-28 average and points to the unfavorable structure, but also the volume of export in relation to EU members from the CEE, especially compared to the Czech Republic, Slovakia, and Hungary, which in the observed period (except Hungary) record a constant increase in the share of high-tech products in total export. With this high share of high-tech products in the Serbian manufacturing industry it is difficult to compete with the observed CEE countries on the world as well as on the EU market.

## Conclusion

The manufacturing industry is an important part of the Serbian and CEE economies, which is confirmed in its share in the total GVA. After the economic crisis and recession, most



CEE members slowed down their fall or recorded growth in the sector's share in total GVA. The EU is striving to build a strong industrial base that plays an important role in the sustainable growth and development of the EU economy. With this in mind, the EU is implementing an industrial policy that encourages investment in the development of Industry 4.0

As a result of the increased investment activity, the manufacturing sector in Serbia records rise in its share in GVA, which is good considering that it faced intensive decline in the long run. However, the analysis also shows that, at the time when the EU encourages the development of Industry 4.0, in Serbian manufacturing sector, high-tech products account for less than 1%, twice lower than the EU average, which reflects on its competitiveness and export, so the share of high-technology products in export is below 2%.

The manufacturing industry in the observed CEE countries, with the exception of Latvia, Estonia, and Croatia, records specialization above the EU average. The manufacturing sector of Serbia records production specialization above the EU average, but below the level of other CEE member countries observed. This partly confirms auxiliary H1. Positive values of RCA index show that the manufacturing industries of the CEE countries have comparative advantages, thus confirming the auxiliary H2. Negative values of the Serbian manufacturing sector show uncompetitiveness on the EU market. Countries with growing RCA record growing competitiveness, and vice versa, in line with changes in levels and growth of specialization of this sector in the observed EU member states from the CEE, which confirms the auxiliary H3. This practically confirms the hypothesis that there is a connection between structural changes, production specialization, and competitiveness of the manufacturing industry of Serbia and most of the new CEE member states.

The manufacturing industry is the most important sector of the Serbian economy, which, despite growth, does not record high specialization, which affects uncompetitiveness of this sector on the EU market. Therefore, further research may focus on the correlation of factors that affect competitiveness with the direction of change in the production structure. The paper can be of assistance to industrial policy makers, in order to determine the best path to sustainable industrial development, using the benefits of production specialization. The fact is that production specialization is the basis for export specialization, so the solution is to change the production orientation towards production digitization and Industry 4.0 development.

## References

- Aiginger, K. (2000). Specialisation of European manufacturing. *Austrian Economic Quarterly*, 2(2000). 82-92.
- Aiginger, K., & Rossi-Hansberg, E. (2006). Specialization and concentration: a note on theory and evidence. *Empirica*, 33(4). 255-266.
- Bachtler, J. (2017). *Towards cohesion Policy 4.0: Structural transformation and inclusive growth*. Regional Studies Association, RSA Europe. 1-46.
- Balassa, B. (1965). Trade Liberalisation and Revealed Comparative Advantage, *The Manchester School of Economic*, Vol. 33, Issue 2. 99-123. /doi: 10.1111/j.1467-9957.1965.tb00050.x/abstract.
- Boheim, M., Handler, H., Ketels, C., Palmberg, C., & Török, Á. (2005). Towards a renewed industrial policy in Europe.

- European Commission, (2011). EU industrial structure 2011 — Trends and Performance. Office of the European Union, Luxembourg, doi:10.2769/28487
- Eurostat. (30. August 2018). *Statistical databases*. Retrieved. 30. August 2018, from <http://ec.europa.eu/eurostat/data/database>.
- Foray, D. (2013). Smart specialisation and the New Industrial Policy agenda. *Policy Brief*, (8), 1-15.
- Foster-McGregor, N., Kaba, I., & Szirmai, A. (2015). Structural change and the ability to sustain growth. Inclusive and Sustainable Industrial Development Working Paper Series, Viena, 19.
- Haraguchi, N., Cheng, C. F. C., & Smeets, E. (2017). *The importance of manufacturing in economic development: Has this changed?* World Development, 93, 293-315.
- Hausmann, R., & Rodrik, D. (2003). Economic development as self-discovery. *Journal of development Economics*, 72(2). 603-633.
- Imbs, J., & Wacziarg, R. (2003). Stages of diversification. *The American Economic Review*, 93(1), 63-86.
- Krugman, P., Obstfeld, M., & Melitz M., (2012). International Economics-Theory and Policy. New York: Addison Wesley.
- McCann, P., & Ortega-Argilés, R. (2015). Smart specialization, regional growth and applications to European Union cohesion policy. *Regional Studies*, 49(8). 1291-1302.
- Mićić, V., Savić, L., & Radičić, D. (2018). The level of production specialization: Serbia and the new EU member states. *Industrija*, 46(1), 79-95. doi: 10.5937/industrija46-1559.
- Romano, L., & Traù, F. (2017). The nature of industrial development and the speed of structural change. *Structural Change and Economic Dynamics*, 42, 26-37.
- Russu, C. (2015). Industrial Specialization of the European Union Member Countries. *Economic Insights-Trends & Challenges*, 67(2). 63-73.
- Saboniene, A. (2009). Lithuanian export competitiveness: comparison with other Baltic States. *Engineering Economics*, 62(2). 49-57.
- Szirmai, A. (2012). Industrialisation as an engine of growth in developing countries, 1950–2005. *Structural change and economic dynamics*, 23(4). 406-420.
- UNIDO, (2017). *Competitive Industrial Performance Report 2016, The Industrial Competitiveness of Nations Looking back, forging ahead*, Vienna International Centre, UNIDO, Vienna, p. 4.
- UNIDO. (2015). *Industrial Development Report 2016. The Role of Technology and Innovation in Inclusive and Sustainable Industrial Development*. Vienna. 28.
- Upadhyaya, S. & Yeganeh, S. M. (2015). Competitive Industrial Performance Report 2014. Research, statistics and industrial policy branch, Working paper series, 12/2014, UNIDO. 2-8.
- Warwick, K. (2013). Industrial Policy: Emerging Issues and New Trends. doi: [org/10.1787/5k4869clw0xp-en](https://doi.org/10.1787/5k4869clw0xp-en).



Vesna Sekulic<sup>1</sup>  
Milica Pavlovic<sup>2</sup>  
University of Nis, Faculty of Economics

ORIGINAL SCIENTIFIC ARTICLE  
doi:10.5937/ekonomika1804057S  
Received: October, 09, 2018  
Accepted: November, 05, 2018

## CORPORATE SOCIAL RESPONSIBILITY IN RELATIONS WITH SOCIAL COMMUNITY: DETERMINANTS, DEVELOPMENT, MANAGEMENT ASPECTS<sup>3</sup>

### Abstract

*In the contemporary conditions of the pronounced dynamism of competition, clearly articulated demands of the social community and increasingly loud ecological requirements, socially responsible business activities become an indispensable strategy of responsible and ethical management of the company. Depending on how well companies manage socially responsible projects, it depends on the degree of sustainable development and the level of quality of relations with the community. Having this in mind, the paper aims to provide a better and more complete understanding of socially responsible behavior of companies in relations with the social community. Consequently, the significance of social responsibility and the role of social investments for community development are in the focus of the paper. The competencies of corporate social responsibility managers for community development have also been analyzed in order to better understand the new role and responsibility of companies.*

**Key words:** corporate social responsibility, community development, social investments

**JEL classification:** L21, M14,

## ДРУШТВЕНА ОДГОВОРНОСТ КОМПАНИЈА У ОДНОСИМА СА ДРУШТВЕНОМ ЗАЈЕДНИЦОМ: КАРАКТЕРИСТИКЕ, РАЗВОЈ, УПРАВЉАЧКИ АСПЕКТИ

### Апстракт

*У савременим условима израженог динамизма конкуренције, јасно артикулисаних захтева друштвене заједнице и све гласнијих еколошких захтева, друштвено одговорно пословање постаје неизоставна стратегија одговорног и етичног управљања компанијом. У зависности од тога колико компанија промишљено управља друштвено одговорним пројектима*

<sup>1</sup> vesna.sekulic@eknfak.ni.ac.rs

<sup>2</sup> milapavlovic@yahoo.com

<sup>3</sup> The paper is part of the Project No. 179066 funded by the Ministry of Education, Science, and Technological Development of the Republic of Serbia

*зависи степен њене одрживости и ниво квалитета односа са заједницом. Имајући то у виду, овај рад има за циљ да омогући боље и потпуније разумевање друштвено одговорног понашања компанија у односима са друштвеном заједницом. Сходно томе, значај друштвене одговорности и улога друштвених инвестиција за развој заједнице у фокусу су овог рада. Компетенције менаџера корпоративне друштвене одговорности за развој заједнице су такође анализирани у циљу бољег разумевања нове улоге и одговорности компанија.*

**Кључне речи:** *корпоративна друштвена одговорност, развој заједнице, друштвене инвестиције*

## Introduction

Including the undertaking of actions that lead to the satisfaction of the company's competitive interests and the interests of the wider community, the socially responsible behavior of modern companies implies, to a significant extent, the creation of good relations with the social community as a significant constituent of their business activities. Therefore, in a wider context, social responsibility is perceived through a broad group of people and groups in a specific geographical area with a common tradition, values, institutions, collective activities and interests (Post, Lawrence, Weber, 2002, p.376).

The social community cooperates with companies and provides them with opportunities for work, so it has certain economic, legal, ethical and philanthropic expectations from them. Consequently, corporate social responsibility can also be considered as a social resource that should contribute to the development of social well-being through the respect of conditions that ensure decent work, sustainable development and environmental protection (at local, regional and global level), through the contribution to government efficiency, as well as through deepening of partnership and dialogue between subjects engaged in the achievement of general social and economic goals. On the other hand, the integration of legal, ethical and ecological principles into a corporate strategy can be a significant source of competitive advantage, so the modern concept of corporate social responsibility implies that companies voluntarily integrate social and environmental problems into their business activities and interactions with stakeholders (Branco Castelo & Rodrigues Lima, 2007).

Each company independently decides on the way in which it will implement socially responsible business activities. The possible difference occurs due to the effects of certain factors such as the size of companies, the characteristics of the industry within which they operate, the organizational culture of companies, the demands of stakeholders, and so on (Barnett, 2007). Some companies focus on specific areas that are most important to them or areas where they have the greatest impact - for example, human rights or the environment - while others try to integrate corporate social responsibility in all aspects of their business (Campbell, 2007). For the successful implementation of the concept, it is crucial that corporate social responsibility principles are implemented in corporate values and strategic planning, and that both managers and employees be dedicated to them (Tsoutsoura, 2004).

Kourula i Halme (2008) define three ways of applying socially responsible business activities, each pervades the elements of socially responsible behavior in relations with the social community. The first type of socially responsible business activities of many companies relates to philanthropy, charity actions and donations. Within the second approach, integration of socially responsible business into the entire business is carried out, whereby the companies try to combine responsibility with their basic business activities. As the most represented and at the same time the most important activities can be distinguished investing in research and development, providing high quality products, applying good practice and certain environmental protection measures. The third approach implies that corporate social responsibility is regarded as a source of business innovation, such as introducing new business services models or attempts to solve the problems of socially vulnerable groups.

The main demands of the social community from companies are mostly of economic character. The social community primarily expects economic development, as companies can contribute to the employment of a large number of people, improve health care of the population or activate some underdeveloped part of the community. An economic requirement relates to the payment of taxes, since the revenues collected in this was is extremely important for the financing the state administration at all levels. In recent decades, the more prominent demand of the social community has become ethical behavior of companies, due to the strengthening of the influence of powerful and big corporations on the state policy, thanks to lobbying, political donation of corporations or even corruption, leading to a weakening of the state's ability to protect the social, political and civil rights of the population (Crane&Matten, 2007, pp. 456-457).

Some authors believe that it is just through corporate social responsibility that institutionalizing and establishing a significant link between market participants, the government and the community (Zadek, 2007). The goal of a partnership that can exist between government, community and companies is not identical in all countries and depends not only on variations in social cohesion, but also on social participation, the situation in political system, historical factors, and the cultural context. (Nga, 2015).

### **Significance of corporate social responsibility for the social community development**

Corporate social responsibility primarily involves the socially responsible and ethical relationship of the company towards the community in which it earns profit, as well as towards all social actors in the community and in the company (Moir, 2001). Social responsible behavior of companies is reflected in their adoption and realization of discretionary business practice and investments that provide support to the community in order to improve its well-being and environmental protection. Kotler&Lee (2005) under the community include employees, suppliers, distributors, public sector partners, and the general public, while the term welfare can refer to health and safety, but also to psychological and emotional needs. In a community there is a sense of community expressed through a sense of co-operation, commitment to the well-being of the group, readiness for open communication and responsibility for itself and for members of the community.

Community development relates to the initiatives that the community undertakes with the partnership with external organizations or corporations in order to empower individuals or groups of people (Maimunah, 2009, p.203). These initiatives are usually involve the training of the groups with the skills necessary to undertake the community change. Skills that need to be mastered are often concentrated on using local resources or strengthening political power by forming large social groups working on common goals. It is very important to define precisely the work with individuals and the ways of possible influence on the position of the community (considered in the context of larger social institutions). The basis of community development are education, training and empowerment of its members.

Social community development can also be viewed as a combination of processes, programs, strategies and activities that ensure community sustainability. The process of social community development itself is essentially a process of overcoming unwanted and unacceptable disparities between conditions and infrastructure, which negatively affects the quality of life in a place where a group of people lives and works (Garriga&Mele, 2004). The development process works best in communities where all layers of society are linked in terms of social solidarity (Community Glossary, 2009).

The United Nations (1971) defines the development of the social community as an organized effort of individuals in the community to provide help in solving the problems it faces, with the minimal help of external organizations. This interpretation is also commonly used in practice, under which external organizations are understood to be governmental and non-governmental organizations, small and medium-sized enterprises, multinational corporation. Here the emphasis is on creativity and “self confidence” in the community when it comes to short-term and long-term goals, but the role of social responsibility of different types of companies is not defined (The United Nations, 1971). The process of developing active and sustainable communities, based on social justice and mutual respect, is also expressed. It is about the impact on structures of power to eliminate barriers that prevent people from participating in issues affecting their lives.

The engagement of local suppliers and the affinity for employment of local community members have proven to be a practice that is effective in creating a good reputation for the company. Large companies also contribute by supporting local entrepreneurial initiatives, that could be manifested through the establishment of mentoring programs for initiating business ventures for individuals or supporting certain entrepreneurial ventures of already existing small companies (Carroll&Shabana, 2010). Generally, companies can provide a contribution to the local community in which they operate in many different ways: opening new jobs for the population, securing payments and benefits for employees, paying taxes. On the other hand, companies larger depends on the health of the population, their expertise and education, the business environment stability, the state of environment in a particular local community where they operate.

Social responsibility of companies implicates on community and its development in many ways. In principle, the role of corporate social responsibility in community development is the direct and indirect benefits received by the community from the companies and their social commitment to the community and its social system. The common roles of corporate social responsibility and community development are reflecting in the following (Maimunah, 2009, pp.204-206):

- sharing the negative consequences that result from industrialization,

- creating closer and more coherent relations between the companies and the community, that becomes a social capital which is essential in community development,
- helping in talent detection among the employees and managers,
- the significant role in transfer of technology,
- helping in environment protection,
- achieving sustainable human rights protection,
- preserving interdependence and the close link between the community and the companies, which in long run creates sustainable development,
- applying the corporate social responsibility program as a help to alleviate poverty,
- achieving corporate sustainability goals.

The success of companies in the socially responsible business practices is determined by the factors of internal and external characters. Among the internal factors the most important are economic reasons, organizational culture, influence of business ethics, since the external factors include harmonization with legal requirements, technological influence, and national culture (Bichta, 2003).

Skills held by corporate social responsibility managers are among the internal factors that determine the success of social responsibility practices, in particular in helping the community. Since corporate social responsibility profession is a relatively new concept, skills and knowledge from other related specialization like human resources development, business ethics, community development, environmental management are of special value and importance (Career Service, 2009).

The specific skills that managers need to have in applying the concept of corporate social responsibility are difficult to distinguish, due to the different roles and range of disciplines involved. However, three groups of skills were identified: business skills, people skills, and technical skills (Maimunah, 2009, p.207). Business skills refer to ability to understand, communication skills, decision making and problem solving skills, leadership skills, information technologies, innovation skills. People skills include altruism, empathy, adaptability, integrity, political awareness. Technical skills primarily involve technical expertise, human rights, dialog with stakeholders, influence, sustainability.

Taking into account the mentioned groups of important skills, Maimunah (2009) emphasizes the six core competences that corporate social responsibility managers should need to possess: the ability to understand the community and its development, capacity building, business perception in the wider context, not only in terms of making profits, relationships with stakeholders, strategic approach to business and community partnership, and understanding of diversity. These managers have a wide range of work opportunities - in human resources, public relations, community resource development.

## **The role of social investment in community driven development**

The fact is that in contemporary business conditions the new paradigm of social responsible business activities is getting more and more important. Consequently, in addition to being expected by companies to behave socially responsibly in their business,



social investment programs that support community development come to expression. These programs are mainly realized in the communities where the indirect or negative influence of the company's business activities are reflected. Corporate social investments as a form of corporate social responsibility represent a comprehensive approach, or a corporate strategy focused on improving social, economic, and ecological well-being. It is especially important to differentiate the terms of corporate social responsibility and corporate social investment, since in practice they are sometimes identified. Corporate social investments actually represent the contribution of company (like employee volunteering, some kind of gift), where only those directly linked to core business activities realize benefits. On the other hand, corporate social responsibility is an initiative of company to take responsibility for environmental impact and social well-being (Naidoo, 2016).

The practice of corporate social investments has required to create certain rules or principles that will enable investors to be more effective and efficient in their investment activities. The principle for social responsible investments means a kind of international guidelines and statements that are relevant to the area of these investments. There have been a large number of rules created, presented and adopted at numerous conferences on social responsible issues, but the UN Principles for responsible investment, issued in 2006, has the greatest application (UN Principles, 2006). These principles were developed by an international group of institutional investors and were based on respecting the increasing relevance of environmental, social and corporate governance issues to investment practice. In the application of the principles it is strive to become the standard or norm of investment processes.

Several reasons have been identified for companies trying to invest resources for social, economic or environmental purposes (Campbell, 2007, pp. 950-952). Some companies are motivated by reputation, while in others primary motivational reasons are production, supply chain, marketing, distribution. Extractive companies, for instance, because of their great social impact on the community, have a strong incentive to invest in local community. Philanthropy, legal benefits, minimizing a negative impact and creating positive one, guaranteeing sustainable procurement bases, and creating new opportunities on the market can also represent an incentive for companies to invest. In many countries, every year is ranked a list that ranks socially responsible companies and, by itself, contributes to the positive promotion of the company in the community (David, Kline&Dai, 2005). Also, for many employees, the wages and other benefits that they can realize are not enough, but when identifying the job, they also take into account that the company's business has been harmonized with their social values. Therefore, many companies will opt for social investments for attracting and recruiting talented professionals. In his paper, Irwin (2003) concludes that companies investing in the social investment program benefit from being able to differentiate themselves into highly competitive markets where consumers are becoming increasingly "sensitive" to the social role of the company. Thanks to the Internet, consumers can explore in more details the socially responsible practice of their favorite brand.

In order for corporate social investments to be sustainable, it is necessary to be treated as a business initiative (Owen, 2007). If they are viewed from the standpoint of the company business motives, even the most innovative, well-accepted social investment face failure over time. The program of corporate social investments has much

greater chances for smooth functioning and survival if there is a correlation between this program and profitability and sustainability of the company (Pogutz, 2007). It is very important that there is a business plan with clear and measurable results.

As the most prominent potential outcomes of corporate social investments in community are the following:

- *Improving reputation and better branding:* Social community investment can allow access to new markets, reduce local regulatory barriers, provide opportunities for participation in local political processes, and enable the company to position itself in the market as more responsible and sustainable than its competitors.
- *Social community investments as a strategic activity:* Companies look at social community investments from a strategic perspective, which allows to create strategies that are aligned with business goals and to take advantage of core competencies.
- *Combining philanthropic and commercial-community activities and community development:* An increasing number of companies provide a wide range of business resources to support community development. Companies invest in order to increase local capacity and contribute to solving problems identified by the community. In some situations, companies cooperate with local NGOs.
- *Creating partnerships:* In order to meet a wide range of community needs it is necessary to create partnerships with non-profit organizations, government agencies, suppliers, other companies and their stakeholders.
- *Creating a global focus:* As generate more and more revenues and profits in realizing international activities, multinational companies redefine the “community”, looking for communities in the regions where they factories work or trying to conclude contracts with companies managed by key suppliers.
- *Measuring and reporting the benefits of corporate citizenship:* Social community investments has traditionally been treated as a goodwill and has not been given special attention. However, companies today monitor and report on the impact of their social community investment on the business success and community satisfaction (Owen, 2007).

Social community investment in developing are especially pronounced and gain significance when communities become development partners, rather than passive recipients of philanthropic activities of companies. Among the factors most affecting the partnership between community and private sector stand out the recognition of the impact of globalization, the increased private capital flows in the developing countries, as well as the appreciation of potential private sector contribution. Thereby the private sector contribution does not only include financial support but can be considerably broadened, so it can include technical and managerial expertise, skills exchange, access to new markets and establishment of new business links (Owen, 2007, p.1). Two possible types of development partnerships between the private sector and the communities are emerging: Social Investment model, which involves financing programs with the main goal of improving the general well-being of the community, and the Economic Linkages model, that closely connect development initiatives and the private sector and includes

training, direct employment, advancement of technical skills, microfinance, development of new supply bases and creation of links between the supply chains. The Economic Linkages model implies the integration of community engagement strategies in the key business activities of the companies and the development of consolidated markets in order to involve communities in the supply chain of companies. Consequently, this model enables the creation of sustainable and effective links between the community and the private sector (Owen, 2007, pp. 1-2).

As one of the models that enables the management of coherent and systematic partnerships between companies, government agencies, and local community organizations is the so-called tri-sector partnership model, based on agreement between companies, government and civil society (Warhurst, 2001, p. 59). The basic idea of the model is to determine the areas of concern by defining the partnership objectives as well as monitoring and reporting collaborative activities. Such a partnerships can be used as a mechanism for ensuring communication and participation in the decision-making process or as a form of financing social investment programs. In addition, the model helps to overcome the key challenges that industrial investment projects face, especially when it comes to:

- Social and political risk management
- Partner relationship management
- An effective assessment of the impact on the environment and the community
- Applying international standards and codes of good practice
- Consulting processes
- Integration of business strategies with regional and rural development plans and local education programs
- Building trust and cooperation
- Allocation of roles and responsibilities of partners and determining community expectations
- Orientation of social community investments to the local development priorities of the community
- Adequate managing foundations (Warhurst, 2001, pp 59).

Readiness to create effective partnerships means more credibility and trust in the relationship between the companies and the community. This is an important benefit for companies, increasing their chances for long-term community support.

## **Conclusion**

In a situation where the market competition leaves no space for further growth and development of the company only on the basis of price and quality, the responsible behavior of company towards its employees, customers, suppliers, the wider community and the environment gets on its significance. Due to the high pressure of international institutions, governments, non-government organizations and customers, there is an increasing pressure on companies to apply the concept of socially responsible business and contributions to the society and the community in which they operate. That is why corporate social responsibility in recent years is increasingly becoming a very important

factor in contemporary business world, that often requires companies to deal with the environment in which they operate, even to ensure resolving all problems that the community faces.

The organized public increasingly forces organizations to act more responsibly in relations with the local community and society as a whole, to behave more sustainably towards nature, and to more humane relationships with employees. The skills required by socially responsible managers vary depending on the different disciplines involved and in the face of accountable managers. The qualifications required by this field are not specified, but, having in mind that this is an area that is still developing, transferable skills and knowledge from related specialized areas such as environmental management, business ethics, human resources management or community development can be helpful.

On the other hand, the practice of socially responsible investing involves behavior and practices of the companies in relation to their social environment. It is possible to carry out a sort of advocacy by the owners to improve corporate social responsibility of their companies and investing in the community in order to support local development. The special type of social responsible investment is investing in the local community. Sometimes this is called alternative investments, because it reflects a different way of investing with a new vision. In our country, in current circumstances and environment, this way of responsible investing has been part of the practice of large enterprises, that have influenced the development of cities and regions. In the world, this type of investing has usually done by the provision of funds to local funds through which give loans to local businesses, cooperatives or companies that are oriented towards the community. This kind of alternative investors want to help in the creation of new jobs, providing basic services or positions of employees and consumers. This method of investing is an effective way for raise capital for local entrepreneurship development. A very important factor for this kind of investment funds in the community are volunteers and funding from public sources, which make it possible to establish funds and identify those who need to borrow funds in order to manage risk and raised capital.

Depending on the extent to which the company is deliberately engaged in socially responsible projects it manages, as well as the principles of their realization, there are certain methods of achieved results affirmation. For companies it is not enough to develop and implement socially responsible principles and initiatives, but it is also important to effectively promote them, with adequate internal and external communication.

## References

- Barnett, M. (2007). Stakeholder influence capacity and the variability of financial returns to corporate social responsibility. *Academy of Management Review*, 32(3), 794-816.
- Bichta, C. (2003). Corporate socially responsible industry (CSR) practices in the context of Greek. *Social Responsibility and Environmental Management*, 10, 12-24.

- Branco Castelo, M. & Rodrigues Lima, L. (2007). Positioning Stakeholder Theory within the Debate on Corporate Social Responsibility. *Electronic Journal of Business Ethics and Organization Studies*, 12(1), 5-15.
- Campbell, L. J. (2007). Why Would Corporation Behave in Socially Responsible Ways? An Institutional Theory of Corporate Social Responsibility. *Academy of Management Review*, 32 (3), 946-967.
- Career Service (2009). Corporate Social Responsibility and Ethical Careers. Available at: <http://www.careers.ed.ac.uk>
- Carroll, B.A.&Shabana, M.K. (2010). The Business Case for Corporate Social Responsibility: A Review of Concepts, Research and Practice. *International Journal of Management Reviews*, 12(1), 85-105.
- Community Glossary (2009), available at: [http://www.findmehere.com/search/dictionary/c\\_index.htm#com](http://www.findmehere.com/search/dictionary/c_index.htm#com),
- Crane A.&Matten D. (2007). *Business Ethics: Managing Corporate Citizenship and Sustainability in the Age of Globalization*. Oxford University Press
- David, P, Kline, S.&Dai, Y. (2005). Corporate Social Responsibility Practices, Corporate Identity, and Purchase Intention: A Dual-process Model, *Journal of Public Relation Research*, 17 (3), 291-313.
- Garriga, E.&Mele,D. (2004). Corporate Social Responsibility Theories: Mapping the Territory, 53, 51-71.
- Irwin, R. (2003). Corporate social investment and branding in the new South Africa. *Journal of Brand Management*, 10(4), 303-311.
- Kotler, P. & Lee, N. (2005). *Corporate Social Responsibility*. New Jersey: John Wiley & Sons, Inc.
- Kourula, A. & Halme M. (2008). Corporate Responsibility Type and Engagement with Nongovernmental Organizations: An Exploration of Business and Societal Outcomes. *Corporate Governance*, 8(4), 557-570.
- Maimunah, I. (2009). Corporate social responsibility and its role in community development: an international perspective. *The Journal of International Social Research*, 2(9), 199-209.
- Moir, L. (2001) What Do We Mean by Corporate Social Responsibility? *Corporate Governance*, 1 (2), pp. 16-22.
- Naidoo, N. (2016). How Corporate Social Investment Can Improve Your PR Game, preuzeto sa: <http://peakco.com/how-corporate-social-investment-can-improve-your-pr-game/> [22.8.2018.]
- Nga, J.L.H. (2015). Global Financial Crisis and Philanthropy: Malaysian Case. *Cosmopolitan Civil Societies Journal*, 7(2), 19-31.
- Owen, P. D. (2007) *Beyond Corporate Social Responsibility: The Scope for Corporate Investment in Community Driven Development*. World Bank Report No. 37379GLB
- Pogutz, S. (2007) Sustainable Development, Corporate Sustainability, and Corporate Social Responsibility: The Need for an Integrative Framework, *International*

- Conference of the Greening of Industry Network, Canada, Waterloo, Ontario: Wilfrid Laurier University, June: 15-17
- Post J, Lawrence A, Weber J. (2002). *Business and Society, Corporate Strategy, Public Policy, Ethics*. Boston: McGraw-Hill Irving
- Tsoutsoura, M. (2004). *Corporate Social Responsibility and Financial Performance*(UC Berkeley Working Paper Series), California, Berkeley: Institute for Research on Labor and Employment
- United Nations (1971). *Popular Participation in Development: Emerging Trends in Community Development*. New York: UN Department of Economic Affairs
- The UN Principles for responsible investment and the OECD guidelines for multinational enterprises: complementarities and distinctive contributions (2006), Working document prepared by the OECD Secretariat with the Secretariat of the UNEP Finance Initiative
- Zadek, S. (2007), *The Civil Corporation: The New Economy of Corporate Citizenship*. London: Earthscan Publications Ltd.
- Warhurst, A. (2001), *Corporate Citizenship and Corporate Social Investment. Drivers of Tri-Sector Partnerships*. *Journal of Corporate Citizenship*, 1, 57–73.



Lana Nastić<sup>1</sup>

Marko Jeločnik<sup>2</sup>

Jonel Subić<sup>3</sup>

Institute of Agricultural Economics, Belgrade, Serbia

ORIGINAL SCIENTIFIC ARTICLE

doi:10.5937/ekonomika1804069N

Received: November, 03, 2018

Accepted: December, 06, 2018

## CONTRIBUTION MARGIN IN SILAGE MAZE PRODUCTION<sup>4</sup>

### Abstract

*Silage maize as a fodder crop has been still produced in Republic of Serbia at insufficient surfaces, mostly at holdings focused to livestock production, providing on that way adequate volume of quality animal feed. In order to determine economic effects of production in paper is used analytical calculation based on variable costs, as well as method of critical values of production and sensitive analysis. Analysis covers three year period, involving comparison of gained results. Paper goal is to present the results achieved in mentioned production, as to evaluate the importance of yields height to gained contribution margin (positive contribution margin was determined within the complete period).*

**Key words:** silage maize production, contribution margin, variable costs, Serbia.

**JEL classification:** Q1, Q120

## МАРЖА ПОКРИЋА У ПРОИЗВОДЊИ СИЛАЗНОГ КУКУРУЗА

### Апстракт

*Кукуроз за силажу се зарад исхране стоке у Републици Србији још увек производи на недовољним површинама и то у већини случајева на газдинствима усмереним и на сточарску производњу, која на овај начин обезбеђују довољне количине квалитетне сточне хране. Да би се утврдили економски ефекти производње у раду је коришћена аналитичка калкулација на бази варијабилних трошкова, као и метод критичних вредности и метод сензитивне анализе. Анализа је вршена за временски период од три године, а накнадно је извршена и компарација остварених резултата. Циљ рада је да се прикажу резултати који се остварују у овој линији ратарске производње и утврди значај висине приноса*

<sup>1</sup> lana\_n@iep.bg.ac.rs

<sup>2</sup> marko\_j@iep.bg.ac.rs

<sup>3</sup> jonel\_s@iep.bg.ac.rs

<sup>4</sup> Acknowledgements - Paper is a part of research at the project no. III 46006 - Sustainable agriculture and rural development in terms of the Republic of Serbia strategic goals realization within the Danube region, financed by the Ministry of Education, Science and Technological Development of the Republic of Serbia.



на финансијски резултат производње (позитивна маржа покрића је остварена током читавог посматраног периода).

**Кључне речи:** производња силажног кукуруза, маржа покрића, варијабилни трошкови, Србија.

## Introduction

Maize has great economic importance as it is used for feeding cattle, in human nutrition and as input for production of large number of industrial products. It provides gaining of over 1,500 industrial products, primarily food products, pharmaceuticals, animal food products, cosmetic products, raw materials for further processing, etc. (Munćan, Živković, 2014).

The most of territory of Serbia has moderate continental climate (Sekulić et al., 2012), suitable for crop production. Unfortunately, in last decades national agriculture is facing with general deficit of rainfalls followed by high temperatures and much frequent and longer heat waves, that induce presence of high intensity droughts (Gulan, 2012). Besides, less than 3% of arable land is irrigated (RPKNS, 2017)

Traditionally, maize is the most grown crop in the Republic of Serbia. At national level, the largest areas under the maize are directed to grain production, while its production as silage maize is conducted at much smaller areas. So for animal feeding, grain is generally more used than silage. In 2017, under the grain maize there were 1,002,319 ha with total production of 4,018,370 tons and average yield of around 4.0 tons per hectare. On the other side, in same year silage maize was grown at 33,244 hectares (Table 1.).

*Table 1: Areas, total production and average yield per hectare of silage maize in the Republic of Serbia*

Year	Harvested areas (in ha)	Total production (in t)	Average yield (t/ha)
2008.	25,318	459,310	18.1
2009.	26,758	586,919	21.9
2010.	27,503	657,201	22.9
2011.	30,157	655,618	21.1
2012.	47,927	736,943	14.9
2013.	32,418	693,258	20.7
2014.	32,143	617,447	19.2
2015.	34,046	589,166	17.3
2016.	30,524	650,741	21.3
2017.	33,244	534,521	16.1

Source: SORS, 2018.

The average yield of silage maize in Serbia is generally at low level and during the period 2008-2017 it ranged from 14.9 to 22.9 t/ha. The lowest yield was achieved in 2012 that was characterized by extreme drought. Last decades, as the consequence of global warming, it came to certain changes in climate, where the hot issue become the lack and bad distribution of rainfalls during the vegetation period. Šimunić and associates (2007) were analysed the needs of several crops for water within the region, as well as the problems related to their irrigation. Among observed crops was silage maize too. Some conclusion goes in a way that silage corn shows the highest deficit for water during the July.

As state Živić and associates (2016) in Serbia in areas where maize is grown in average is missing up to 200 mm of rainfalls. Lack of water has unfavourable impact both to the development of plants and achieved yields. Possibility of appliance of agro-technical measure of irrigation in maize is also observed by Jeločnik (2017).

“In line to genetic potential and available agro ecological conditions of production, yield of silage maize ranges 12-25 tons of total dry matter per hectare within the phase of physiological maturity for silaging with the dry matter content of 35-42%” (Terzić et al., 2012).

During the selection of silage maize hybrids, it is necessary to know the quality parameters important for later gaining of maize silage, such are “the yield of dry matter from complete plant, the share of cobs in dry matter, content of fibres in acid and neutral detergent, as in vitro digestibility” (Radosavljević et al., 2005).

According to analysis of production costs in crop production in Vojvodina and their comparison in various years it was concluded that agrarian policy should enable stabile business conditions, as unstable economic conditions have negative impacts to primary agricultural production, as in such a this environment producers cannot make a proper business decisions (Bošnjak, Rodić, 2010).

Economic effects of production of various crops or production of one crop by different production intensity could be compared according to analytical calculation based on variable costs (Ivanović, Jeločnik, 2016; Jeločnik et al., 2013).

Production of silage maize in Serbia is mostly organized by those producers that are focused to livestock production. They usually use the silage of whole plant for cattle feeding. In addition to concentrated feed, silage maize represents significant feed in livestock production at ruminants. In this way, heads are approaching to more quality feed in order to achieve better production results. But, as states Orović (2017) advancements in the area of agricultural production that happened in last 10-20 years, are still insufficient for greater progress, so it should continue with activities on racial composition of domestic animals, conditions of their breeding and care, adequate nutrition, improvement in crop, fodder and fruit plants growing, etc.

## Methodology and data sources

Research was based on data gained from family agricultural holdings oriented to crop and livestock production, located in Mačva District. Whole production of silage maize (silage of complete plant) is used in animal nutrition at the holdings. Data are collected for three production years (period 2015-2017). Main research goal

is presentation of economic effects in silage maize production, as well as yields and variable costs impact on the height of contribution margin. Besides gained producers data, secondary data of national Statistical Office, scientific and professional literature focused on research theme was also used. Better analysis is provided by presentation of all results with tables, expressed in RSD and EUR per ha of production surfaces.

Calculation of contribution margin in production of certain crop culture considers the totally gained incomes by the production of certain culture subtracted for totally generated variable costs (Subić, Jeločnik, 2016). Generally, variable cost in crop production involves: seeds, fertilizers, pesticides, fuels and lubricants or external services of mechanization, engaged labour, etc. (Subić et al., 2010).

According to significant impact of yield and price oscillation of products and main inputs on gained financial results, there are justified requirements for analysis of production results in conditions of uncertainty. Most common method for that purpose is determination of critical production values (equalizing of contribution margin to zero): critical price, critical yield and critical variable costs. In same manner it will be used the method of sensitivity analysis, which follows the trend of change in contribution margin due to decrease in yield or sales price, or due to growth of variable costs of production (Nastić et al., 2014).

## Results with discussion

Calculation of silage maize production was made according to data collected from the production of maize hybrid AS 72, used for silage preparation from the whole plant. Mentioned hybrid is also used for the grain production, but in case it is used for the production of silage, larger volume of seed per unit of production area (for 10%) is sown. Research considers only one maize hybrid in order to eliminate the impact of different varieties on the amount of gained incomes and incurred costs. In next tables (Table 2., 3. and 4.) are presented calculations based on variable costs in silage maize production. Within the analysed period the highest incomes were generated in 2016., mostly initiated by the volume of achieved yields of 45.000 kg/ha.

Table 2: Calculation of silage maize production in 2015.

Element	Quantity	UM	Price (RSD)/ UM	Total RSD/ha	Total EUR/ ha
<b>A. Incomes</b>					
Silage maize	35.000,00	kg	5,00	175.000,00	1.449,52
Subsidies				12.000,00	99,40
<b>Value of production (total A)</b>				<b>187.000,00</b>	<b>1.548,91</b>
<b>B. Variable costs</b>					
Seed	2,50	kg	4.000,00	10.000,00	82,83
Mineral fertilizers				28.800,00	238,55
Pesticides				2.100,00	17,39
Costs of mechanization				31.600,00	261,74
Other costs				650,00	5,38
<b>Variable costs (total B)</b>				<b>73.150,00</b>	<b>605,90</b>
<b>C. Contribution margin (A-B)</b>				<b>113.850,00</b>	<b>943,01</b>

Besides the production value, in generation of total income the public subsidies for plant production provided by the Ministry of Agriculture has been also participated. This sum in mentioned period had decreasing trend, from 12.000 RSD/ha in 2015., to 4.000 RSD/ha in 2016., or 2.000 RSD/ha in 2017. (MPŠV, 2016).

Table 3: Calculation of silage maize production in 2016.

Element	Quantity	UM	Price (RSD)/ UM	Total RSD/ ha	Total EUR/ha
<b>A. Incomes</b>					
Silage maize	45000,00	kg	5,00	225.000,00	1.827,49
Subsidies				4.000,00	32,49
<b>Value of production (total A)</b>				<b>229.000,00</b>	<b>1.859,97</b>
<b>B. Variable costs</b>					
Seed	2,50	kg	4.150,00	10.375,00	84,27
Mineral fertilizers				29.400,00	238,79
Pesticides				3.100,00	25,18
Costs of mechanization				31.220,00	253,57
Other costs				720,00	5,85
<b>Variable costs (total B)</b>				<b>74.815,00</b>	<b>607,66</b>
<b>C. Contribution margin (A-B)</b>				<b>154.185,00</b>	<b>1.252,31</b>

Within the observed period, the highest contribution margin was gained in 2016., in amount of 154.185,00 RSD/ha, or 1.252,31 EUR/ha. In both other years, the value of contribution margin is at almost the same level, approximately around 950,00 EUR/ha. On the level of the contribution margin, or its change in observed period, the greatest impact had the achieved yield of grown crop, that was the highest in 2016. Such results are primarily caused by the weather conditions appeared in analysed period, as there were no significant changes in the applied agro-technical measures.

Table 4: Calculation of silage maize production in 2017.

Element	Quantity	UM	Price (RSD)/ UM	Total RSD/ ha	Total EUR/ ha
<b>A. Incomes</b>					
Silage maize	35.000,00	kg	5,00	175.000,00	1.442,23
Subsidies				2.000,00	16,48
<b>Value of production (total A)</b>				<b>177.000,00</b>	<b>1.458,71</b>
<b>B. Variable costs</b>					
Seed	2,50	kg	3.800,00	9.500,00	78,29
Mineral fertilizers				9.600,00	79,12
Pesticides				4.350,00	35,85
Costs of mechanization				38.100,00	313,99
Other costs				720,00	5,93
<b>Variable costs (total B)</b>				<b>62.270,00</b>	<b>513,19</b>
<b>C. Contribution margin (A-B)</b>				<b>114.730,00</b>	<b>945,52</b>

Within the structure of variable costs the highest share has mechanization costs. In all years their share is above 40%, and the highest is in 2017 (61,18% of total variable costs).

The costs of mineral fertilizers and pesticides are shown in Table 5.

Table 5: Costs of mineral fertilizers and pesticides

Element	Quantity	UM	Price (RSD)/UM	Total RSD/ha	Total EUR/ha
<b>2015.</b>					
<b>Mineral fertilizers (total)</b>				<b>28.800,00</b>	<b>238,55</b>
NPK (15:15:15)	300,00	kg	48,00	14.400,00	119,27
KAN	400,00	kg	36,00	14.400,00	119,27
<b>Pesticides (total)</b>				<b>2.100,00</b>	<b>17,39</b>
Motivel	1,00	l	2.100,00	2.100,00	17,39
<b>2016.</b>					
<b>Mineral fertilizers (total)</b>				<b>29.400,00</b>	<b>238,79</b>
NPK (15:15:15)	300,00	kg	50,00	15.000,00	121,83
KAN	400,00	kg	36,00	14.400,00	116,96
<b>Pesticides (total)</b>				<b>3.100,00</b>	<b>25,18</b>
Siran	2,0000	kg	850,00	1.700,00	13,81
Rezon	2,0000	l	700,00	1.400,00	11,37
<b>2017.</b>					
<b>Mineral fertilizers (total)</b>				<b>9.600,00</b>	<b>79,12</b>
KAN	300,00	kg	32,00	9.600,00	79,12
<b>Pesticides (total)</b>				<b>4.350,00</b>	<b>35,85</b>
Basar	1,50	kg	2.000,00	3.000,00	24,72
Rezon	1,50	l	900,00	1.350,00	11,13

Besides the cost of mechanization, significant share in total variable costs of silage maize production have the costs of mineral fertilizers, that ranges from 15,42% (in 2017., when only KAN was used) to 39,37% (in 2015.).

Besides height of yields, for animal nutrition its content is also important, as needs of domestic animals could be properly satisfied. Influence of fertilization to silage maize are observed by Manojlović and Marijanušić (2016). They conclude that during each vegetation according to fact that silage maize produce high volume of biomass rich with mineral elements, production requires increased quantity of various minerals (macro and micro elements) that are injected into the land by appliance of certain mineral fertilizers.

Costs of pesticides have not differ significantly, as in terms of used preparations, as in terms of their total value (from 17,39 to 35,85 EUR/ha).

Within the structure of the costs of machine operations (Table 6.), the most significant are silage preparation (from 37,65% to 47,24%) and transport (from 23,88 to 29,15%).

It is important to note that besides mentioned costs, it has been also added costs of transportation, preparation of silage (wading) and purchase of bacterial inoculants often used in practice. Costs of transport and wading are not indicated because their amount oscillates according to distance between the parcel and silo, type and capacity of aggregate used for transport, type of silo, quality of mass used for silage, etc.

Table 6: Costs of mechanization

Machine operation <sup>1</sup>	Year					
	2015.		2016.		2017.	
	RSD/ha	EUR/ha	RSD/ha	EUR/ha	RSD/ha	EUR/ha
Tillage	9.000,00	74,55	9.100,00	73,91	9.100,00	75,00
Transport of mineral fertilizers	1.400,00	11,60	750,00	6,09	1.500,00	12,36
Spreading of mineral fertilizers	1.350,00	11,18	1.400,00	11,37	1.450,00	11,95
Rototilling	2.400,00	19,88	2.530,00	20,55	2.550,00	21,02
Sowing	1.450,00	12,01	1.490,00	12,10	1.500,00	12,36
Pesticide spraying	2.400,00	19,88	2.470,00	20,06	2.500,00	20,60
Between row cultivation	1.700,00	14,08	1.480,00	12,02	1.500,00	12,36
Silage preparation	11.900,00	98,57	12.000,00	97,47	18.000,00	148,34
<b>Total</b>	<b>31.600,00</b>	<b>261,74</b>	<b>31.220,00</b>	<b>253,57</b>	<b>38.100,00</b>	<b>313,99</b>

Source: author's calculation according to ZSV, 2013.

Note: <sup>1</sup> As average price of diesel it is assumed the price of 135 RSD/l in 2015., or 140 RSD/l in 2016. and 2017.

Besides contribution margin, critical values of production are also calculated: critical price, critical yield and critical variable costs (Table 7.). Mentioned indicators are prepared for all analysed years. The lowest critical price and the highest critical variable costs are recorded in 2016., while the highest critical price and the lowest variable costs are recorded in 2017.

Table 7: Critical values in silage maize production

Description	RSD(kg)/ha	EUR(kg)/ha
<b>2015.</b>		
Expected yield (OP)	35.000,00	289,90
Expected price (OC)	5,00	0,04
Subsidy (p)	12.000,00	99,40
Variable costs (VT)	73.150,00	605,90
Critical price: $KC = (VT - p) / OP$	1,75	0,01
Critical yield: $KP = (VT - p) / OC$	12.230,00	101,30
Critical variable costs: $KVT = (OP \times OC) + p$	187.000,00	1.548,91
<b>2016.</b>		
Expected yield (OP)	45.000,00	365,50
Expected price (OC)	5,00	0,04
Subsidy (p)	4.000,00	32,49
Variable costs (VT)	74.815,00	607,66
Critical price: $KC = (VT - p) / OP$	1,57	0,01
Critical yield: $KP = (VT - p) / OC$	14.163,00	115,03
Critical variable costs: $KVT = (OP \times OC) + p$	229.000,00	1.859,97

<b>2017.</b>		
<b>Expected yield (OP)</b>	35.000,00	288,45
<b>Expected price (OC)</b>	5,00	0,04
<b>Subsidy (p)</b>	2.000,00	16,48
<b>Variable costs (VT)</b>	62.270,00	513,19
<b>Critical price: <math>KC = (VT - p) / OP</math></b>	1,72	0,01
<b>Critical yield: <math>KP = (VT - p) / OC</math></b>	12.054,00	99,34
<b>Critical variable costs: <math>KVT = (OP \times OC) + p</math></b>	177.000,00	1.458,71

Achieved yields, or produced quantity of silage maize has significant impact on the value of gained contribution margin. For this reason, it was prepared the sensitive analysis of contribution margin change due to fall in yield or price of final product (Table 8.).

*Table 8: Change of contribution margin in silage maize production according to fall of crop yield or price*

<b>Fall of yield or price of crop (%)</b>	<b>Change of contribution margin (RSD/ha)</b>	<b>Change of contribution margin (EUR/ha)</b>
<b>2015.</b>		
10,00	96.350,00	798,06
20,00	78.850,00	653,11
30,00	61.350,00	508,16
40,00	43.850,00	363,21
50,00	26.350,00	218,26
60,00	8.850,00	73,30
<b>2016.</b>		
10,00	131.685,00	1.069,57
20,00	109.185,00	886,82
30,00	86.685,00	704,07
40,00	64.185,00	521,32
50,00	41.685,00	338,57
60,00	19.185,00	155,82
<b>2017.</b>		
10,00	97.230,00	801,30
20,00	79.730,00	657,08
30,00	62.230,00	512,86
40,00	44.730,00	368,63
50,00	27.230,00	224,41
60,00	9.730,00	80,19

Although the height of the contribution margin over the years show pronounced variations, the sensitivity of the contribution margin to the fall of yield or price of product in all analysed years is relatively equalized, the margin equals to zero at yields or price reducing for 65,05 (in 2015.) to 68,52% (in 2016.).

## Conclusion

Areas and yields in silage maize production in the Republic of Serbia within the period 2008-2017. have been showed expressed oscillations, where the lowest yield was achieved in 2012. in conditions of extremely dry year. Analysing the production of silage maize in the Mačva Region for the period 2015-2017., there are achieved positive contribution margins. The best result was gained in 2016. (154,185.00 RSD) as the result of achievement of the highest yields in silage maize production (45 tons). In the structure of variable costs, the largest share has the costs of mechanization, whose share in all observed years were over 40%. By the method of sensitive analysis, it was determined that contribution margin is equalling to zero if yield or a price are decreasing for around 65%.

## References

- Bošnjak, D. & Rodić, V. (2010). Komparativna analiza troškova proizvodnje osnovnih ratarskih useva u Vojvodini. *Ekonomika poljoprivrede*, 57(2), 233-243.
- Gulan, B. (2012). Elementarna nepogoda ili nova stvarnost: Suša će prepоловити prinose. *Korak*, 12(73), 28-37.
- Ivanović, L. & Jeločnik, M. (2016). Uputstvo i model za izračunavanje marže pokrića na poljoprivrednim gazdinstvima. In Subić, J., Janković, S., Vasiljević, Z. & Lukić, M. (Eds.), *Unapređenje finansijskih znanja i evidencija na poljoprivrednim gazdinstvima u Republici Srbiji* (145-160), Beograd, Srbija: Institut za ekonomiku poljoprivrede.
- Jeločnik (2017). *Ekonomski instrumenti za upravljanje klimatskim rizicima u ratarskoj proizvodnji Republike Srbije*. Nепубликована doktorska disertacija, Novi Sad, Srbija: Poljoprivredni fakultet.
- Jeločnik, M., Bekić, B. & Subić, J. (2013). Marža pokrića u mobilnom pčelarenju na teritoriji grada Pančeva. *Ekonomika*, 59 (2), 73-82.
- Manojlović, M. & Marijanušić, K. (2016). Uticaj đubrenja na prinose i kvalitet krme lucerke i krmnog kukuruza. *Letopis naučnih radova*, 40 (1), 28-39.
- MPŠV (2016). Pravilnik o načinu ostvarivanja prava na osnovne podsticaje u biljnoj proizvodnji i obrascu zahteva za ostvarivanje tih podsticaja. *Službeni glasnik Republike Srbije*, br. 9/16.
- Munćan, P. & Živković, D. (2014). *Menadžment ratarske proizvodnje*. Beograd, Srbija: Poljoprivredni fakultet.
- Nastić, L., Jeločnik, M. & Subić, J. (2014). Analysis of calla lily and cucumber production in greenhouse. *Ekonomika*, 60 (4), 209-217.
- Orović, D. (2017). *Optimizacija poljoprivredne proizvodnje na porodičnim gazdinstvima u Topličkom okrugu*. Nепубликована doktorska disertacija, Beograd, Srbija: Poljoprivredni fakultet.
- Radosavljević, M., Jovanović, R. & Vančetočić, J. (2005). Kvalitet zrna i mogućnosti korišćenja ZP hibrida kukuruza. *PTEP* 9(1-2), 12-14.



- RPKNS (2017). Navodnjavamo jedva tri odsto njiva, Regionalna privredna komora Novi Sad (RPKNS), web portal RPKNS: <http://rpkns.com/navodnjavamo-jedva-tri-odsto-njiva/>
- Sekulić, G., Dimović, D., Kalmar Krnajska Jović, Z. & Todorović, N. (2012). Climate vulnerability assessment: Serbia, Belgrade, Serbia: Environmental improvement center: WWF for nature, web link: [http://awsassets.panda.org/downloads/cva\\_srbija\\_english.pdf](http://awsassets.panda.org/downloads/cva_srbija_english.pdf)
- Šimunić, I., Pandžić, K., Ivančan Picek, Branka, Bogunović, M. & Husnjak, S. (2007). Analiza manjka vode za razne biljne kulture. Agronomski glasnik, 69(3), 167-177.
- SORS (2018). Production indicators of silage maize, data base of the Statistical Office of the Republic of Serbia (SORS), Belgrade, Serbia.
- Subić, J., Ivanović, L. & Jeločnik, M. (2010). Uticaj podsticaja na pokrice varijabilnih troškova u proizvodnji ratarskih useva. Zbornik naučnih radova Instituta PKB Agroekonomik, 16(1-2), 251-264.
- Subić, J. & Jeločnik, M. (2016). Economic effects of new technologies application in vegetable production. In Subić, J., Tomić, D., Lovre, K. & Ševarlić, M. (Eds.), Emerging technologies and the development of agriculture (pp. 15-35). Belgrade, Serbia: SAAE.
- Terzić, D., Radosavljević, M., Milašinović Šeremešić, M, Pajić, Z. & Todorović, G. (2012). ZP Hibridi kukuruza kao sirovina za proizvodnju silaže. Selekcija i semenarstvo, 18(2), 61-69.
- Živić, M., Paunović, A., Madić, M., Knežević, D., Jelić, M. & Bokan, N. (2016). Analiza proizvodnje kukuruza na području smedereva u periodu 2013-2015. godine. *XXI Savetovanje o biotehnologiji*, vol. 21(23), (117-122), Čačak, Srbija: Agronomski fakultet.
- ZSV (2013). Cenovnik mašinskih usluga u poljoprivredi: 2013. Novi Sad, Srbija: Zadrudni savez Vojvodine.

**Predrag Vuković<sup>1</sup>**  
*Institute of Agricultural Economics,  
Belgrade*

SCIENTIFIC REVIEW ARTICLE  
doi:10.5937/ekonomika1804079V  
Received: September, 18, 2018  
Accepted: October, 18, 2018

## THE FORMATION AND PROMOTION OF RURAL TOURIST PRODUCT IN THE REPUBLIC OF SERBIA<sup>2</sup>

### Abstract

*Business on tourism market requires perception of the interests of supply and demand at micro and macro level. The tendency is to place the market products on the market that enable the achievement of the business goal and the satisfaction of both sides, supply and demand. Rural tourism with its specificities, requires a careful approach to tourist demand and its segments, i.e. niches. Consistent implementation of the marketing concept with adequate investments policy and market research, creation and placement of a tourist product is a guarantee of success on the market. Serbia has respectable resources for the development of rural tourism (natural and social). However, in practice, the problem arises in the insufficient recognition of local stakeholders in the ability to put these resources in an adequate manner in the function of tourism development, as well as local communities, more broadly. The aim of the paper work is to present a marketing approach in formation and promotion the rural tourism product, based on the resources the Republic of Serbia has.*

**Key words:** *tourism, destination, rural areas, segment, promotion, formation*

**JEL classification:** *M31, M37, Q13.*

## ФОРМИРАЊЕ И ПРОМОЦИЈА РУРАЛНОГ ТУРИСТИЧКОГ ПРОИЗВОДА У РЕПУБЛИЦИ СРБИЈИ

### Апстракт

*Пословање на туристичком тржишту захтева перцепцију интереса понуде и тражње на микро и на макро нивоу. Тежња је да се тржишту пласирају туристички производи који омогућавају остварење циља пословања и самисфакцију обе стране, понуде и тражње. Рурални туризам са својим специфичностима захтева пажљив приступ туристичкој тражњи и њеним сегментима, односно нишама. Доследна примена маркетинг концепта са адекватним улагањима у истраживање тржишта, креирање и пласман туристичког производа представља*

<sup>1</sup> predrag\_v@iep.bg.ac.rs

<sup>2</sup> Article as invited lecture was presented 10<sup>th</sup> May 2018, at the "Ninth Tourism Forum" which has been held between 9<sup>th</sup> to 12<sup>th</sup> May 2018, in Palić, Subotica, organized by the Tourist Organization of Serbia. Article is part of project III – 46006 „Sustainable agriculture and rural development in the function of accomplishing strategic objectives of the Republic of Serbia in the Danube region“, financed by the Ministry of Education, Science and Technological Development of the Republic of Serbia in the period 2011-2018.

*гарант успеха. Србија има респектабилне ресурсе за развој руралног туризма (природне и друштвене). Међутим, у пракси проблем настаје јер локални стејкхолдери нису у могућности да препознају могућности да се ти ресурси ставе на адекватан начин у функцију развоја туризма, као и локалних заједница, шире гелдано. Циљ рада је да представи маркетинг приступ у кеирању руралног туристичког производа, полазећи од ресурсних могућности које Република Србија има.*

**Кључне речи:** туризам, дестинација, рурална подручја, сегмент, промоција, формирање

## Introduction

Rural tourism has been developing with different intensity in the Republic of Serbia since the seventies of the twentieth century. Nowadays he has different intensity, forms and character in different parts of Serbia. They are determined by the natural-geographical characteristics of the area, the degree of development of the local economy, the anthropotics heritage and the awareness of the local population about its importance for development of the local communities. (Vuković, P., 2017, p.58.)

Starting from the fact that more than 80% of the territory of the Republic of Serbia cover of rural areas, according to the 2011 Census, and that 44% of the total population lives in these areas, the question arises is regarding valorisation of numerous resources (natural and social - anthropogenic) that Serbia possesses these areas. In order to realize this, it is necessary to create a large number of tourist products. Success will be guaranteed if there is a marketing and managerial approach. This can only be achieved through the education of all levels of management involved in the process of managing rural tourism products.

## Concept of rural tourist product

The issue of defining a tourism product is complex, because it can be a single service for a company (eg hotel accommodation), a set of “packaged” services (for example, a lump sum trip) or even a whole tourist destination. For this reason, there is a large number of definitions of a tourist product in the literature whose content difference is based on different approaches to defining this term. (Zečević, B. 2007, p.118).

Bakić, O. (2005, p.128) carries out the classification of all theoretical views expressed when defining a tourism product in four basic groups:

- 1) those who consider the tourist product as a “mixture” (amalgam) of various elements and its constituent parts.
- 2) the attitudes that the product observe from the aspect of individual offerers (hotel companies, utility companies, travel agencies, etc.).
- 3) those which observed the product as original compound and derivative elements of tourist attractions.
- 4) attitudes that consider a tourist product as partial and as an integrated product.

Bearing in mind the complexity of the problem McCarthy, J. (1978, pp. 237-240), introduces the concept of the so-called. a total product, which is much more than a physical

product, because it also implies its functional and esthetic characteristics. The complete product, in addition, does not necessarily include a physical or material product, as in the case of a service.

*Kotler at al.* (2006, p. 304) have a very wide approach in defining a tourist product. They emphasize that under the product can be considered all that can be offered to the market, in order to attract attention, encourage purchasing, use and consumption, so that the needs and desires can be met. Products include physical objects, services, places, organizations and ideas. This definition, according to them, is the planned part of the product that the company offers. A tourist product also means an unplanned part and includes all the benefits and “surprises” (pleasant and unpleasant) that tourists receive while staying in a particular destination.

A certain number of authors point out that the tourist destination is one, but also many products. (*Manente, M. and Mangeti, V.*, 2006, p.76; *Buhallis, D.*, 2000, p.97; *Seaton* 1996, pp. 350-351, etc.)

According to the *Law on Tourism (Official Gazette of the Republic of Serbia, No. 36/2009, 88/2010, 99/2011 - other Law, 93/2012 and 84/2015)*: “tourism product is a set of interdependent elements that are organized the practice as a special value chain, which consists of material products and services, natural values and cultural assets, tourist attractions, tourist suprastructure and tourist infrastructure.

Bearing in mind the definition of rural tourism provided by numerous international organizations that follow its development, character and dynamics such as:

- OECD document „*Tourism Strategies and Rural Development*“ (OECD 1994, p. 14 -16.);
- EuroGites, (European Federation of Rural Tourism 2005 at a conference in Yalta in Ukraine);
- UN FAO document „*The Scope of Organic Agriculture, Sustainable Forest Management and Ecoforestry in Protected Area Management*“ (UN FAO, 2004, pp. 16-17), as well as the fact that the rural area represents the basis on which rural tourism is based and on which its development is based, which is clearly emphasized in the *Encyclopaedia of Tourism* (2005), it can be concluded that the rural tourism product represents all the things that are defined according to the applicable “*Law on Tourism*” (*Official Gazette of the Republic of Serbia, No. 36/2009, 88/2010, 99/2011 - Law on the Law, 93/2012 and 84/2015*) in defining a tourist product with a clear indication that the characteristics are related for the rural area and its specificities.

The first document that explores the phenomenon of rural tourism in a comprehensive way was “*Tourism Strategies and Rural Development*”, (OECD, 1994). The author of this document *Lane B.* says that the basic characteristics of rural tourism are related to:

- 1) Located in rural areas;
- 2) Functionally rural – built upon the rural world’s special features;
- 3) Rural in scale;
- 4) Traditional in character, growing slowly and organically, and connected with local families;
- 5) Sustainable – in the sense that its development should help sustain the special rural character of an area, and in the sense that its development should be

sustainable in its use of resources. Rural tourism should be seen as a potential tool for conservation and sustainability, rather than as an urbanizing and development tool;

- 6) Of many different kinds, representing the complex pattern of rural environment, economy and history.

The same document emphasizes the factors one must consider when determining rural tourism (type of vacation, intensity of vacation use, location, management, style, degree of integration with the community), (OECD, 1994).

*Kotler at al.* (2006, p.399) define the value delivered to the customer as a consumer's assessment of the overall product capability to meet its needs. They also point out that the difference between the total value for the client and the total cost of the marketing offer is the earnings for the client or the value delivered to the client. The formation of a unified tourism product by consumers directly depends on the availability of all elements of the tourist offer.

The World Tourism Organization document “*A Practical Guide to Tourism Destination Management*” (UNWTO, 2007, p.1), presented the basic elements of tourist destination supply: attractions, private facilities and services, availability, human resources, image and character, price . These views were later accepted by other authors in literature (such as, V.T.C. Middleton, Fyall, A., Morgan, M., Ranchold A., 2009; Kotler, P., Bowen, J., Makens, J. 2006, etc.).

Concept is based on marketing view on tourism as synergic economic activity. Tourism include material and non material elements in tourist supply . i.e. tourist product include mix of product and services. Total tourist product include large scale of material and non-material usefulness which consumer/tourist/visitors buy.

Numerous autors (*Kotler at. al.* 2006, p.305., *Zečević, B.* 2007, p. 121; *Gonroos C.*, 1987, p.83. etc.) classify four level of tourist product:

- 1) The *basic product* are what tourists actually buys.
- 2) The *expected product* represents services or goods that must be present (they are implied) so that tourists can consume the basic product.
- 3) An *additional product* provides added value to the basic product and helps it to be different from the competitor. Often they are confronted with the expected and additional products. This stems from the fact that what the expected products represent to a single market segment can represent additional products (content) to another. For example, if a family holiday does not require catering in an accommodation, business travelers staying in it are expected.
- 4) The *expanded product* includes all the contents that come to meet tourists in order to raise the level of quality of the basic product, they are combined with them. They mean availability, atmosphere, customer interaction with the service organization, customer involvement and their interaction.

Following this logic it could be given a more detailed description of rural tourist product (table 1.)

**Table 1. – Four level of destination tourist product**

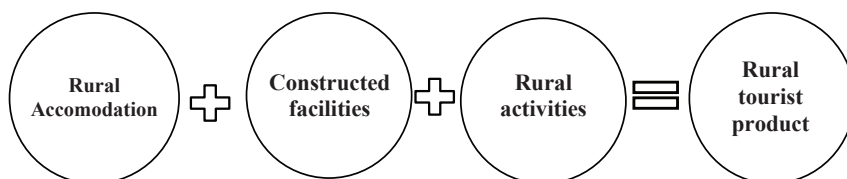
<b>Level of product</b>	<b>Example</b>
<i>The basic product</i>	- Attraction and recreation. - Hospitality services of accommodation and food
<i>The expected product</i>	- Ecological preservation of the rural area - Tidiness of the rural household - Suitable climate conditions in the destination - Availability of accommodation facilities - Traffic connections
<i>An additional product</i>	- Tourist info centers - Conditions for fun - Conditions for shopping / shopping - Animation of tourists, etc.
<i>The expanded product</i>	- Good traffic signalization - Silence and peace - Physical segregation of segments of tourists (eg young people from families with children, etc.)

*Source: Adopted according to Zečević, B. (2007), Marketing turističkih destinacija - uloga informacione tehnologije, p.121.*

### **Formation of the rural tourist product**

The “*Master Plan for the Sustainable Development of Rural Tourism*” (2011, p. 91) emphasizes that the rural tourism product is the concept of an integrated rural experience based on the interaction between rural accommodation, built facilities and rural activities (Figure 1.)

*Figure 1. Process of formatting rural tourist product*



*Source: The Master plan of sustainable development or rural tourism in Serbia, 2011, UNDP, p. 91.*

The Strategy for Rural Tourism Experiencing is suggested on the following way:

- development of an integrated and holistic experience of Serbian rural tourism, focusing on the development of rural activities and rural accommodation, with the simultaneous focus on the integration of these three components.
- support the development of an integrated strategy for the experience of rural tourism by identifying ways in which different elements (activities and accommodation) can be complemented.

- building centers for activities that will support the development, commercialization and achievement of rural activities at central points across the territory.
- involvement of local stakeholders in the development of the rural tourism experience. They should be involved in the development of rural activities, rural accommodation and local rural tourism facilities.
- investing a special and focused effort to reduce the differences in rural tourism seen in the qualitative analysis of the tourism sector (in the Diagnostic Report), through the development of products and activities involving local communities. This is especially important for the development of products and services that include agricultural products in the tourism sector.

#### a) Rural accommodation

In the Republic of Serbia unfortunately there is no unique base of rural tourist accommodation facilities. Today there are some initiatives which come from Tourist organization of Serbia and some branches tourist associations.

One of the biggest associations of rural tourism in Serbia is “The Rural Tourism of Serbia”. This national association established nine associations in 2002. Today the association is counting more than 500 members. In 2004, the association has set up a presentation [www.selo.co.yu](http://www.selo.co.yu) which is designed as a database of the total rural tourist accommodation deals. In 2005, it realized project “Promotion of rural tourism in Serbia,” which includes all municipalities and tourism organizations of municipalities and cities that have a rural tourist offer. During the years, the Internet site has recorded continuous rise in the number of visitors, and in 2006 over 200 rural households that are located in the database of the site received 90% of the guests particularly through the website. Thanks to the results of the Internet website, the National Association “Rural tourism of Serbia” is an active member and representative of Serbia in the “European Federation of Rural Tourism – EUROGITES” (Vuković, P. et al. 2016, p. 271.).

It is important to highlight that UNWTO (2007) set private and public facilities and services as a second important subject of tourist destination supply who attract visitors to come and stay in destination. It points out that there is a wide scale of various facilities and services that support to come and stay of tourists in the destination, which includes infrastructure (public services, public transport and roads) and direct services to visitors (accommodation, information for guests, relaxation facilities, guides, catering and sales facilities).

UNWTO and OECD publications (2012), as well as the Statistical Office of the Republic of Serbia (*Monthly Statistical Bulletin* 01/2018), group receptive capacities according to the appropriate methodology in a similar manner. It is common for receptive capacities to be classified into:

- basic receptive capacities, under which we mean facilities for tourist accommodation and facilities for food and drink (hospitality facilities),
- supplementary receptive capacities involving various types of facilities in which food, beverages, consumer goods shops, various types of services, food and recreation facilities for tourists, etc, are sold, etc.
- Complementary receptive capacities.

### b) Constructed (built) facilities

In rural areas, the built-in attractions include rural settlements, rural farms, planning and urban organization of facilities in a rural settlement, rural road network, shape, size and number of agricultural parcels, types and layouts of trees and other green areas (Ružić, P., 2009).

### c) Rural Activities

It is considered that the opportunity to deal with non-pension activities in rural areas is the key to gaining competitive advantage on the market nowadays.

Roberts L, and Hall D., (2003) summarized the views of Thibal S., (1988) and Lane B., (1994, p. 16), and made a list of off-board tourist activities that can take place in rural tourist destinations (Table 3).

Table 3. Non-pansion tourist activities in rural tourist destinations

No.	Type of activity	Activity specification
1.	<b>Touring</b>	<ul style="list-style-type: none"> <li>- Hiking (footpaths, fitness trails, nature parks),</li> <li>- Horse-riding,</li> <li>- Motorized touring,</li> <li>- Small town/village touring,</li> <li>- Advanture holidays/ village touring,</li> <li>- Cycling,</li> <li>- Cross-country skiing,</li> <li>- Donky riding,</li> <li>- Touring in gypsy caravans, wagons</li> </ul>
2.	<b>Water-related activities</b>	<ul style="list-style-type: none"> <li>- Fishing,</li> <li>- Swimming,</li> <li>- River/canal tourism (houseboats, narrow boats, barges),</li> <li>- Canoeing, kayaking and (whitewater) rafting</li> <li>- Windsurfing,</li> <li>- Speedboat racing,</li> <li>- Sailing,</li> <li>- Facilities of aqualand type</li> </ul>
3.	<b>Air related activities</b>	<ul style="list-style-type: none"> <li>- Light aircraft,</li> <li>- Hang-gliding and micro-light aircraft,</li> <li>- Hot air ballons,</li> <li>- Paragliding.</li> </ul>
4.	<b>Sport activities</b>	<ul style="list-style-type: none"> <li>a) Requiring natural settings: potholing, rock climbing, orienteering.</li> <li>b) Requiring modified/constructed settings: tennis, golf, hunting, low-intensity downhill skiing.</li> </ul>
5.	<b>Cultural activities</b>	<ul style="list-style-type: none"> <li>- Archaeology,</li> <li>- Restoration sites,</li> <li>- Rural heritage studies,</li> <li>- Museums,</li> <li>- Local industrial, agricultural or craft enterprises,</li> <li>- Courses in crafts,</li> <li>- Artistic expression workshops,</li> <li>- Folk groups,</li> <li>- Cultural, gastronomic and other routes.</li> </ul>



6.	<b>Health-related activities</b>	- Fitness training, - Spa and health resorts, - Assault courses.
7.	<b>Passive activities</b>	- Relaxation holidays in a rural milieu, - Nature study in outdoor settings, including birdwatching, photography. - Landscape appreciation.
8.	<b>Hallmark activities</b>	- Rural sporting festivals, - Agricultural shows
9.	<b>Rural business related activities</b>	- Small scale conventions/conferences; - Incentive tourism short-breaks,

Source: Roberts L, and Hall D., (2003): “Rural Tourism and Recreation: principles to practice”, Leisure and Tourism Management Department, The Scottish Agriculture College, Auchincruive, Ayr, UK, CABI Publishing, p. 2.

### Tourist product life cycle

The task of management is to manage products from the moment the idea arises, until the moment of making a decision on its “extinguishment”, a leave of absence. In order to monitor product development and, generally speaking, its “life”, a product life cycle is used as an important analytical tool in marketing, or a shortened PLC - “product life cycle”. The idea that went into the development of the concept is that nothing, and even the product is not eternal.

There is a great consensus of the author in marketing literature that the product is moving through four phases of the life cycle: introduction, growth, maturity and decline.

In order to better understand marketing goals and strategies throughout the product life cycle, we can best use the tables made by Jobber and Fahy (2006, p.160.).

Table 3. - Marketing goals and strategies throughout the product life cycle (PLC)

	<b>Introduction</b>	<b>Growth</b>	<b>Maturity</b>	<b>Decline</b>
<b>Strategic marketing</b>	Build up	Build up	Hold	Harvest / pulling out money
<b>Strategic focus</b>	Market spread	Penetration	Protect share	Productivity
<b>The brand goal</b>	Product awareness / test	Brand Preference	Loyalty to the brand	Brand exploitation
<b>Products</b>	Basic	Differentiated	Differentiated	Rationalized
<b>Promotion</b>	Creating awareness / provoking a test	Creating awareness / trial repeated purchases	Maintenance awareness / repeated purchase	Stop/ Eliminate
<b>Price</b>	High	Lower	Lowest	Growing
<b>Sale</b>	Weaker	Wider	Intensive	Selective

Source: Jobber D & Fahy J., (2006): „Fundations of Marketing“, McGraw-Hill Education (UK) Limited, p.160.

## Promotion of the rural tourist product of Serbia

A destination promotion strategy made up of a number of elements has the basic task of informing and encouraging tourist demand for staying in the destination (*Bakić, O.*, 2005, p. 132-133.)

A promotional mix could be defined as a mix of propaganda, sales promotion, public relations, personal sales, and publicity. Optimal combination of these elements should also give optimal results. This is why this issue is of strategic importance for the destination, and it is mainly visited by the Tourist Organization of Serbia (TOS) in Serbia.

*Mil C.*, (1990) state that a phase in the process of forming a promotional mix are following:

- a) Determining priority markets and segments.
- b) Precise the targets of the promotional mix depending on the market.
- c) Developing an appropriate offer
- d) Selection of promotional mix instruments
- e) Providing financial resources for promotional activities.
- f) Control of the implementation and correction of promotional activities.

Some of the funds available for promotion are:

1. Graphic resources: “tourist informer”, tourist map, general prospectus of the city, pocket format informers, luxury publications with detailed information about the city offer for specific occasions (congresses, fairs ... etc.).
2. Audio-visual means: spots, tourist films, video tapes, CD-ROM of appropriate content, video-text that allows two-way communication, “holograph” as a combination of Smart building and a total combination of everyday activities that tourists have at the destination of the so- “virtual reality”.
3. Website of the city - some of the web sites where the destination can be promoting.
4. Tourist information centers intended for visitors who are in the Republic or outside the country. An important role here is the choice of location where the center opens but primarily targeted market segments, or target consumer groups.

## Conclusion

Serbia has respectable resources for development of rural tourism. The attitude is based on the rich natural and social (anthropogenic) resources which are located in the rural areas. Creativity in making rural tourism products should enrich the tourist supply of Serbia. All comparative advantages that certain destinations have (natural and social - anthropogenous) should be used in the formation rural tourist product. In this way, the assumption of their future competitiveness is created.

One of the basic characteristics of the tourist offer is its fixedness, while on the other side demand has an elastic character. For this reason, when forming a product, it should be ensured that the supply is such that it can easily be adapted to any eventual changes in the tourist market. In this way, the lifetime of a tourist product is prolonged.

Rural tourism is in the initial level of development in Serbia. In order to allow for its systematic development to achieve the best results, set its balanced development, to stop numerous negative processes that burden the living of population in rural areas (unemployment, accelerated aging of the rural population, migration of the population into large urban cities, decline in macroeconomic indicators, etc.) it is very important that all stakeholders must be educate on the way they can form rural tourist products. The expectations are that rural tourism will enable the “development wheel” of rural areas to be launched. In the organization of educational activities, local authorities, regional chambers of commerce, the Tourist Organization of Serbia, local associations and associations of farmers, advisory services, etc. should play an important role.

Bearing in mind the synergistic character of tourism (as a business, tourism links a large number of economic and non-economic activities) and its positive multiplier effects on the area (destination) in which it is developing, it is important at the very beginning of its development to start it in a systemic way. This practically means that all innovations in the knowledge of the countries that have achieved the best results in rural tourism development should be used (such as Austria, Italy, Switzerland, Germany, France, etc.), as well as from the fields of marketing and management in the development of rural tourist destinations. Also, the promotion of a tourist product may be one of the crucial activities to attract demand. Considering the spatial distance of rural areas from urban city centers, it is necessary to use all available promotional mix instruments. The advancement of information and communication technologies is certainly in favor of promotional activities. It allows to overcome “GAP” in the spatial distance of rural from urban city centers. In addition to strengthening the promotion activities in addition to the Tourist Organization of Serbia, which according to the Law of tourism is obliged to perform promotional activities, other factors should be included in the promotional activities. This applies to the public and private sectors – its stakeholders.

If this approach were to be adopted, the basis for the successful development of rural tourism would be created.

## References

- “*A Practical Guide to Tourism Destination Management*”, UNWTO, 2007, Madrid.
- Bakić O., (2005): „*Marketing menadžment turističke destinacije*“, Čigoja štampa, Beograd.
- Boyd W. H. & Walker Jr. (1990): “*Marketing Management, a Strategic Approach*”, Irwin, Homewood, Ill.
- Buhallis, D., (2000): „*Marketing the competitive destination of the future*“, Tourism Management 21, (2000), pp. 97-116.
- Enciclopedia of Tourism (2005), published by Routledge, 2 Park Square, Milton Park, Abingdon, Oxon, OX.
- Gonroos C., (1987): “*Developing the Service Offering – A Source of Competitive Advantage*”, in Add Value to Your Service, AMA – American Marketing Association, Chicago,

- Jobber D., & Fahy J., (2006): „Foundations of Marketing“, McGraw-Hill Education (UK) Limited
- Kotler, P., Bowen, J., Makens, J. (2006): „Marketing u ugostiteljstvu, hotelijerstvu i turizmu“, Mate, Zagreb
- Lane B., (1994): “What is Rural Tourism”, *Journal of Sustainable Tourism*, No. 1-2., Vol. 2., pp. 7-21.
- McCarty J., (1978): „*Basic Marketing: A Managerial Approach*“, Richard D. Irwin Inc., Homewood, p. 237-240.
- Manente, M. and Mangeti, V., (2006): „*Organizations and Participants in Destination Management*“, *Tourism Futures, Tourism Business Frontiers: Consumers, Products and Industry*, Buhalis, D., Costa, C., ed., Butterworth-Heinemann, Oxford, p.76.
- Middleton, V.T.C., Fyall, A., Morgan, M., Ranchold A. (2009), *Marketing in Travel and Tourism*, Butterworth-Heinemann, Oxford, 2009;
- Mil C., (1990), *Tourism – The International Business*, Prentice Hall international Inc., Englewood, Cliffs, New Jersey.
- Monthly Statistical Bulletin* 01/2018, Statistical Office of the Republic of Serbia, link: <http://arhiva.stat.gov.rs/WebSite/repository/documents/00/02/81/30/MSB-01-2018.pdf> (accessed 01.09.2018)
- OECD (1994): “Tourism Strategies and Rural Development”, Appendix A., p. 47-50, OCDE/GD (94) 49, web link: <http://www.oecd.org/dataoecd/31/27/2755218.pdf> (accessed: 26.08. 2018).
- OECD (2012): „*Tourism Trends and Policies 2012*“, p. 94, web. site: [http://www.keepeek.com/Digital-Asset-Management/oecd/industry-and-services/oecd-tourism-trends-and-policies-2012\\_tour-2012-en](http://www.keepeek.com/Digital-Asset-Management/oecd/industry-and-services/oecd-tourism-trends-and-policies-2012_tour-2012-en) (accessed: 21.08.2018.)
- Republički zavod za statistiku, *Mesečni statistički bilten*, 01/2018.
- Roberts L, and Hall D., (2003): “*Rural Tourism and Recreation: principles to practice*“, Leisure and Tourism Management Department, The Scottish Agriculture College, Auchincruive, Ayr, UK, CABI Publishing.
- Ružić, P., (2009.): „*Ruralni turizam*“, Institut za poljoprivredu i turizam, Poreč.
- Seaton, A. V. (1996): “*Destination Marketing*”, p. 350-356, in A. V. Seaton and M. M. Bennett, *The Marketing of Tourism Products: Concepts, Issues and Cases*, International Thompson Bussines Press, London.
- Scialabba, N. E., and Williamson, D., (2004): „*The Scope of Organic Agriculture, Sustainable Forest Management and Ecoforestry in Protected Area Management*“, working paper No. 18, p. 16-17, UNFAO - Food and Agriculture Organization of the United Nations, Rome, 2004. web site: <ftp://ftp.fao.org/docrep/fao/007/y5558e/y5558e00.pdf> (accessed: 26.08. 2018)
- Seaton, A. V. (1996), *Destination Marketing*, pp. 350-376, in A.V. Seaton and M. M. Bennett, *The Marketing of Tourism Products: Concepts, Issues and Cases*, International Thomson Bussines Press, London.

- The Master plan of sustainable development or rural tourism in Serbia, 2011, UNDP, MDGIF.
- Thibal S., (1988): “*Rural Tourism in Europe*”, Council of Europe, Strasburg.
- „Tourism Strategies and Rural Development”, OECD, 1994, web. site: <http://www.oecd.org/dataoecd/31/27/2755218.pdf> (на дан 25.08. 2018 год.)
- Vuković, P.,(2017): „Character and dynamics of development rural tourism in the Republic of Serbia“, journal: *Ekonomika*, No. 4. Vol. 63, pp. 53 – 60.
- Vuković, P., Popović, V. and Arsić. S. (2016): „*State and Condition for implementing ICT in Roural Touirsm in the Republic of Serbia*“, Thematic Proceedings: „*Emerging Technologies and the development of agriculture*“, EAAE (European Association of Agricultural Economist) seminar, August 30th – September 1st, 2016 Novi Sad Serbia, Published by Serbian Association of Agricultural Economist, Faculty of Economics, Subotica, Institute of Agricultural Economics, Belgrade, pp. 257-275.
- Zakonu o turizmu* (Sl. Gl. R. Srbije, br. 36/2009, 88/2010, 99/2011 - dr. zakon, 93/2012 i 84/2015 )
- Zečević. B., (2007): *Marketing turističkih destinacija – uloga informacione tehnologije*, Jugo knjiga komerc, Biograf, Zemun, Beograd.

**Zaklina Spalevic<sup>1</sup>**

*Sinergija University, Faculty of Tourism  
and Hospitality, Bjeljina, BiH*

**Milos Ilic<sup>2</sup>**

*University of Pristina,  
Faculty of Technical Science Kosovska Mitrovica*

**Vladimir Savija<sup>3</sup>**

*Public institution Gymnasium Filip Višnjić, Bijeljina*

SCIENTIFIC REVIEW ARTICLE

doi:10.5937/ekonomika1804091S

Received: October, 29, 2018

Accepted: November, 25, 2018

## THE USE OF DRONES IN AGRICULTURE - ICT POLICY, LEGAL AND ECONOMICAL ASPECTS

### Abstract

*The rapid development of information and communication technologies from the standpoint of hardware and software resources has led to their increasing application in various areas of everyday life and work. One of the novelties of the hardware industry are the drones. The set of services that drones offer have enabled their use in many areas. One of the currently popular areas for usage of drones is agriculture. Agricultural fields in which a drone can be used depends largely on its equipment, primarily set of sensors and/or high resolution cameras. This paper gives an overview of use cases in agriculture where drones are suitable for use. Furthermore, advantages and limitations of using such aircraft are given. From different economical and legal aspects the use of drones is described. The use of drones in agriculture can greatly contribute to the development of precise farming, reducing production costs and the production of healthier food.*

**Key words:** Drones, agriculture, DJI Phantom, legal issues, economical benefits

**JEL classification:** O32, O33, Q16

## ИНФОРМАТИЧКА, ПРАВНА И ЕКОНОМСКА КАРАКТЕРИЗАЦИЈА УПОТРЕБЕ ДРОНОВА У ПОЉОПРИВРЕДИ

### Апстракт

*Убрзан развој информационо комуникационих технологија са становишта хардверских и софтверских ресурса довео је до њихове све веће примене у различитим областима свакодневног живота и рада људи. Један од новитета хардверске индустрије свакако су и мале беспилотне летилице*

<sup>1</sup> zspalevic@sinergija.edu.ba

<sup>2</sup> milos.ilic@pr.ac.rs

<sup>3</sup> ss54@skolers.org

*популарно назване дрoнови. Скуп сервиса које дрoнови нуде омогућио је њихову употребу у многим областима. Једна од актуелних области примене дрoнова је пољoпривреда. Делатности у којима дрoнови могу бити заступљени у области пољoпривреде зависе у многоме и од опремељености самог дрoна различитим сетом сензора и/или камерама високе резолуције. У раду је дат преглед примене дрoнова у пољoпривреди са становишта области погодних за њихову употребу. Такође су обрађене предности и ограничења употребе оваквих летилица. Предности и недостаци су описани са различитих економских и правних аспеката. Њихова употреба у многоме може допринети развоју прецизне пољoпривреде, смањењу трошкова производње и производњи здравије хране.*

**Кључне речи:** *Дрoнови, пољoпривреда, ДЈИ Пхантом, правни аспекти, економске предности*

## Introduction

The agricultural development strategy in order to produce quality agricultural products in recent years is developing in the direction of the so-called controlled production and precise agriculture. There are different definitions of precision agriculture. The global concept on which precision agriculture is based is the use of information and communication technologies for the collection and processing of data obtained from various sources. The obtained data are used for the purpose of making a better approach to the cultivation of cultivated plants (Srinivasan, 2006). Under this domain, we can categorized systems for collecting data from the field, field mapping, decision making as well as automation of certain agricultural production processes (Robertson at.el. 2007). A certain number of research shows that automation of agricultural production is still at an early stage, mainly due to the difficult conditions in which automated machines operate: inaccessible and uneven terrain, different types of soil, as well as changes in weather conditions (variation of temperature, precipitation, humidity, dust, etc.).

The key techniques on which precision agriculture is based are remote sensing techniques. One of the most used techniques in novel time is to capture production areas from the air (Barrientos at.e., 2011). Remote control platforms used to collect the necessary information on the basis of a series of land-based photos can include: satellites, balloons, planes, and small drones. The use of satellites and planes is expensive and time-consuming, so the recording process can not be repeated frequently. Drones on the other hand offer simpler working mechanisms, good fitting sensors (optical, infrared, sensors for radio detection and ranking, ...) and different types of cameras (RGB, NIR, RE, MultiSpec, ThermoMap), the possibility of frequent repetition of the flight above the production area, and all that at a significantly lower price (Zhang & Kovacs, 2012). Drones are small in size, easy to transport and assemble, they provide instant response to the project requirements as well as quick engagement on the ground. Some of the applications applied in agriculture, based on the processing of images obtained using drones, include: application for monitoring and mapping the condition of the soil, classification of plants on production areas, monitoring the occurrence of diseases and

pests, stress detection in plants caused by excess water, detection of water deficiency in soil, analysis of plant leaflets on pesticide content, assessment of the state of biomass of plants, as well as monitoring of the number of weed plants on production areas (Lan et.al, 2009).

The aim of this study is to analyze the current state of drone use in agriculture, as well as the types of drones that are commonly in use. Such as the use of large aircraft, the use of drones is governed by the rules laid down by the Directorate of Civil Aviation, both in Serbia and abroad. The paper provides legal frameworks for the use of drones on the territory of Republic Serbia as well as their comparison with the legal regulations abroad. Apart from legal aspects, the use of drones was also analyzed from an economic point of view.

### **Types of drones in commercial use**

The scope of drones application in precision agriculture covers different areas and purposes. Selecting a specific drone, and the equipment will largely depend on the drone's purpose. Drones that can currently be purchased on the market and therefore used in the field of precise agriculture can be divided into two categories: fixed-wing drones and so-called quadcopters (or multi-rotor drones) (Nixon, 2018). Both categories contain a larger number of models from different manufacturers.

The category of drones with fixed wings is based on three models: Sensefly eBee, PrecisionHawk Lancaster and Trimble. Sensefly eBee is an economical and convenient system for extremely low-dimensional photogrammetry. It stands out with easy handling and launch by hand with a steep take-off and the possibility of lowering in small spaces. In the standard version these drones are equipped with an infrared camera, but can be subsequently equipped with plug-ins that as a result create a 3D thermal map of the space (Nixon, 2018). Also, using eMonition software, they can connect to computers and tablet devices in order to simulate the flight and determine the flight path before before takeoff drone. In addition to the simulation, this software also allows the subsequent change of the originally set path of the drone while it is in the air. It is also compatible with the Google Earth service. The maximum coverage range for a single flight duration varies from 2.2 km<sup>2</sup> to 40 km<sup>2</sup> depending on flight height and weight of equipment. The proven maximum flight time in practice is 59 minutes. Resolution on the ground is up to 1cm per pixel (Livona, 2017).

The second model in category with fixed wings is PrecisionHawk Lancaster. This drone is completely autonomous and easy to use. Like the previous model, it also launches out from hand. After lasing he starts to collect data from a predetermined flight path. After the flight tour, the drone starts mechanism for automatic landing (Precision Hawk, 2014). It is equipped with a large number of sensors that can be changed in the field without additional configuration of the aircraft itself. Due to a weight of 2.4 kg without additional equipment, which is 1.3 kg more than the weight of the previous model, the maximum flight time of this model is about 45 minutes. The maximum average coverage for one flight is about 300 hectares at a height of 100 meters. The maximum speed of this model is 79 km/h.

Trimble Dron is the third model in the category of drons with fixed wings. This drone is more powerful and faster than other models, which allows it to capture a larger



surface in the same time period (Trimble, 2017). For example, the maximum flight duration of the UX5 Trimble model is about 50 minutes, at a speed of 80 km/h. The body of the aircraft is made of graphite fibers, which gives it high resistance and stability, and a reliable flight at high wind speeds (up to 18 m/s) or even stronger rain, when other systems have to be grounded. It has its own software package for tracking and recording terrain as well as the subsequent processing of high quality photos in the RGB and NIR variants. All three models, in addition to connecting to base stations, can also be connected with smart devices within agricultural machines in order to get these machines from the latest data from the field.

The category of quadcopter drones includes a large number of different models. For application in agriculture, three groups of quadcopter models can be distinguished: AGCO Solo, senseFly eXom and DJI multi-rotors drones (Nixon, 2018). Each group contains a large number of different performance models. Each model, as its name suggests itself, is equipped with four engines each of which is powered by one propeller. This mobility solution ensures high accuracy of movement, reduces the required surface for take-off and landing, but at the same time consumes more energy. Also, these models have an option that allows the device to return to the base station. The specific purpose of this functionality consists in the fact that the airplane independently takes care of the required amount of energy to return to the base station, which reduces the possibility of falling aircraft due to power failure (Solo, 2017).

The first of the AGCO Solo models has the ability to be remotely control from the ground as well as the autonomous flight according to the predetermined route. The flight duration of this model with the basic set of cameras is about 20 minutes, while the maximum speed is about 88 km/h. It is equipped with two specialized cameras for mapping the earth's surface. First camera is the GoPro Hero 4 for the RGB spectrum, and the second is NIR GoPro camera for the infrared spectrum. It is suitable for creating orthomosaics as well as creating the NDVI (*Normal Difference Vegetation Index*) map of the state of the plants. The SenseFly's eXom model was created for field inspection and mapping in close proximity. It offers recording of various recordings including HD images, ultra HD images, and thermal images of the surface. All three cameras are located in one moving head. The entire recording head can rotate to 270°, while each camera can be rotated independently in the head in the range of 50° to 100°. In addition to the camera equipment, it is equipped with a set of motion sensing sensors as well as a set of ultrasonic sensors, which enables the operator great precision when managing the aircraft (Inside Unmanned System, 2017). This type of aircraft equipment offers the ability to shoot from proximity to achieve a resolution of less than one millimeter. Weight of the model with complete equipment is 1.8 kg. The maximum flight length is up to 22 minutes, while the maximum speed is 25.2 km/h. The aircraft can withstand wind blows up to 8 m/s.

The DJI multi-rotor group of drones contains a larger number of models. The characteristics of these models when it comes to their application in agriculture vary from drones for beginners to professional drones. For example, one of the newer models called DJI Phantom 4 Pro is equipped with a one-inch 20MP sensor that delivers a dynamic range of approximately 12 blends. Video is 4K, but with H.265 codec, the whole process is faster and easier: 4096 x 2160 with 30 fps and 3840 x 2160 with 30 fps, at 100Mbps. Of particular relevance is the new mechanical shutter, which eliminates the deformation

of the image when shooting moving targets (so-called rolling shutter effect) (DJI, 2017). As far as the lens is concerned, its focal length is 24 mm, with a viewing angle of 84° - while the aperture value is  $f/2.8-11$ . The aircraft is equipped with three sets of visual systems that are tasked to, in a three-dimensional space, map and guide the ramps to obstacles in front, behind and below the aircraft to avoid collisions (to detect objects that are located distant up to 30 m from the drone). In addition to these three sets of systems, on both sides of the Phantom 4 Pro there are infrared obstacle detection systems that can spot foreign bodies at a distance of 0.2 to 7 m from the drone. In addition to the standard return functionality to the base station, this model also includes the so-called Landing Protection option which ensures that when landing the aircraft does not land on uneven terrain or in water. This model can reach a maximum speed of 72 km/h in the so-called Sport mode, the uphill speed is 6 m/s and a lowering speed of 4 m/s. The maximum flight length is 30 minutes (Pefoto, 2016). The remote control, unlike any other model that requires the use of one of the smart devices (phone, tablet) equipped with its own screen, which additionally features built-in GPS, compass, HDMI port and microSD card slot. The remote can communicate with the aircraft up to a distance of 7 km.

The both categories of drones (with fixed wings and quadcopters) are successfully applied in different areas of agriculture depending on the specific needs of users. The method of using drones for the purpose of collecting and processing data from the field can be divided into five phases (Parrot, 2017). In the first stage, it is necessary to select the appropriate cameras and sensors to which the drone will be equipped in order to collect the necessary data, in accordance with the possibilities of the drone itself. After preparing and checking the drone functionality, it is necessary to carry out the flight and collect the necessary data. On the basis of the collected parameters, initial terrain maps, orthomosaic, or NDVI maps of planted crops can be created. The second phase is based on analysis of images and data obtained after the completed flight. Basic processing and data overview in most cases can be done with the built-in software on the remote control of the aircraft. More detailed information is obtained by processing the received images to some of the specialized software on a separate computer. Different methods are used to process the data thus obtained, in addition to processing images from the same extracts meta data. In order to check the accuracy of data in the third phase on the field, control points can be selected to compare the actual state of the production area with the state obtained by processing the collected data (Parrot, 2017). In the fourth phase, an assessment of the state of the recorded area or its individual parts is made. For example, in this phase, an assessment of the damage done to crops under the influence of various diseases and pests, as well as climatic factors, is carried out. At this stage, an assessment of additional irrigation or assessment of the occurrence of adverse effects of the presence of too much water on the surface it also can be made, which causes the need for drainage. On the basis of all implemented assessments in the fifth phase, a plan of future activities which should be applied over the observed production area (saving of production area or some specific parts, installation of drainage systems, activation of irrigation systems, protection against diseases and pests, ...) can be implemented. Such a plan of activities can be activated if we work with automated machines that will transfer geo-data to a set of instructions for the given machine. In this way precise processing of the concrete surface can be done. For example, it can be determined in advance which part of the area will receive as much nutrients, more or less water, as well as chemical treatment for protection against diseases and pests.

By comparing the models from both categories, it can be seen that fixed-wing drones can achieve longer flight time and can cover a larger surface over a period of one flight. At the same time, unlike the quadcopter, they can pick up a smaller load that limits them in terms of camcorder equipping. When it is necessary to create more precise photographs, to do a more detailed inspection of the terrain and when is necessary to take-off and landing on a small surface, quadcopters are definitely a better choice.

### The use of drones in agriculture

During many researches, it is confirmed that drones have been widely used in agriculture. One of the basic purposes of the drones is to monitor the current health condition of crops on production areas. In order to solve this task, the drones should be equipped with cameras for recording different wavelengths of the solar spectrum. In this way, by processing recorded photographs, the state of agricultural crops can be estimated using the already mentioned NDVI maps (Oljaca et.al., 2016). These maps are based on the NDVI index, which takes the value of the difference between the intensity of the reflected wavelength of light from two different frequencies. The first frequency is VIS (visible part of the spectrum, 400-700 nm), while the second NIR (infrared part of the spectrum, 700-1300 nm). Applied to reflection by capturing vegetation, chlorophyll of a healthy plant absorbs most of the visible part of the spectrum of light that is used in the photosynthesis process. On the other hand, healthy plants reflect a large part of the infrared portion of the spectrum. The space covered by the vegetation of weaker physiological state, as well as the area on which the vegetation is bulky reflects a larger amount of visible part of the spectrum, and a smaller part of the infrared. The values of the calculated NDVI index for the given pixel of the recorded surface are in the range of -1 to +1 (Przyborski, 2017). This practically means that if there is no green leaf (green plants) on the recorded surface then the value of this index will be approximate to zero. Zero for index values indicates that there is no vegetation, while values close to +1 (0.8 - 0.9) indicate the highest possible representation of green leaf in plants. In order to reduce possible impacts on the value of the NDVI index generated by various natural factors (soil color, better leaves, water content in plants, biomass quantity, ...), it is possible to calibrate this index with several different factors. Some of the indexes are Soil Adjusted Vegetation Index, EVI (Enhanced Vegetation Index) and others (Oljaca et. al., 2016). Based on this calibration, it is possible to analyze substantially more different vegetation-biophysical parameters using the data collected by drone remote shooting. For this reason, it is increasingly common practice to correct the NDVI index to a number of factors which significantly raises the accuracy and reliability of NDVI index. As one of the correction factors, we can use the NNR (*Nutrogen Nitrogen Index*), which requires knowledge of the actual and critical oxygen concentration in plants, or the RI index (*Response Index*), in which NDVIrs calibration tape of the culture fed by the dose according to the recommendation of the basic chemical soil analysis, etc.

As mentioned earlier, drones can also be used to assess the needs for irrigation or drainage of the terrain (Mazur, 2016). In order to perform this task, drones should be equipped with hyper spectral, multispectral or thermal sensors. With the use of these sensors, parts of the terrain that are dry and require irrigation can be identify. Also, these

sensors can monitor the plant health as well the amount of energy or heat the plant emits. From the data on the amount of heat, information about the amount of water that the plant can surrender with transpiration can be obtained. This kind of information is another indicator of the state of the plant's health. On the basis of the obtained images, it is also possible to determine the degree of damage to plants caused by the defoliation of the leaf mass due to the lack of water, which can further cause the decrease in yield (Erickson, 2004). Different researches show that the degree of loss of leaf mass at an early stage of vegetation can be determined with an accuracy between 48% and 100%, while at the end of the vegetation period it can be determined with an accuracy between 81% and 100%. In the reproductive stage, the degree of leaf mass loss that may cause poor insemination and yield reduction can be determined with an accuracy between 71% and 98%, as demonstrated by the experimental researches described in (Erickson, 2004). Drones can also be used for the purpose of classifying plants on the production areas being observed. From the created plants classification based on recorded images, information about the cultures that are involved in the observed surface can be obtained, as well as information whether on concrete surfaces there are cereals or the surfaces are under fruit or vegetable crops (Rao et. al., 2007). In this way, the information received can greatly help with the realization of various projects where the importance of culture on the production surface is of great importance. At the same time, data can be obtained much faster, and in that way time of project realization can be accelerated. In the process of weed communities, monitoring and the mapping of the weed population on certain production area can be created based on obtained recordings. On the basis of this information, the protection of cultivated plants can be done much more efficiently, as only the areas where the weed presence is above the permissible limit will be treated. In the same time the herbicides intended for controlling the weed families detected on the production area will be used (Gutierrez et.al., 2008). In addition to efficient protection, in this way significant economic savings as well as environmental protection can be achieved, since the treatment of areas where there are no weeds will not be done. Such monitoring may be particularly important when it comes to monitoring the occurrence of weeds belonging to a group of allergens that are hazardous to human health. The meta data obtained from each of the images can identify the sites where the populations of such plants appear, with the aim of proper treatment and destruction. Locating and monitoring forests and fires on agricultural land is another task where drones are successfully applied (Hinkley & Zajkowski, 2011). Based on the recordings and metadata from them, information of the locations where the fire occurred, as well as the direction of the fire spreading and the intensity of the same can be obtained. Also, in the case of a large number of locations where fires are spotted, information about their distance, and the characteristics of the terrain affected by the fire can be provided. These information are mostly useful for fire services and people from the mountain rescue service.

### **Legal regulations for the use of drones**

Aviation regulations can be one of the limiting factors in the use of all types of drones both in agriculture and in other areas. In many cases, the law on aviation regulations introduces different types of limitations. For example, an unmanned aircraft must not come

out of the visibility line of the person operating it, which in many ways reduces the flight path (Lewis, 2007). From another side in many countries these regulations are not too strict. For example, during a certain time period Germany did not require any license to operate these aircrafts if their total mass does not exceed 5kg, and if the flight distance is not more than 1.5 km outside the populated place or place of departure (Aber et.al., 2010). In 2017 a new Drone Regulation came into force in Germany. Based on these regulations multicopters can only fly up to a height of 100m above ground. It is allowed to operate higher if remote pilot operate on an approved model airfield or have obtained a permit from the responsible civil aviation authority. If the aircraft is in controlled airspace, there is a maximum ascent height of 50 meters. In principle, flights outside the line of visibility are allowed as long as pilot do not let drone rise higher than 30 meters above ground. If the copter weighs more than 250 grams, pilot will also need another person who can observe the copter with the naked eyes and alert him to possible dangers during the flight. Under these conditions, the law does not rate maneuver as a “flight out of sight”. If these restrictions are not enough pilot can request a permit for out-of-sight flights with the National Aviation Authority. However, this approval is only granted to unmanned aerial vehicles with a take-off mass of more than 5 kilograms. For each drone owner is obligated to buy drone insurance for operations in Germany. A safety distance of 1.5 kilometers must be observed to the outer borders of airports. This rule applies to all types of drones (Markert, 2018). The latest drone regulation defines some places that drone operators have to keep 100 meters apart. These include: crowds (group of more than 12 persons), disasters, disaster areas, locations of authorities and organizations with security responsibilities, federal highways, federal waterways, railways, industrial plants, prisons and facilities of the penal system, bundeswehr installations and troops as well as other military facilities and organizations, power generation and distribution plants (power plants, wind turbines, substations, etc.), facilities in which activities requiring protection level 4 by the Biological Agents Ordinance (institutes in Hamburg, Berlin, Marburg and on the island of Riems) are carried out, lands of constitutional organs of the Federation and the federal states as well as upper and highest federal and state authorities, diplomatic and consular representations (embassies), international organizations in the sense of international law (UN, EU, NATO, etc.), and land of police and other security agencies. This already limits many maneuvers. Even in rural areas, there can be significant limitations. The Civil Aviation Authority (CAA) can grant permits to fly in these areas. Unfortunately, every federal state has his CAA. Each CAA handles the permits differently. It depends on flight location if drone pilot can get permission to fly in the areas mentioned above. With the new drone regulation from 2017, the previous separation for a drone flight is mostly canceled, and now the same rules apply to leisure pilots and commercial users. That's a positive thing because professional users have been significantly disadvantaged so far (Markert, 2018).

In United States it is required that every person who operates with the aircraft owns a pilot license to operate with a specific category of unmanned aircraft. In the United States, the flight of unmanned aircraft is strictly regulated by the Federal Aviation Administration (FAA). Because the potential loss of life from inflight accidents is unacceptably high, the FAA is understandably unwilling to loosen unmanned aircraft regulations simply to facilitate environmental remote sensing. Nearly all environmental research using unmanned aircraft within the U.S. National Airspace System is conducted within the bounds set by a Certificate of Authorization (COA) granted to a cooperating government agency. The difficulty of obtaining a COA and the cost of operating under its provisions should be considered in every prospective project. While a COA is customized for each specific operation, the following requirements may be required (FAA, 2016).

- Even if s/he does not actually control the aircraft movement moment-by-moment, a licensed private pilot may be required to serve as the in-flight commander for the vehicle.
- Because small-scale aircraft are hard to see from a distance, provisions for detecting and avoiding other aircraft in the flying area are essential. This may include having on-ground crew members serving as horizon-to-horizon lookouts.
- A maximum altitude limit may be defined to further lower the probability of in-flight collision with commercial or private aircraft.
- The proposed unmanned aircraft operations may only be permitted within limited geographic areas sequestered from civilian aircraft operation. Unmanned aircraft flight over inhabited areas or near airports may be completely forbidden.
- Even if the small-scale aircraft is capable of remote flight, the aircraft may nonetheless be required to stay within unaided visual range of the flight team members. The use of a chase vehicle to maintain visual range would likely be acceptable.
- While the aircraft may be capable of autonomous flight, failsafe provisions may be required for instantly reassuming manual control in case of emergencies.
- Provisions may be required for the pilot of the unmanned aircraft to maintain contact with local air traffic controllers.

The cost of these regulations, as well as the process of obtaining a COA, will probably discourage many environmental researchers from adopting or developing unmanned aircrafts.

In Canada, the operation of unmanned aircrafts falls under the Canadian Aviation Regulations, which are administered by Transport Canada – the federal agency overseeing Canada’s transportation systems. In order to carry out non-recreational remote sensing surveys with small unmanned aircrafts, an individual must hold insurance and a Special Flight Operations Certificate (SFOC) (Transport Canada 2008). Similarly to the United States, Canada also requires special approval that can be obtained from the air traffic control in charge of the part of the airspace in which the flight is performed. Also, in addition to take-off permission for a particular flight, a person operating a unmanned aircraft must pass a specific type of training. Within the scope of the license for the unmanned aircraft use, the insurance coverage covering the cases of falling of the aircraft which can lead to the injury of people, animals and material damage to the objects is obligatory (Hardin & Jensen, 2011). One important restriction that impacts remote sensing with small unmanned aircrafts is the regulatory requirement that they are operated within visual range at all times, even though the telemetry between the unmanned aircrafts and ground control system may reach well beyond this limit. In practice, this means that unmanned aircrafts must remain relatively close to the takeoff point, limiting the area that can be surveyed in a single flight. The maximum distance will vary according to the size, shape and colour of the unmanned aircraft, as well as the weather conditions and lighting. Although Transport Canada may specify otherwise, for many unmanned aircrafts the maximum visual range is <1km, which yields a maximum surveyable area of  $\approx 3$  km<sup>2</sup> from one location. When the flight altitude is in question, Canada has a maximum allowed flight height of 120m, although according to the technical characteristics of most unmanned aircraft, the minimum flight height at which the smallest turbulence effect is 640m. This allows for very high ground resolutions in the imagery, but makes

it necessary to collect many more images than would otherwise be necessary, which can in turn introduce problems at the processing stage. At low flying heights, the effects of relief displacement and tree lean are often greatly exaggerated, making it extremely difficult to produce good orthoimages for some areas. In areas of high relief, the 120m limitation may not be practical, and may thus rule out the use of a unmanned aircraft. Under such circumstances, Transport Canada may allow a higher flying height; however the additional time involved in obtaining the certification may impact the viability of a project. The simplified SFOC application process currently limits unmanned aircraft operation in Canada to daylight use only. For photogrammetric and most remote sensing applications this is not a problem. However the daytime-only requirement can be a limitation for thermal surveying. This particularly affects applications such as search and rescue operations, and heat loss and energy efficiency audits as night enhances thermal contrasts. With the development of reliable sense and avoid systems, night flights may become more commonplace in the future. However at present night time operation is only permitted when a full SFOC application has been lodged.

Due to safety considerations, there are also restrictions on where small unmanned aircraft surveys can be carried out. Currently in Canada, no unmanned aircraft overflights are allowed in urban areas, or within 30m of people or inhabited structures unless consented. The high spatial resolution that can be obtained from small unmanned aircraft surveys would be very useful in many urban settings; however, for public safety and perhaps privacy concerns, this restriction is likely to remain in place for research and commercial applications. Further restrictions on location apply in restricted airspace, and close to airports. A recent report by the Canadian unmanned aircraft systems program design working group proposes major changes for regulation of lightweight unmanned aircrafts under 25 kg in weight (Transport Canada, 2012). In particular, this report proposes that unmanned aircrafts classified as “low energy” should be exempted from SFOC regulations. The proposed definition of low energy is that the kinetic energy imparted by the platform to a stationary person or object in the event of a crash is less than 12 J/cm<sup>2</sup>, which is not considered to be a dangerous impact. The implications of this change are that many small unmanned aircrafts could potentially be operated without restriction, particularly those optimised for surveillance. This recommendation has been criticised for ignoring privacy concerns, and has prompted calls for a wider public debate on the implications of regulatory change (Gersher, 2014).

In the Republic of Serbia, in accordance with Article 8 of the Convention on International Civil Aviation (Chicago Convention), no aircraft that can be operated without a pilot must not overwhelm the territory of the Republic of Serbia without special approval or contrary to the terms stated in that approval. By legal regulations model aircraft is unmanned aircraft of operating mass of up to 20kg, not counting fuel for a flight, used for sports or recreational purposes, to which the provisions of the Convention on International Civil Aviation are not applicable. Unmanned aircrafts can be used for economic, scientific, educational, sporting and other purposes so as not to endanger the safety of air traffic (Cizmarov, 2015). For any damage resulting from the use of unmanned aircraft, a person using an unmanned aircraft is responsible. Article 1 of the Rules on Unmanned Aircraft defines that without any permission on the territory of the Republic of Serbia, only aircrafts with an operating mass less than 0.5kg can fly, if their speed does not exceed 20 m/s and which reaches a maximum of 15m of the flight length and maximal height up to 10m. All other unmanned aircraft are divided into four categories according to technical characteristics. For each of the categories, a set of approvals and licenses that person which operates with aircraft must have is defined. The maximum permissible height of the unmanned aircraft in this case is 100m above the

ground. The maximum permissible horizontal distance of the unmanned aircraft from the person handling the unmanned aircraft is 500m. In the same time the unmanned aircrafts that are prohibited for use are those unmanned aircrafts whose operating mass is more than 150kg, as well as unmanned aircraft whose flight is fully controlled by a computer installed on the aircraft. All flights need to be in line-of-sight, which is an operation of an unmanned aircraft where a remote pilot has continuous visual contact with an unmanned aircraft without using any external optical or electronic aids, where vision correction aids (such as glasses or contact lenses) are not considered as external aids.

This is the same regulation as in other mentioned countries. Article 12 of the Rules defines that a person operating an unmanned aircraft used for commercial purposes, as well as a person who manages a drone category 2, 3 and 4 can only be a health-capable adult, who has passed a knowledge test in the subject of an aviation regulations (Cizmarov, 2015). In the Article 15 of the rules on Unmanned Aircrafts is defined that the pilot of the unmanned aircraft when operating with unmanned aircraft must have manufacturer's manual for using unmanned aircraft, original or certified copy of the approval of the Directorate, act on acceptance of the declaration of competence, and certificate of achievement for successful knowledge testing. In order to maintain the correct record of unmanned aircraft in the territory of the Republic of Serbia, all unmanned aircraft used for commercial purposes, as well as drones of category 2, 3 and 4 used for non-commercial purposes, shall be entered in the Aircraft Records. For each flight operator need to submit application for allocation of airspace to the Civil-Military Coordination Unit. The application need to be submitted five working days before the planned piloting the unmanned aircraft. In case of special purpose flights in the part of airspace allocated for flying the unmanned aircraft, at the request of the Ministry of Defence or the Ministry of Interior civil-military co-ordination unit cancels the decision on the allocation of airspace and promptly notify unmanned aircraft operator and the person handling unmanned aircraft. Based on the mentioned regulations in Republic of Serbia in the class D od airspace it is prohibited to fly unmanned aircraft at a height less than 5 km from the reference point, unless otherwise authorized. At a distance of more than 5 km from the aerodrome reference point located in Class D of airspace and up to the limit of Class D of airspace, the piloting the unmanned aircraft is permitted at the height of up to 30 m above the ground. When the external load is in question unmanned aircraft are prohibited to carry people, animals, and dangerous goods.

In some cases unless is otherwise authorized, unmanned aircraft are prohibited: carriage of liquids, dropping of items and carriage of external load that is not an element of structure and equipment. When the significant infrastructure and other facilities (power plants, electrical high voltage installations, state institutions, military facilities, water treatment plants, highways, correctional facilities, etc.) is in question, unless there is approval from the owner or user of the facility, the use of unmanned aircraft is prohibited at a horizontal distance of less than 500m.

### **Economic aspects of the use of drones**

From the economic side, standard drones for public use range from 450 euros to 1,300 euros. In the domain of agriculture, the price of small drones without specific technology ranges from 1,500 euros to 3,000 euros. On the other hand, drones equipped with high-tech equipment that can simultaneously raise equipment of higher weight can reach the price above 25,000 euros. In the table bellow different drones that can be found



on the market are compared. Selected drones are compared based on price and based on the category in which they belong. The price of the drones was taken by the drones in the basic equipment package. This practically means that the price can only be higher if more specific equipment is added, especially when it comes to specific high-resolution sensors and cameras.

If we compare prices of drones presented in Table 1 we can see that drones with fixed wings have a higher price compared to multirotor drones. The difference in price is far from negligible, since it is a price that is several times higher. From other side if we compare performances of these two types of drones that are most frequently used in agriculture we must agree that fixed wing drones have better possibilities. Fixed wing drones like the Sentera Phoenix 2, AgDrone by HoneyComb, PrecisionHawk Lancaster and SenseFly eBee SQ are often preferred by farmers because they can cover more area and spend more time in the air than a multi-rotor platforms like the DJI Phantom 4. Fixed wing drones often carry more payload than a multi-rotor – which means more sensors – so more information can be captured in a single flight. This can reduce the total time to collect data for a given acre. The best example is the difference in price for Phantom 4 pro with and without camera for NDVI recording, which is approximately 2000 euros. In this way user gets best of both worlds — a fully-gimbaled color camera for scouting, plus NIR photos for NDVI indexing. Photos are geo-tagged and timestamped to enable quick, streamlined field scouting and identification of problem areas. Multi-rotor drones are generally cheaper than fixed wings, starting at around 1,500-10,000 euros for a professional-grade camera drone packaged with multi-spectral cameras and software for agriculture image processing.

*Table 1: Comparison of different drones prices*

Model name	Fixed Wing Agriculture Drones	Multirotor Agriculture Drones	Price [euros]
senseFly eBee SQ	+	-	12,000
PrecisionHawk Lancaster 5	+	-	25,000
AgDrone by HoneyComb	+	-	10,000
Sentera Phoenix 2	+	-	18,000
Phantom 4 PRO	-	+	1,989
Phantom 4 PRO with NDVI Upgrade	-	+	3,989
DJI Smarter Farming Package	-	+	8,300
AGCO Solo	-	+	7,850
Sentera Omni	-	+	16,995

If we observe sensor equipment there are many choices of imaging sensors available today for agriculture drones (Nixon, 2018). All these sensors and specific cameras can be observed like additional equipment, which will increase the price. Options range from 200 euros for a GoPro HD camera to well over 50,000 euros for a hyper-spectral camera. The most common and cheapest type of sensor is a high-resolution camera, which takes visible wavelength images. Several of these cameras can also take near-infrared images when equipped with the right filters. Another additional charge that should certainly be counted in the total cost of using the drones is also mandatory insurance. In the Republic of Serbia

insurance for DJI Phantom 4 Pro is approximately 200 euros per year. The problem with drone insurance is that user need to pay fixed amount regardless of the categorie to which the dron belongs. More precisely, all the drones are categorized as drones for commercial use, and based on that amount of insurance is calculated. Such insurance police covers property damage and liability for about 6000 euros. Another example shows that the costs to insure a 20,000 euros drone aboard are approximately 2,495 euros. This amount will be paid for PrecisionHawk Lancaster (Nixon, 2018). When the use of drones is in focus we can tell that the benefits are multiples. For example Agris Co-op Ltd. in Chatham, Ontario is one of the first precision agriculture drone imaging service providers to enter the Canadian market. Using fixed-wing eBee and Swinglet drones, the firm shoots high-res NDVI images of corn fields in Ontario for a price of about 5 euros an acre. A single flyover covers 100 acres in 15 minutes, capturing about 300 images for a price of 500 euros. This compares to a cost of about 1,500-2,000 euros for satellite or manned aircraft photography of 100 acres, or 15-20 euros per acre. In the same time these older methods yield less resolution, can be hampered by cloud cover, and take more time to process the images. On a single day, Agris can cover more than 1,000 acres using a single drone. Images are post-processed in about 2 days.

## Conclusion

The improvement of agricultural production in recent years is based on the use of information and communication technologies in agriculture. The possibilities offered by the use of these technologies are used both in terms of automation and modernization of agricultural machinery, as well as in the use of independent devices. Drones as one of the types of multidisciplinary devices are very useful in the field of improving agricultural production, as witnessed by a large number of surveys.

Rather than opting for one type of drone, some farmers and operators purchase less expensive versions of both. A fixed wing drone is used for large open spaces where long, unobstructed straight-line passes are possible, and, a small inexpensive multi-rotor is used for spot-checking trouble areas more closely, for quick scouting missions and for handling area a plane cannot fly over. Lots of farmers today start by buying a ready-to-fly 1,500 euros quadcopter like a Phantom 4 PRO or an NDVI-equipped pre-tested solution like DJI's Smarter Farming Package. After testing the ROI of drone surveying, they may upgrade to more expensive and more efficient multi rotor and fixed wing packages that can integrate with their Farm Management Information Systems (FMIS) and Agronomy Management Systems (AMS).

In our opinion, the regulations that control small-scale aircraft flight form the greatest obstacle to the technology's widespread adoption for environmental remote sensing. first group includes those practitioners who seek to use existing small-scale aircraft for environmental monitoring. Their primary interest is not building and testing unmanned aircraft, but applying them as tools to gather environmental data. For many of these potential non-pilot users, the hurdle of obtaining the necessary approvals to conduct their data gathering is largely insurmountable. Consequently, the civilian demand for small-scale unmanned aerial systems remains stagnant. The second stakeholding group includes those corporations developing and selling remotely piloted systems (and allied components and services) whose primary motive is profit. These corporations almost

universally focus on potential sales within the military and federal law enforcement sector where regulation obstacles are more easily managed. Until regulatory requirements can be satisfied and the demand for environmental small-scale aircraft effectively increased, the current corporate focus will not be adjusted to serve environmental remote sensing.

## References

- Aber, J. S., Marzloff, I., & Ries, J. B. (2010). *Smallformat aerial photography: principles, techniques and geoscience applications*. Oxford, Elsevier.
- Barrientos, A., Colorado, J., Cerro, J. D., Martinez, A., Rossi, C., Sanz, D., & Valente, J. (2011). Aerial remote sensing in agriculture: A practical approach to area coverage and path planning for fleets of mini aerial robots. *Journal of Field Robotics*, 28(5), 667-689.
- Cizmarov, M. (2015). *Pravilnik o bespilotnim vazduhoplovima*. Direktorat civilnog vazduhoplovstva Republike Srbije.
- DJI News (2017). DJI Raises Bar For Aerial Imaging With Two New Flying Cameras, Retrieved January 08, 2017., from: <http://www.dji.com/newsroom/news/dji-raises-barfor-aerial-imaging-with-two-new-flying-cameras>
- Erickson, B. J., Johannsen, C. J., Vorst, J. J., & Biehl, L. L. (2004). Using remote sensing to assess stand loss and defoliation in maize. *Photogrammetric Engineering & Remote Sensing*, 70(6), 717-722.
- FAA, (2016). *Unmanned Aircraft Systems (UAS)*, U.S. Department of transportation federal aviation administration. Retrieved June 20, 2018, from [https://www.faa.gov/documentLibrary/media/Order/FAA\\_JO\\_7200\\_23\\_2.pdf](https://www.faa.gov/documentLibrary/media/Order/FAA_JO_7200_23_2.pdf)
- Gersher, S. (2014). Canada's domestic regulatory framework for RPAS. A call for public deliberation. *Journal of Unmanned Vehicle Systems*, 2(1), 1-4.
- Gutierrez, P. A., Lopez-Granados, F., PenaBarragan, J. M., Jurado-Exposito, M., & HervasMartinez, C. (2008). Logistic regression product-unit neural networks for mapping *Ridolfia segetum* infestations in sunflower crop using multitemporal remote sensed data. *Computers and Electronics in Agriculture*, 64(2), 293-306.
- Hardin, P. J., & Jensen, R.R. (2011). Small-scale unmanned aerial vehicles in environmental remote sensing: Challenges and opportunities. *GIScience & Remote Sensing*, 48, 99-111.
- Hinkley, E. A., & Zajkowski, T. (2011). USDA forest service–NASA: unmanned aerial systems demonstrations–pushing the leading edge in fire mapping. *Geocarto International*, 26(2), 103-111.
- Inside Unmanned Systems (2017). *enseFly, a Parrot Company, Introduces eXom, a Rotary Drone that Features Five Vision Sensors and the Ability to Record a Variety of Imagery*, Retrieved January 05, 2017., from: <http://insideunmannedsystems.com/sensefly-parrotcompany-introduces-exom-rotary-drone-features-fivevision-sensors-ability-record-variety-imagery>
- Lan, Y., Huang, Y., Martin, D. E., & Hoffmann, W. C. (2009). Development of an

- airborne remote sensing system for crop pest management: System integration and verification. *Transactions of the ASABE*, 25, 607-615.
- Livona. (2017). Economical aerial aerophotogrametry system, Retrieved December 20, 2017., from: <http://www.livona.rs/bas/ebee/>
- Lewis, G. (2007). Evaluating the use of a low-cost unmanned aerial vehicle platform in acquiring digital imagery for emergency response. *Geomatics solutions for disaster management*, Berlin Heidelberg, Springer.
- Markert, F. (2018). Drone Laws in Germany, Retrieved: August 20, 2018. from <https://drone-traveller.com/drone-laws-germany/>
- Mazur, M. (2016). Six ways drones are revolutionizing agriculture. *MIT Technology Review*.
- Nixon, A. (2018). Best Drones For Agriculture 2018: The Ultimate Buyer’s Guide. Retrieved September 18, 2018., from: <http://bestdroneforthejob.com/drone-buying-guides/agriculture-drone-buyers-guide/>
- Oljača, M., et. al (2016). Application of drones in agriculture. In *Proceedings of the 18th Scientific Conference with International Participation - Current Problem of Agriculture Mechanization* (pp. 89-101). Beograd.
- Parrot (2017), Drones for agriculture: Drones in the crop scouting workflow, Retrieved April 15, 2017., from: <https://www.sensefly.com/applications/agriculture.html>
- Pefoto (2016), Lansirani novi dronovi - DJI Phantom 4 Pro i DJI Inspire 2. Retrieved March 08, 2018., from: <http://pcfoto.biz/vest-412795-lansirani-novi-dronovi-djiphantom-4-pro-i-dji-inspire-2>
- Precision Hawk. (2014). Drones to Elevate Business Intelligence, Retrieved December 20, 2017., from: <http://www.precisionhawk.com/lancaster>
- Przyborski, P. (2017). Measuring Vegetation (NDVI & EVI), Earth Observatory, Retrieved: June 01, 2017., from: [http://earthobservatory.nasa.gov/Features/MeasuringVegetation/measuring\\_vegetation\\_2.php](http://earthobservatory.nasa.gov/Features/MeasuringVegetation/measuring_vegetation_2.php)
- Rao, R., Garg, P. K., & Ghosh, S. K. (2007). Development of an agricultural crops spectral library and classification of crops at cultivar level using hyperspectral data. *Precision Agriculture*, 8(4-5), 173-185.
- Robertson, M., Carberry, P., & Brennan, L. (2007). The economic benefits of precision agriculture: case studies from Australian grain farms. Grains Research & Development Corporation.
- Solo AGCO Edition (2017). Agriculture from a new perspective, Retrived January 05, 2017. from: [http://www.pages05.net/agco/SOLO\\_UAV/](http://www.pages05.net/agco/SOLO_UAV/)
- Srinivasan, A. (2006). *Handbook of precision agriculture: Principles and applications*. Danvers, MA: CRC Press.
- Transport Canada. (2012). UAV systems program design working group phase 1 final report. Retrieved August 20, 2018, from [http://www.h-a-c.ca/UAV\\_REPORT.pdf](http://www.h-a-c.ca/UAV_REPORT.pdf).
- Trimble (2017). Trimble UX5 Aerial Imaging Solution for Agriculture, Retrieved January 05, 2018., from: <http://uas.trimble.com/ux5>
- Zhang, C., & Kovacs, J. M. (2012). The application of small unmanned aerial systems for precision agriculture: a review. *Precision agriculture*, 13(6), 693-712.



**Jasmina Smigic Miladinovic<sup>1</sup>**  
*High Economic School of Professional  
Studies Pec in Leposavic*

SCIENTIFIC REVIEW ARTICLE  
doi:10.5937/ekonomika1804107S  
Received: October, 09, 2018  
Accepted: November, 27, 2018

## BITCOIN - ITS CONDITION AND TENDENCIES

### Abstrakt

*The appearance of cryptocurrency marks the arrival of a new unlimited global system with no intermediaries and costly intercontinental transactions. Digital money would make it possible for us to have significantly quicker and cheaper transactions, which, along with present technology, is considered inevitable in the future. This paper includes three topics and deals with the bitcoin phenomenon and its influence on economic growth. The paper presents the bitcoin technology, its advantages and some risks to which the system's users are exposed. Bitcoin represents an exceptional technical achievement, and specific features of bitcoin present a particular challenge for its users.*

**Keywords:** *cryptocurrency, bitcoin, blockchain, cryptography, digital money*

**JEL classification:** *E 40, F 30, G 10*

## БИТКОИН - СТАЊЕ И ТРЕНДОВИ

### Апстракт

*Настанак криптовалута може се означити као долазак новог глобалног, безграничног система без посредника и скувих интерконтиненталних трансакција. Дигитални новац би нам омогућио значајно брзе и јефтиније трансакције, што се уз постојеће технологије сматра неминовношћу у будућности. Рад обухвата три тематске целине и бави се феноменом биткоина и каква је његова улога на привредни раст. У раду је приказана технологија Биткоина, предности и неки ризици којима су изложени корисници овог система. Биткоин представља једно изузетно техничко достигнуће и саме специфичности Биткоина представљају посебан изазов његовим корисницима.*

**Кључне речи:** *криптовалута, биткоин, block chain, криптографија, дигитални новац*

### Introductory discussion

Bitcoin is a phenomenon known worldwide, but not many people are able to explain its essence and finer details. Everyone knows that it is an ever more popular digital money, but few are familiar with how to earn, who pays and how to spend that money.

---

<sup>1</sup> jasnacs0411@yahoo.com

Nowadays, bitcoin is in the spotlight. This cryptocurrency has not gold backing, has not a country of origin, and is not backed by any particular country or banking organisation. Bitcoin is completely digital and is created in a process called “mining”, which can be performed on standard computers or by using a specialised hardware, by respecting strict rules provided by automatic cryptographic systems and the bitcoin community. The cryptocurrency as a digital form of money is based on the digitized so called , the main book of all crypto watch transactions called blockchain. Blockchain records individual transactions and ownership of all cryptocurrencies that are in circulation, and this system is managed by the so-called blockchain miners who have to update all transactions that have occurred and ensure the accuracy of the informations ( Milutinović, 2018, p.105) . Those computers and specialised hardware solve a complex series of mathematical algorithms, with the speed and efficiency of their mining depending on the speed of their solving. In addition, mining is an automatic process carried out continually by a computer, preferably 24 hours a day and seven days a week. Bitcoin can be mined by anybody, regardless of their country or nationality. A question presents itself: How can money be created from calculations that serve nothing? Paper currency is neither worth by itself until its value appears on the market. Amount of bitcoins is limited, and their appearance “out of nothing” occurs to the predictable rhythm, which prevents inflation and becomes the basic prerequisite for the confidence of brokers and merchants who accept bitcoin. It includes a P2P interaction, in which each owner transfers electronic money to the next owner, by signing and adding to the end of the coin a hash of the previous transaction and a public key of the next owner. Payment verification is done by informing the whole Bitcoin network about the carried out transaction. By doing so, double payment is prevented and generating of nonexistent money is avoided. These transactions are carried out without transferring personal information between participants in a transaction. In contrast to totally anonymous transactions, payment in bitcoins leaves a trace that is recorded and accessible to the public. Participants in a transaction, however, do not have to do business under their own names, for they may apply by using pseudonyms. Bitcoin offers to its users lower transaction costs, an increased privacy, as well as a long-term protection of purchasing power from inflation. Nevertheless, bitcoin still has not enough participants and a financial basis to secure stability, so the price of bitcoin oscillates significantly. Its users still feel uncertain about being safe from thefts and frauds. Even authorised state agencies have numerous dilemmas and analyses of the existing and future risks related to the application of bitcoin. As there is no controlling agency (bank), there is neither a transaction log, and money refund, in the case of a non-delivery of paid goods and services, cannot be legally regulated. Even though the number of bitcoin users is growing, it is still insignificant compared to credit cards and the use of USD, EUR and other currencies (Dinić, 2014). Nevertheless, bitcoin system represents a remarkable conceptual and technical achievement. It can also be used by the existing financial institutions (which can issue their own bitcoins). There are also no obstacles for state governments to use the technology.

The birth of the idea of crypto currencies can be characterized as a kind of globalization of the international payment system, where perhaps it is more accurately to use the term individualization and privatization instead of globalization. Does , however, this phenomenon of crypto currency carry a new latent form of domination of world powers with the aim of achieving virtual colonization? Are crypto currencies only semingly exempt from national characteristics ? ( Djordjevic, 2018, p.95).

## 1. Basic characteristics of digital payments

The history of the human kind has known various means of payment. The American dollar has been the most used means of payment for nearly fifty years since World War II, but its reputation has decreased considerably thanks to many acts of the USA Central bank (Federal Reserve), and many have begun looking for an alternative (FEE, 2013). If a closer look is taken at the past, we see that people have used different means of payment, such as silver, gold, wheat, shells, tobacco, salt, paper, etc. Almost none of these means is used today, except for gold, silver, and paper currency. For a means to become suitable for payment, it has to have some important characteristics; for instance, it would have to remain valuable for a long time period, its quantity should be limited, it should be easy to divide it into parts, and it should be portable.

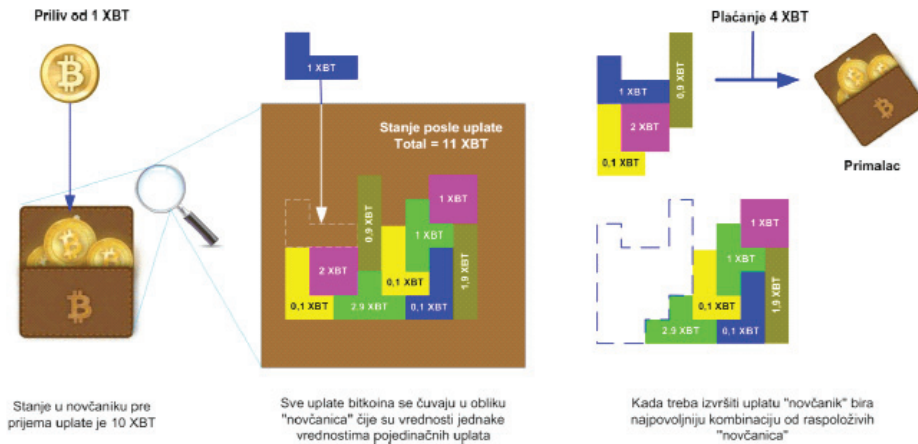
Modern-day payments that include financial institutions are exposed to a number of limitations and entail relatively high costs, the amounts of which are measured by percentage. That way, when money changes several owners, a significant amount remains in the banks. This reason, along with others, brought to creation and launching of bitcoin, digital currency, in 2009. The credit for creation of bitcoin is given to a creator who used a pseudonym Satoshi Nakamoto, and who published his creation principles in the article “*Bitcoin: A Peer-to-Peer Electronic Cash System*” (Nakamoto, 2008). Bitcoin includes a P2P interaction, and electronic currency is defined as a chain of digital signatures. Each owner transfers a coin to the next owner by signing a hash of the previous transaction and public key of the next owner, and by adding all of that to the end of the coin. The receiver may check the signatures in order to check the property chain. The payment verification is done by informing the whole network of the executed transaction. In that fashion, double payment is prevented and generating of nonexistent money is avoided. The verification may last a few minutes.

These transactions do not involve transferring of personal information between transaction participants. In contrast to completely anonymous transactions, bitcoin payments leave a transaction record, noted and accessible to the public. Transaction parties do not have to do business under their own names, for they may apply through pseudonyms. An important question presenting itself is: How are bitcoins created? For something to have value, it is necessary for its creation to be expensive, that is to say more expensive than the market value of that something being created. For instance, there is gold in the ground and it is accessible to everybody, but its extraction from the ground is expensive and unprofitable for the vast majority. That is why the majority of gold users are not able and neither is it in their interest to mine for gold, and each new kilogram of produced gold brings significant worth to the producer. Bitcoins are created in a similar manner. Quite a few arithmetical operations for a complex algorithm need to be carried out for one bitcoin to be mined. It is quite probable that an individual bitcoin miner would try very hard before they manage to mine some. It is, therefore, recommended to have several miners joined together, who should try mining bitcoins by using their joint forces and a number of computers. Roughly put, the problem being solved by miners is reduced to the following: If  $x$  represents a series of blocks (so-called *blockchain*), if  $y$  stands for an additional block and  $n$  for an additional number, the aim is to find the  $n$ , so that the resulting hash function  $f(x, y, n)$  has a value lower than the set value of  $\alpha$ . (Velde, 2013)



Hash function maps a text or numbers of an arbitrary length into a number of a fixed length. For instance, taking the first letter of a word or addition of all the digits of a number, until one obtains as a result a number that can be expressed through one digit, maps any word or number by hash of length one. The bitcoin hash function is deterministic, but so much complex that the result looks like accidental numbers. That is why it is very difficult for miners to reach an appropriate solution to the problem. They need to test a lot of different combinations for various values of  $n$ , which demands high computer capacities and a considerable consumption of time and energy, until the required condition is met. The lower the value of  $a$ , the harder it is to meet the condition. By contrast, a suggested solution  $(x,y,n)$  can easily be verified. A part of the number  $n$  includes verifying that the bitcoin added to the block  $y$  has not already been spent in the block  $x$ .

The code makes it possible for any miner to take into the block  $y$  a certain kind of transaction, which creates  $N$  of new bitcoins and attributes them to the miner. The first miner to reach a solution sends the information to all other miners who verify it. After the verification (performed by the majority of miners), a new block is added to the chain and the lucky miner becomes an owner of  $N$  of new bitcoins. A part of the bitcoin protocol regulates the temporal values of  $N$  and  $a$ . The difficulty of  $a$  is adjusted every two weeks so as to provide the dynamics of bitcoin creation of six times an hour. The more miners who work on creating new bitcoins, the stricter are conditions. The initial value of 50 of the number  $N$  is halved every 210.000 blocks. It leads to a definition that the number of available bitcoins asymptotically approximates the number of 21.000.000 (Velde, 2013). Therefore, just as the mines' deposits become ever poorer after a long production and gold production becomes ever less profitable, so does bitcoin mining become unprofitable. In order for mining not to die out, a reward for the work of miners is anticipated from other funds. During bitcoin transactions, a participant is enabled to “pay for” the transaction, so that it could be carried out in a quicker procedure. The transaction rates are defined according to a special algorithm, in which the size of the transaction, the age of the record, or the length of the record in kB, are all taken into consideration. If any of the “banknotes” from the wallet in the transaction is less than 0,01 XBT, or if the money change is less than 0,01 XBT, then it is required to pay a compensation for the transaction to the amount of 0,0001 XBT per such a banknote (Matonis, 2013). By doing so, the intention is to discourage sending of too little values. The task of the wallet is to choose the most favourable combination of banknotes for a payment. An example of the means of payment in bitcoins is shown in Figure 1.

**Figure 1:** Technology of payment in bitcoins

Payment per kB means that the compensation for a transaction is determined according to the length of the record in bytes. The length of the record depends on the number of inputs and outputs for a transaction. The length of the record  $L$  is roughly determined according to this formula:

$$L = 148 \cdot \text{input\_number of\_banknotes} + 34 \cdot \text{output\_number of\_banknotes} + 10$$

The input number of banknotes includes the number of banknotes and records excluded from the wallet, and the output number of banknotes includes the amount being sent, as well as a refund for the difference between the paid amount and the necessary one - the change. If  $L$  is  $<10000$  bytes, and the transaction's value is high enough, with the records old enough, then the transaction is free of charge. Otherwise, it is charged for. In the case of a compensation payment per kB, other compensations are not charged for.

In transactions, the priority is given to older bitcoin records, and to records with a greater value. Every transaction shows a priority defined by the age, size and the number of inputs. For each input, the wallet calculates the product of values of inputs with the age of input within a block, and then the products are summed up and the obtained amount is divided by the size of transaction given in bytes. If the obtained quotient is smaller than 0,576, then such a transaction requires paying for compensation. That means that a transaction may involve a lot of small or new banknotes, and that the compensation need not be paid if a big old banknote is included, because the transaction estimate takes a mean value as an authoritative one. It happens sometimes that a compensation should be paid for, and that the compensation is not required if the transaction is carried out at a later stage because the banknotes have aged enough

## 2. Advantages of bitcoin use

Bitcoin offers to its users lower costs of transactions, an increased privacy and a long-term protection of purchasing power from inflation. However, bitcoin still has

not enough participants and a financial base to secure stability, so its price oscillates significantly. Its users still feel uncertain about being safe from thefts and frauds. Even authorised state agencies have numerous dilemmas and analyses of the existing and future risks related to the application of bitcoin. Regardless of those dilemmas, many people, including Ron Paul, see the bitcoin as an excellent means of payment, which makes the following possible (Lukić, 2016):

- Purchase of anything in secrecy;
- Absence of banks in the chain of payment;
- Payment with no commission charged;
- No concern that inflation will devalue currency in the future.

That can be exemplified by a temporal change of value of the USD. For instance, by using Consumer Price Index, if somebody had had 100 USD in their wallet in 1952, he would have to expect to have 11,56 USD today due to inflation. The situation becomes even worse, if some other criteria are considered. Table 1 shows values of today's amount of the USD, as an equivalent of a 100 USD value from 1912 and 1962.

**Table 1:** 2012 values, equivalent of 100 USD value from 1912 and 1962

		\$100 from	1912.	1962.
Ekvivalent u 2012	by using Consumer Price Index (Index of consumer prices)		\$2400	\$751
	by using GDP deflator (BDP deflator)		\$1730	\$579
	by using unskilled wages		\$9900	\$794
	by using Production Worker Compensation		\$14000	\$966
	by using a nominal GDP per capita		\$14300	\$1490
	by using a relative share of GDP		\$45600	\$2450

How did such a drop in the USD value occur? The explanation is simple - by printing money without backup. Until the 70s of the twentieth century, printing of the dollar had been carried out with numerous restrictions, but for a few decades now the USA Central bank has been printing billions of dollars, and thus devaluing the worth of the USD.

Basel Committee on Banking Super Vision, since 1988, has brought a series of instructions and amendments, known as Basel Standards, with the aim of developing a system of rules and standards that will be a mechanism for improving the stability of the financial system, establishing equitable market conditions for the operation of international banks by defining uniform solvency coefficients and defining the role of regulators in situations with unclear jurisdictions, as no bank with subsidiaries in different jurisdictions could escape control and audit. By these standards, banks are allowed to determine capital adequacy to cover market risk by applying VaR and Expected Shortfall (ES) Model (Radivojevic, Curcic, Marcetic, 2018, p.100).

As for the bitcoin currency, it is known precisely when and how much of it is going to be on the market. Thanks to the applied algorithm, one knows that the number of bitcoins is going to approximate asymptotically the figure of 21.000.000. Since the first

bitcoin, launched in 2009, their number had grown to about 12 million on 12 December 2013, and it is estimated that their number will reach 18 million in 2024, and that there will have been about 21 million bitcoins by 2140. After that, the number of issued bitcoins should not change at all. The second important values criterium from Table 1 is thus fulfilled.

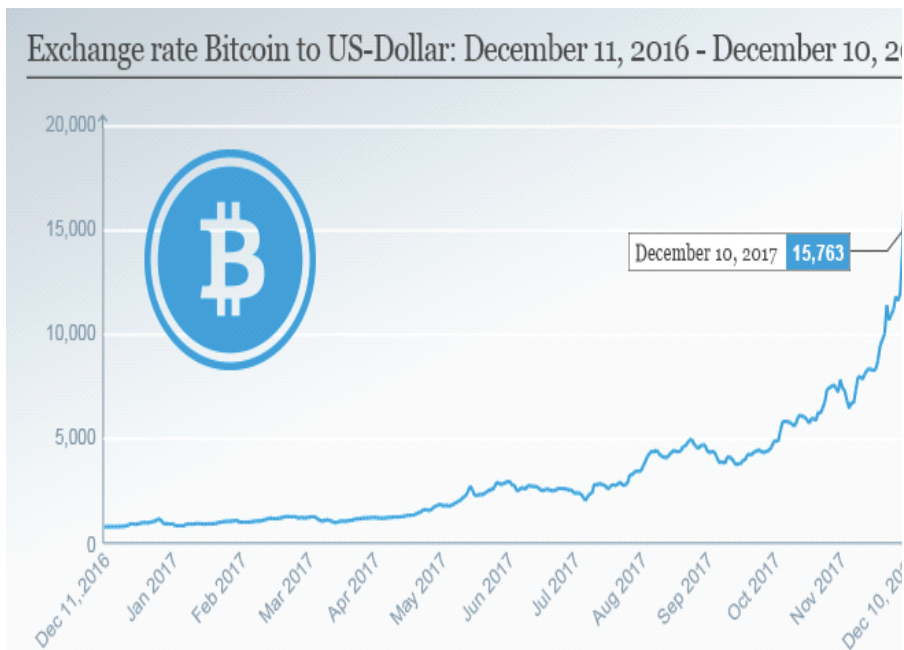
It is hard to counterfeit the USD, as well as silver and gold. Given that bitcoin is based on an open-code software, one might think that it is easier to counterfeit. However, bitcoin is based on cryptography, and it is practically impossible (or, apparently, unprofitable) to counterfeit it. In addition, each transaction requires a confirmation by other system participants, which prevents possible manipulations through double payments. Bitcoin includes some more advantages, as well (Lukić, 2016):

- It can be very easily transferred from one spot to another on Earth, regardless of quantity and geographical position if there is an Internet connexion;
- Acceptance of bitcoins is free of charge;
- There is no money refund (chargeback);
- Bitcoin can be exchanged for any other currency.

Based on the advantages cited above, one can note a favourable gradient of increase in the total number of transactions, as shown in Figure 2.

It is not easy to say which means of payment is the best, especially if the conditions change all the time, but it is probable that bitcoin will likely manage to reach the top of the list, primarily thanks to its advantages. It is also most probable that the today's dollar-led means of payment will be pushed to a considerably lower position.

**Figure 2:** Total number of transactions for the period of 2016 – 2017



### 3. Risks related to bitcoin use

Bitcoin makes it possible for a user to create an unlimited number of wallets. That is why one can say with certainty how many miners there are on the network, and what the real number of bitcoin users is, but it is noticeable that the number of wallets increased rapidly for the period of January 2013 and January 2014. Since its creation, and until January 2013, some 50 thousand wallets have been created. The total number of bitcoin wallets is presented in Figure 3.



Due to a relative anonymity of its users, bitcoin makes it possible for individuals to generate, transfer, launder or steal financial resources. With its application, it presents for investigators challenges similar to those of other virtual money, such as WebMoney, and there are also additional difficulties due to its decentralized nature. The FBI estimates, which are considered reliable, state that criminals will treat bitcoin as an alternative payment option in the near future, although they would not give up on the existing traditional means of payment.

Less reliable are considered the FBI estimates that mention a use of bitcoin for money laundering (FBI, 2012). This hypothesis is difficult to prove, because there are not enough reports on bitcoin. Thanks to its decentralized status, the system will most probably resist possible attacks, but criminals will focus on attacking private bitcoin wallets and they will try it by using third-party services.

Bitcoin transactions are accessible to the public, although the only information identifying a bitcoin user is a randomly pseudo-generated bitcoin address, which makes the transaction pretty anonymous. However, transactions are not completely anonymous, even though bitcoin is clearly decentralised, for there is a place that can provide data on participants in a payment. That place is where bitcoins turn into a *fiat currency*, i.e. decree money. In order to increase the anonymity of a transaction, users can do the following (Dhaliwal, 2017):

- Create and use a new bitcoin address for each incoming payment;
- Route the whole bitcoin traffic through an anonymiser;
- Combine the old bitcoin addresses into a new address, in order to make new payments;
- Use specialised services for money laundering;
- Use third-party eWallet services to consolidate addresses. Today there are third-party services that offer an option to create an eWallet that would enable

users to consolidate many bitcoin addresses and that provides a simple access to its bitcoins from any device;

- Individuals may create bitcoin clients to increase anonymity easily (as well as being able to choose a bitcoin address from which to make payments), and for all that users do not have to have a particularly technical education in order to make transactions anonymous.

There are patterns of behaviour of taxpayers, facing a possibility to evade taxes, which appear in the financial literature. Of importance here is the relation between the expected benefit from tax saving and the expenses they would have to bear if uncovered and punished (Marcetic, Curcic, Lazovic, 2016, p.239).

Nowadays, the specific features of bitcoin represent a special challenge to uncovering and preventing of illegal activities. Being a decentralised system, bitcoin does not have a central institution and it cannot control or notify of suspicious activities in accordance with the money laundering prevention programme, and it does not accept or carry out legal requests, such as court orders. According to the FBI, the main vulnerability of the decentralised systems of payment include (Dhaliwal, 2017):

- Absence of software or ability to track and identify suspicious monetary patterns appearing in money laundering;
- Absence of identification of real owners of accounts, as well as their real location;
- Absence of records about transaction history, related to the real participants in transactions;
- A considerably harder identification of sources for means of payment, compared to some other types of online currency;
- Law enforcement agencies cannot target a particular central location or a company, and they cannot switch the system off while conducting their investigation.

As stated above, bitcoin requires that its users use third-party services during conversion of their bitcoins into fiat money. Buying, selling, bitcoin trade or their conversion to some other currency, all of that is performed outside of the P2P system. Due to the number and variety of the third parties, there is a real possibility for a transfer or a conceivable money laundering. The users who do not want to use those third-party services might post their own “buy” or “sell” requests on *freenode IRC* (Internet relay chat).

In July 2011, FinCEN revised the definition of “money transfer service” and now it means “accepting of money, means or other values, exchanged for money from one person, and transfer of money, means or other values to another place or person in any of the ways”. It is most likely that the business model of most third-party bitcoin services qualifies those third parties as money carriers, and assigns the money transfer services to 31 CR Part 1010.100 (ff) (FDIC, 2015). The third parties, bitcoin service providers, which are qualified as money carriers and want to work legitimately, have to register with FinCEN, and they have to implement money laundering prevention programmes; they would also have to keep certain records and submit reports on suspicious activities and currency transactions, as required. Some countries demand that those third parties secure a state licence (Federal Register, 2011). That is why some bitcoin service providers,

under the pressure of legal norms, lay down a condition stating that “members agree to provide precise, up-to-date and complete data on themselves, as required in the registration procedure, and that they should keep them updated” (MT.GOX, 2012).

The risks of using bitcoin should also concern the system’s users. Criminals cannot attack a central station, but they can attack individual wallets and third-party bitcoin service providers. The first malware programme “Infostealer Coinbit”, designed to steal bitcoins from compromised bitcoin wallets, was discovered in June 2011. The programme could infect a user’s computer, and transfer a digital bitcoin wallet to a server in Poland (Poulsen, 2011). Especially exposed to risks are the users who do not use an encryption with their bitcoin wallets. An FBI report (2012) mentions cases of theft of 25.000 bitcoins, an attempted counterfeit selling of bitcoins worth 7 million USD, as well as a theft of bitcoins from online gaming sites in 2011, and a case of theft of computer resources for the purpose of bitcoin mining.

The fact of the matter is that banks will not either act friendly towards the development of a competition, and it would not be strange if they tried to disrupt the business with bitcoins. On the other hand, at the end of February 2014, some rumours appeared about the bitcoin code not being totally reliable, with possible errors in the code, but the biggest attack on bitcoin so far came from one of the largest exchange service (bitcoin to other currency) providers, Mt. Gox. A message, appeared on their site on 07/02/2014: “In light of recent news reports and potential repercussions on MtGox’s operations and the market, a decision was taken to close all transactions for the time being in order to protect the site and our users. We will be closely monitoring the situation and will react accordingly” (Mt.Gox Team, 2014).

As a reason for the interruption in their work they cited technical causes, as well as a drop in prices on the bitcoin stock exchange by 20% - almost 180 USD - due to an overwithdrawal of bitcoins. Unofficially, some 750.000 bitcoins were taken away, which means, in the case of a hacking or a forcible blockade of the web site, that Mt Gox’s losses amounted to about 350 million dollars (A.N.R., 2014). It was not the first time that Mt Gox’s clients had problems with accessing their accounts. The other six bitcoin exchange service providers dissociated from Mt Gox’s actions, and they said that they would continue to do business as usual. In regard to this event, there is an interesting statement of a German student of science, Max Hampel, who posted it on his blog, saying that once and for all the bitcoin community should be ready to renounce exchange of bitcoins for money through Mt.Gox. More details on this point of view can be found in an article by Rob Wile, published in the *Business Insider* (Wile, 2014).

Mark Karpeles, Mt Gox’s former service manager, also spoke about the insecurity of investment in bitcoins. He explained in his presentation that bitcoin investments were risky, and that the high value of bitcoins was based on high demand, but that there were no guarantees that even the next day the value would not be reduced to 0. In the statement, he does not expect that to happen, but it is probable (Karpeles, 2014).

## Conclusion

Although the number of bitcoin system users is growing, it is still small in comparison with the number of credit card users, and compared to the use of the

USD, EUR and other currencies. Nevertheless, bitcoin system represents a remarkable conceptual and technical achievement. It can also be used by existing financial institutions (which may issue their own bitcoins). There are also no obstacles for governments to use this technology. The application of the bitcoin system offers quite a few advantages to its users, by making it possible for them to realise transactions free of charge or with a minimum compensation, within a reasonably short time period, and by providing them with freedom and independence from financial institutions. The bitcoin system will be getting more stable with the number of its participants growing, and its value will be ever less oscillating, thus providing its users with security in terms of the worth of their money, that is to say bitcoins.

On the other hand, with the stabilisation and growth in number of users, the bitcoin will, according to the FBI and others, become a very useful means for various manipulations and criminal activities. The situation, however, is the same with any other currency, be it electronic or fiat money. Moreover, neither gold nor paper currency bear any record on their previous owners. Indeed, there are banknotes' numbers that are filed during bank transfers, but that is applicable mostly for the big-denomination USD banknotes. The slowing down of growth in the number of bitcoin system users may be affected by unpleasant events, such as it was in the case of the business cessation of Mt Gox, one of the biggest bitcoin exchange service providers, then some reported cases of theft of bitcoins, as well as legal bans on bitcoin trade in China and India. It is hoped that, with time and stabilisation of circumstances (in terms of legal regulations), the climate will become positive for bitcoin. According to the above, it is believed that bitcoin is not a temporary phenomenon, and that it will get to feel at home on the Internet as a regular means of payment.

## References

- A.N.R. (2014). *Platforma za trgovinu bitcoin valutom Mt.Gox prestala sa radom*.
- Bohme, R., Christin N., Edelman, B., Moore, T.(2015),”*Bitcoin: Economics, Technology and Governance*”, *Journal of Economic Perspectives*, Vol.29.
- Coderrr. (2011). *Patching the Bitcoin Client to Make it More Anonymous*.
- Čičin-Šain D. (2007). *Novac i poslovno bankarstvo*. From Sveučilište u Zadru,
- Dinić V. (2014). *Bitkoin kao decentralizovana valuta*. Bankarstvo Journal issue 2/ 2014.
- Dhaliwal S. (2017). *Poland Officially Recognizes Trading in Bitcoin and Other Cryptocurrencies*.
- Djordjevic A.,(2018). *The application of advanced technologies in the field of international finances: bitcoin pfenomenon*, *Ekonomika 1/2018* , p.95, *Društvo ekonomista “Ekonomika”* , Nis
- FDIC (2013). *FDIC Law, Regulations, Related Acts*. From FDIC Federal Deposit Insurance Corporation
- FEE (2013). *The truth about Bitcoin and alternative Currencies*.
- Federal Register. (2011). *Bank Secrecy Act Regulations; Definitions and Other Regulations Relating to Money Services*.



- FBI (2012). *Bitcoin Virtual Currency: Unique Features Present Distinct Challenges for Deterring Illicit Activity*. Directorate of Intelligence. Washington.
- Kaye B. (2016). *Australian says he created bitcoin, but some skeptical*.
- Karpeles M. (2014). *Ugasio se najveći servis za razmjenu bitcoina*.
- Lee T. B. (2011). *How Private Are Bitcoin Transactions?*
- Lowenthal, T. (2011). *Bitcoin: More Covert than it Looks*.
- Lukic, V. (2016). *Potentials and limits of private digital currencies, Ekonomski fakultet, Beograd, ekof.bg.uploads2016/03*
- Marcetic M, Curcic N., Lazovic K., (2016) . *Modalities of Value Added Tax Evasion in the Republic of Serbia, ANALI Ekonomskog fakulteta u Subotici, Vol 52, broj 35/2016, p.239, Univerzitet u Novom Sadu*
- Matonis, J., (2013). *The appeal of a nonpolitical currency. Paymentsource.com*.
- Milutinovic, M.,(2018). *Крипocurrency, Ekonomika 1/2018, p.105, Društvo ekonomista “Ekonomika”, Nis*
- MT.GOX. (2012). *Terms of use*. From MT.GOX:  
[https://mtgox.com/terms\\_of\\_service](https://mtgox.com/terms_of_service)
- Mt.Gox Team. (2014). *Mt.Gox*. From Mt.Gox: <https://www.mtgox.com/>
- Nakamoto, S.(2008).*Bitcoin : Apeer/to/peer Electronic Cash System. http/bitcoin.org/bitcoin.pdf*
- Radojevic N., Curcic N., Marcetic M., ( 2018)., *Quantifying Extreme Market Risk in the selected Western Balkan Countries, Industry JSE, Current Issue Vol.46, No.2/2018, p.100*.
- Poulsen K. (2011). *New Malware Steals Your Bitcoin*.
- Velde F. R., (2013). *Bitcoin: A primer*. From Chicago Fed Letter.
- Wiki (2013). *Anonymity*. From Bitcoin.
- Wile R. (2014, 02 07). *The Fall Of Mt. Gox*. From Business Insider.

**Dorde Ćuzović<sup>1</sup>**  
High School of Business,  
Novi Sad

SCIENTIFIC REVIEW ARTICLE  
doi:10.5937/ekonomika1804119C  
Received: May, 15, 2018  
Accepted: November, 05, 2018

## SOVEREIGN WEALTH FUNDS INVESTMENT STRATEGIES

### Abstract

*Sovereign Wealth Fund (SWFs) is important participant in global financial market. Although they were arisen more than fifty years ago, in the theory they have not been explored. In the literature, there is no relevant theoretical and empirical material on the basis of which we can make reliable economic objectification of financial assets available to SWFs, and even more difficult to realize their investment objectives and strategy. There are relatively few comparable data on their assets, investment strategy and management, indicating a lack of transparency of SWFs. It has prompted us, referring to the available contemporary theory and practice of progressive developed countries, to study the structure of the investment portfolio, investment models, countries and companies invested by SWFs. In the paper, we are looking for an answer to the question: Can SWFs in the global economic and financial crisis significantly mitigate its consequences? The results of the research we will test on the most developed SWFs.*

**Key words:** Sovereign Wealth Funds (SWF), investment strategy, investment portfolio, investment models

**JEL classification:** G23

## СТРАТЕГИЈЕ ИНВЕСТИРАЊА НАЦИОНАЛНИХ ФОНДОВА БОГАТСТВА

### Апстракт

*Национални фондови богатства (ФНБ), су важан учесник на глобалном финансијском тржишту. Иако су настали и почели да функционишу, пре више од педесет година у теорији нису довољно истражени. У литератури не постоји релевантна теоријско-емпиријска грађа на основу које можемо извршити поуздану економску објективизацију финансијских средстава којима располажу ФНБ, а још је теже спознати њихову стратегију и циљеве инвестирања. Постоји релативно мало упоредивих података о њиховој активи, инвестиционој стратегији и управљању, што указује на недовољну транспарентност пословања ФНБ. То нас је подстакло да с позивом на доступну савремену теорију и прогресивну праксу развијених земаља, сагледамо структуру инвестиционог портфолиа, моделе инвестирања, земље и компаније у које ФНБ инвестирају. У раду ћемо потражити и одговор на питање: да ли*

<sup>1</sup> cuzovic@gmail.com

*ФНБ у условима глобалне економске и финансијке кризе могу допринети ублажавању њених последица. Добијене резултате истраживања тестираћемо на примеру најразвијенијих ФНБ.*

**Кључне речи:** *Национални фондови богатства (ФНБ), стратегија инвестирања, инвестициони портфолио, модели инвестирања*

## Introduction

Although the Sovereign Wealth Funds (SWF), the National Wealth Funds Fund (SWF), originated and began to function more than fifty years ago, in theory they have not been sufficiently explored. There are relatively few comparable data on SWF, and not standardized practice of publishing information on their assets, investment strategy and management, which undermines the insufficient transparency of SWF's business. In the literature, there is no relevant statistical-empirical material on the basis of which we can execute a reliable economic objectification of the financial assets (assets) held by SWF. SWF countries are economically rich, earning high prices for oil and other strategic raw materials and products. The increase of the SWF from the end of the 20th and the beginning of the 21st is related to the accumulation of excess foreign currency reserves of developing countries, new global financial players (Washington Post, 2007, p.A20). Although they are still a category with a number of unknowns, the literature agrees that SWF serves to stabilize government revenues and export revenues, and aim to accumulate savings, as resources obtained through the sale of natural resources are not recovering and may disappear after a certain amount of time Davis, Ossowski, Daniel, Barnett, 2001). Global financial market analysts believe that SWF through a reverse investment strategy can contribute to the stabilization of the global financial imbalance. Therefore, they propose a diversification of the portfolio outside government bonds in US dollars, which have largely invested a large amount of traditional reserves up to now. However, such a diversified portfolio raises the question: Can SWF deform the value of assets through non-commercial buying and selling of HoVs (Davis, Ossowski, Daniel, Barnett, 2001). According to the International Monetary Fund (IMF), 2008, FNB controlled \$ 3 trillion in assets (Johnson, 2007), and is expected to grow to 15 trillion by 2015 (Jan, 2007b).

In 2009, The Institute of SWF published a list of 52 funds, and in 2012 there were 66. It is estimated that 12 out of 66 SWF have over \$ 100 billion in assets. Thus, the largest Norway Government Pension Fund Global has assets of \$ 664.3 billion (Sovereign Wealth Fund Institute, 2012). The second is Abu Dhabi Investment Authority (ADIA), which has \$ 627 billion (Sovereign Wealth Fund Institute, 2012b). Of the ten largest ones, five are commodity funds (for oil) and five are non-profitable. The three non-core are based in China (including the Hong Kong Monetary Authority Investment Portfolio) and two in Singapore, which is the ninth largest SWF in the world with assets of \$ 157.5 billion (Sovereign Wealth Fund Institute, 2012). Out of the aforementioned 66, six are from the USA, and the largest is the Alaska Permanent Fund, which is at the 21st largest (Sovereign Wealth Fund Institute, 2012). Based on these data, it can be concluded that SWF represents one of the most burdensome financial institutions in

the global financial market, whose market recognition is related to the accumulation of surplus foreign exchange reserves that are conditioned by two fundamental factors: a) growth in commodity prices, and b) the policy of a continuous surplus of the current balance of payments of developing countries.

In accordance with this object and goal of research, the question arises: academic-expert controversies about the establishment of SWF and their investment strategy. This has prompted us to, with reference to modern theory and modern practice of market-developed countries, look at the investment strategy of SWF in the global financial market. In the paper, we will also look at the answer to the question: can SWF, in the conditions of the global economic and financial crisis of 2008, contribute to alleviating its consequences by linking the surplus and deficit financial sector (Van Horne, Wachowicz, 2007).

### **Theoretical methodological approach to SWF research and investment strategy**

In literature (Schubert, Barenbaum, 2010; Jen, 2007a; Johnson, 2007; Truman, 2007; Mishkin, 2006; Aizenman, 2007; Allen, Caruana, 2008; Bartolotti, Fotak, Megginson, 2010; Bernstein, Lerner, Schoar, 2009, Rozanov, 2005), SWF is most often defined as “... government investment funds that are funded by foreign reserves, but managed separately from official foreign exchange reserves.” In domestic literature (Soskic, Zivkovic, 2011; Kapor, 2008; Kvirgic, 2010) SWF is also defined as “financial institutions (investment companies) of individual countries - which invest in individual countries: Chile, Mexico, Brazil, Japan, Spain, etc. “As a rule, these are closed-type funds and their actions oscillate around the net asset value per fund fund (NAV-Net Asset Value), but, interestingly, they exhibit the highest price volatility at the time of the stock market in the US, not at the time of operation the stock exchanges of the countries in which they invested. This suggests that they are less likely to act as foreign portfolios of actions, and more like domestic actions of the United States. “(Soskic, Zivkovic, 2011, pp. 481).

Although there is no generally accepted SWF definition, three elements are recognizable, which distinguish them from other investment funds: a) they are owned by the state, b) SWF does not have a clearly defined and limited liability, and c) SWF is separate from official foreign exchange reserves. Given that SWF behaves as a (CAMP-Capital Asset Pricing Model) model for determining the price of invested capital, some theoreticians raise the issue of their effectiveness as a factor of portfolio diversification. This is particularly true for newly developed SWF females in development. If it turns out that SWF is less important than the prediction of individual analysts, the reserves of Asia and the Middle East will likely cause major changes in the role of the US dollar and in the decision-making structure within the IMF. However, the available information suggests that SWF is mostly a conservative investor (IMF, 2008, p.4).

The investment strategy of the SWF can be explored through various theoretical and empirical approaches. Apart from several relevant sources (Bartolotti, Fotak, Megginson, 2010; Balding, 2008), there is no systematized empirical-statistical analysis of the SWF investment strategy that could serve as a platform for further economic

objectivization and more extensive academic and expert discussion on this topic. In the absence of a generally accepted SWF definition, there are also a number of open questions about the SWF investment strategy in the context of the globalization of financial markets. The establishment of SWF is still under a veil of secrets, the portfolio structure, portfolio diversification and investment strategies are only partially known for the lack of transparency in SWF's work. Due to lack of transparency, the theoretical and empirical research of SWF investment strategies is confronted with a number of unknowns. The Linaburg Madeuell Transparency Index has been developed for SWF transparency. Conscious of these limitations, we will strive to pay particular attention to the SWF assets structure, investment portfolio, investment models, corporate investment distribution, territorial investment allocation and the stabilization role of SWF as an investor in accordance with the available empirical and statistic data.

In the literature it can be found that SWF is not without influence on the global economic and financial crisis that began in 2008. The crisis, conditioned by uncontrolled capital flows in the global financial market, is a warning to the financial oligarchy that it must take into account the transparency of SWF. Some countries, such as Russia and Qatar, have used their SWF to mitigate the effects of the crisis. (Jen, 2007a). Developing countries have used SWF to buy shares in companies from the West and invest in areas that will reduce the effect of volatility in commodity prices on government revenues and balance of payments. Managed by this account, Chinese SWF bought in 2007 the shares of American companies Morgan Stanlez and Blackstone Group, and FNB from Dubai bought shares from Sony and several other Asian companies.

### **Previous research on SWF investment strategy**

In the introduction we pointed out that SWF is government investment funds, which are financed by surplus foreign exchange reserves, but managed separately from official foreign exchange reserves. The theory and practice agree that SWF's main growth factor is the large surplus achieved by individual countries due to high oil prices, financial globalization, and imbalances in the global financial system. We will support this research with empirical statistics and point to the countries with the largest SWF. The previous research (Balding, 2008, p.26) indicates that a developed (European) country - Norway and developing countries: the United Arab Emirates, Saudi Arabia, China, Kuwait, Russia and Singapore, are the foremost developing SWF.

Academic and expert filings show that SWF is a heterogeneous group of investment companies that instrumentalize different investment strategies in order to achieve different goals. However, the available data show that SWF are passive long-term investors with no special intention to influence the operational decision-making of companies, using their own voice. Some of the SWF also apply socially responsible investment and ethical guidelines that exclude individual investments (eg in the military industry or the tobacco industry). Also, SWF's investment strategy, with a significant share of investments in more risky financial assets such as shares, is far more complex and involves a much wider geographic allocation of investments.

In the paper we search for the answer of the question: why are some countries cautious about foreign investment? The answer of some politicians to this question

is: “The strengthening of state investment funds gives us a completely new, unknown element in the economic circulation,” she said in 2007. German Chancellor Angela Merkel, while French Foreign Minister Jean-Pierre Juet has also said that “... at the level of Europe, we need to organize better in order to defend our interests.” For all of this, it is understandable that under the auspices of institutions, such as the IMF and the OECD, initiatives have been initiated to somehow regulate SWF activity, pointing to an increase in the role of the investor in the sphere of investment in the global financial market.

There is a lot of theoretical discussions about the possibility and consequences of the restructuring of financial markets through SWF that are present in the scientific-professional public. The results of the survey (Kapor, 2008, p. 7) indicate that the restructuring of financial markets through SWF can start diversification not only outside the US dollar but also outside the euro area. In support of this assertion, it is stated that the official reserves are currently excessive both in the eurozone and in US government bonds. However, these theoretical arguments also have their limit because they ignore the role of the reserve currency of the US dollar and the euro, (OECD, 2007), which may be important in the “restructuring” of SWF in the global financial market.

The papers dealing with investment strategies of SWF (Bortolotti, Fotak, Megginson, 2010, p. 29) pay attention to the socially responsible behavior of these funds and give priority to projects that promote environmental, economic and ethical principles (Peaucelle, 2010). This promotes the transparency of SWF’s investment strategy and achieves the satisfaction of all stakeholders: owners, managers, investment funders, employees and society as a whole. Although some SWF have acquired significant ownership in many companies, they generally act as a portfolio investor, investing on the basis of a market index and buying only less participation in companies. Some SWFs, especially those newly established, hire external portfolio managers, while others rely on their own strengths.

In the end of the paper, we will see SWF as a counterweight to global financial institutions. The results of the survey so far indicate that theory and practice agree that the influence of SWF on the structure and stability of the global financial market will be envied in the coming period from the motives behind the investment decisions of these funds. It is certain that “benevolent” and socially responsible investments will positively influence the financial stability of investment flows, while non-commercial (“risk”) motives can have a negative impact on financial stability (Jen, 2007a).

### **Analysis of the operation and structure of the SWF portfolio**

Statistical empirical analysis for the purposes of this research was based on 1,216 SWF investments worth 357,1 billion dollars, using the FNB database (Bortolotti, Fotak, Megginson, 2010). This database is organized by Monitor Group and Fondazione Eni-Enrico Mattei (FEEM) and includes domestic and international investment 35 SWF in the period from January 1986 to September 2011. The database structure is based on three sources. The first source is the observation of 785 SWF investments in the value of \$ 250.9 billion and were obtained from public sources and from the Monitor Group, which includes investment in equity from the listed equity, unallocated capital, which is not unlisted equity, commercial real estate, private equity funds and joint ventures (Table

1). Another source is a listing of 239 purchases of shares purchased by pre-determined SWF groups, worth \$ 84.1 billion, contained in the Securities Data Corporation Global New Issues Database. This database includes companies that are on the list and those that are not on the list. The third source is a sample of 230 acquisitions from and outside the list, valued at \$ 71.8 billion, made by the SWF's previous SWFs, as shown in the Zephyr Mergers and Acquisitions database.

After combining three sets of data and a matrix of 71 common observations for two or more samples, the dates of investments are evaluated, amounted to SWF investors, and the purchased shares are monitored and recorded possible data (if possible). Although FEEM-Monitor SWF analysis is not comprehensive (because it does not monitor investing in corporate bonds), it is the most comprehensive database on the type and scope of SWF's realized investments.

The data systematized in Table 1 of the Monitor-FEEM SWF, disputed earlier opinion that SWF mainly invest in the purchase of stocks of Western listed companies. The analysis shows that although more than 90% (1,098 of 1,216) of realized investments represents equity participation, only one third of them are investments in shares of listed companies. The remaining two-thirds of investments represent the purchase of stocks of unlisted companies, private equity funds, initial public offers and joint ventures. The average value of investments in shares on the stock exchange is \$ 383 million, and this transaction was purchased on average 19.4% of the shares of the company, while the average value of SWF investments in unlisted companies was 349 million dollars, and in the initial public offering 396 million dollars. The values of these investments are similar to each other, as well as investments in shares of listed companies. However, the analysis shows that SWF purchases much higher shares in unlisted companies (53.3% on average) than investing in leased companies or initial public offerings (3.9% on average).

Investments in private equity funds are the largest SWF investments with an average value of \$ 1,905 million. Similarly, the acquired shares in these funds are large (on average 59.2%). Joint ventures are relatively small (with an average value of \$ 120 million) and an average value of 45.5%. SWF real estate investments are, on average, immediately behind initial public offerings in size (\$ 546 million) and include the purchase of the largest shares of 73.1% on average. But this is not a rule, but one of the strategies for portfolio diversification in order to reduce investment risk.

While typical SWF investments involve the purchase of significant but smaller roles in targeted businesses, one-third (261 of the 785 analyzed investments) of all jobs represents the takeover of the majority stake of the target company. In support of this, the analysis shows that the 184 cases observed relate to the purchase of 100% of the capital of the target company.

*Table 1: Portfolio Structure SWF – Monitor – FEEM Database*

	Total		Size (in mil.dollars)		Стечени уде (%)	
	Number of observations	Total value (in mil. dollars)	Mean value	Centerline value	Average allotment	Centerline part
All transactions	1.216	357.133	441	55	42,3%	26,2%
Quoted participation in capital	379	141.218	383	50	19,4%	9,0%

Unquoted participation in capital	719	170.659	453	361 (36)	450	52,5% (49,0%)
Unquoted operational companies	691	154.202	442	349 (33)	440	53,3% (49,0%)
Private capital funds	10	9.526	5	1,905 (1,200)	5	59,2% (46,0%)
Initial public offers	7	2.773	7	396 (170)	7	3,9% (2,7%)
Mutual investments and the rest	8	145	1	120 (120)	2	45,5% (45,5%)
Investment in property	118	45.256	83	546 (245)	56	73,1% (100%)

*Source: Bortolotti, B., Fotak, V., Megginson, W., (2010). Sovereign Wealth Fund Investment Patterns and Performance. Working Paper. University of Oklahoma.*

The analysis of the empirical-statistical data given in Table 1 confirms the theoretical stances of previous research (Mikkelson, Partch, 1985; Hertzfel, Lemmon, Linck, and Rees 2002) that most SWF investments make purchases of shares in companies by private arrangement and primary offer of shares. Only 23 deals, worth \$ 667 million, can be considered as open market buying shares in these companies. The source cited points out that all documents published by the stock exchange on private equity deals have a positive result, while the mass of empirical evidence shows that market reactions to public offers are negative 2-3%.

### **Analysis of investment portfolio of SWF**

In the previous section we emphasized that there is no relevant statistical-empirical material on the basis of which we can execute a reliable economic objectification of the financial performance of the SWF. There is relatively little comparable data on their assets, investment strategy and management. On the other hand, available information suggests that SWF is mostly a conservative investor (IMF, 2008, p. 7).

Although some SWF have acquired significant ownership in many companies, they generally behave as a portfolio investor, investing in a market index and buying only minor shares in companies. Some SWFs, especially those newly established, hire external portfolio managers, while others rely on their own strengths.

SWF can rightly be said to be a heterogeneous group of investment companies that instrumentalizes different investment strategies in order to achieve different goals (IMF, 2008, p.9). For example, some SWF only invests in publicly-listed financial assets (stocks and bonds) in strategic allocation of funds, while others invest in all major types of financial assets, including alternative investments (eg real estate). It is not uncommon for some SWF to manage stock market indices by establishing the maximum amount of investment in individual companies in order to ensure diversification of the portfolio. The other SWF is using a strategy to maximize absolute returns over a longer period of time, choosing to gain greater involvement in companies that they consider to be a profitable investment.



However, the available data show that SWF are passive long-term investors with no special intention to influence the operational decision-making of companies, using their own voice. Some of the SWF also apply socially responsible investment and ethical guidelines that exclude individual investments (e.g. in the military or tobacco industry).

SWF's external managers are mainly used to improve their profitability and achieve an active risk-adjusted yield, and at the same time to reduce the opportunity costs of holding large foreign exchange reserves. Although domestic experts, who manage foreign exchange reserves in many countries, generally have enough experience in investing in financial markets in fixed income instruments, their knowledge is limited when it comes to other types of financial assets (eg Actions). Therefore, more and more SWF rely on external managers in terms of strategic asset allocation, even for passive, index-based investments.

In any case, the SWF portfolio is much more diversified in asset allocation, than in the case of the traditional management of foreign currency reserves by the central bank. Also, SWF's investment strategy with a significant share of investments in risky financial assets (such as shares) is far more complicated and involves a much wider geographic allocation of investments. Proof of this is, for example, Norwegian SWF, whose assets make up 40% of the portfolio in shares and a much wider geographical dispersion of investments. It is estimated that SWF has a relatively higher investment in developing economies, which, despite considerable instability, yield higher yields in the long run. Practice shows that SWF still invest relatively little in hedge funds, private risk projects and real estate, which we discussed in more detail when analyzing the SWF Monitor-FEEM database.

## SWF investment model

Table 2 shows the empirical-statistical data on the structure and investment models of SWF. This table also presents the number and value of domestic investments - the purchase of shares in companies in the country of origin of SWF.

Singapore's SWF accounts for over 57% of the total FNB investment and 41% of total investment, while Temasek Holdings and its subsidiaries account for 42% of the total number of recorded investments and 18% of the value of all investments.<sup>2</sup>

Other SWF investors include China Investment Company (12 deals worth \$ 37.4 billion), UAE's Mubadala Development Company (62 deals worth \$ 30.3 billion), Istithmar (80 deals in the value of 26.96 billion Qatar Investment Authority (29 deals worth \$ 20.9 billion), the Kuwait Investment Authority (18 deals worth \$ 19.9 billion) and the Abu Dhabi Investment Authority (42 jobs worth \$ 19.1 billion). The data systematized in Table 2, draw attention to the fact that the number of FNB investments in the home country makes up only 21.6% of the total and 16.3% of the value of all SWF investments.

Табела 2: Sovereign Wealth Fund Home Country and Investment Patterns

Country	Fund name	Total number and values of investments		Number and value of domestic investments		Participation in capital quoted on the bourse		Participation in capital unquoted on the bourse		Investments in property		Other investments (private capital, initial public offers, joint investments)	
		Number of views	Value in millions of dollars	Number of views	Value in millions of dollars	Number of views	Value in millions of dollars	Number of views	Value in millions of dollars	Number of views	Value in millions of dollars	Number of views	Value in millions of dollars
Singapore	Government Investment Corp&subs	188	81.383	3	408	66	34.110	81	31.331	41	17.340	0	0
Singapore	Temasek Holdings, Temasek Capital	510	65.454	159	9.213	166	34.828	332	27.754	8	2.805	4	68
China	China Investment Company, Ltd	12	37.350	2	20.100	6	7.250	4	23.000	0	0	1	4.100
United Arab Emirates	Mubadala Development Comp	62	30.279	20	9.171	11	2.560	38	17.875	5	2.548	8	7.296
United Arab Emirates	Istithmar	80	26.962	15	3.972	22	5.195	37	7.110	26	14.658	1	unavailable
Qatar	Qatar Investment Authority (QIA)	29	20.926	0	0	13	9.291	8	5.891	5	4.744	3	1.000
Kuwait	Kuwait Investment Authority	17	19.878	1	unavailable	4	6.019	10	12.963	3	896	0	0
United Arab Emirates	AbuDhabi Investment Authority	42	19.072	7	51	19	14.372	19	3.565	4	1.135	0	0
United Arab Emirates	Dubai International Capital LLC	20	11.062	4	22	4	1.834	16	9.228	0	0	0	0
Malaysia	Khazanah Nasional Bhd	108	10.019	90	8.398	36	6.502	65	3.260	6	137	1	120
United Arab Emirates	Dubai International Financial Centre	11	8.858	3	unavailable	7	8.445	3	413	1	unavailable	0	0
United Arab Emirates	International Petroleum Investment Corp	20	8.081	3	1.821	5	2.413	15	5.668	0	0	0	0
Saudi Arabia	Saudi Arabia Public Investment Fund	3	4.266	3	4.266	0	0	3	4.266	0	0	0	0
United Arab Emirates	Dubai Financial LLC	8	2.922	0	0	3	1.073	6	1.849	0	0	0	0
United Arab Emirates	Investment Corporation of Dubai	3	2.518	1	unavailable	1	1.504	2	1.014	0	0	0	0
Libya	Libyan Investment Authority	44	2.101	1	unavailable	3	125	26	330	13	438	2	1.200
South Korea	Korea Investment Corporation	2	2.000	1	0.05	1	2.000	1	0.01	0	0	0	0
	The rest 9 funds	49	2.604	13	929	12	3.697	53	15.142	11	555	5	unavailable
	<b>Total</b>	<b>1.216</b>	<b>\$357.133</b>	<b>326</b>	<b>\$58.351</b>	<b>379</b>	<b>\$141.218</b>	<b>719</b>	<b>\$170.659</b>	<b>118</b>	<b>\$45.256</b>	<b>25</b>	<b>\$13.784</b>

Source: Bortolotti, Izop: B., Fotak, V., Megginson, W., Sovereign (2010). Wealth Fund Investment Patterns and Performance. Working Paper. University of Oklahoma.

The obtained results of the analysis show that the Singapore FNB is investment-oriented globally, while the Chinese SWF is primarily focused on the domestic market, especially since 2007, which coincides with the onset of the global financial and economic crisis. Also, Singapore's SWF is leading in the investments of listed companies, as well as real estate investments. However, the results are surprising for two significant SWFs - for Norwegian Government Pension Fund-Global and Abu Dhabi Investment Authority (ADIA). Although the Norwegian fund is the world's second largest SWF and recognized as a leader in global investment, there are no statistical data on the models and structure of investments in the previous table. This is because the fund signs subcontractors for investment managers (asset managers) and therefore has never been listed (registered) as a buyer of shares or real estate in any database.

There are two main publicly available reasons for a modest number of SWF investments (ADIA), where only 42 investments were recorded, although the total amount was \$ 19.1 billion. First, (ADIA) employs managers (asset managers) for a larger number of their investments, especially for smaller portfolio investments in these companies. Second, the (ADIA) has a more conservative investment philosophy than other SWFs, so that its investment strategy is dominated by capital investment, government and corporate bonds denominated in dollars, which are not visible to the search techniques shown in the previous table.

### **Corporate distribution of FNB investments**

Table 3 shows the balance (elements) of the corporate distribution of FNB investments. Empirical-statistical data aim to familiarize users of this analysis with the diversification of the FNB portfolio and their investments in companies of different sectoral affiliations. We note that FNB favors investments in financial companies of other sectors, which is shown by the results of the research presented in Table 3.

Investments in financial companies include 376 investments, accounting for 30.9% of all jobs by number, and more than half (54.6%) of total investments. Other important sectors that attract investments FNB are real estate (11.9% of jobs, 15.3% of value), information and communication technologies ICT (7.5% of jobs, 7.7% of value), production (9.1% jobs, 5.3% of value) and infrastructure (11.9% of jobs, 15.3% of value). It should be noted that favoring investing in financial companies is a phenomenon of a newer date. As noted in the earlier analysis, FNB has directed less than one-fifth of its investments to financial companies in 2007, and in the earlier years even less.

Table 3. International and Industrial Distribution of SWF Investments

	Finances	Property	Informational Technologies	Entrepreneurs	Infrastructures	Services	Production	Telecommunication	Consumer products/ services	Transport	Healthcare	Trade	Natural Resources	Energy and communal services	Materials	Others	Number of views/ total in millions of dollars
USA	41 \$79,385	13	15	7	0	17	6	2	5	5	13	1	1	2	0	2	132
Great Britain	19 \$18,537	18	1	2	2	12	10	2	5	1	4	3	Ha	\$400	0	\$14	\$79,385
China	18 \$26,318	21	6	4	1	\$6,174	\$1,547	\$134	\$94	\$118	\$3,187	1	1	\$369	\$17	0	\$47,688
Switzerland	3	\$2,070	\$122	\$42	\$925	\$1	\$34	\$5	\$852	\$406	\$6	\$20	\$50	\$20	\$29	\$50	\$31,000
UAE	\$27,160	0	0	0	0	0	\$1,290	0	0	\$1,970	\$43	0	0	\$77	0	0	\$30,540
Singapore	\$1,141	10	35	32	0	Ha	\$123	0	Ha	Ha	Ha	Ha	\$1,821	\$2,100	0	0	\$14,877
Australia	\$1,126	6	2	5	0	\$6	\$35	\$428	\$751	\$1,576	0	\$49	\$878	\$1,089	\$6	\$848	\$13,230
Malaysia	\$1,119	12	8	23	2	4	12	13	0	Ha	\$890	Ha	\$13	\$4,985	0	\$14	\$12,110
Hong Kong	\$2,786	0	10	4	3	0	\$158	\$2,563	Ha	Ha	\$321	\$37	\$55	\$191	\$36	\$55	\$10,550
Japan	\$319	8	0	3	0	0	\$182	\$1	\$207	0	0	0	0	\$52	\$9	0	\$7,915
Indonesia	\$238	0	0	6	2	2	3	2	Ha	\$173	\$95	\$862	Ha	\$780	0	0	\$6,939
India	\$2,874	0	0	8	2	4	\$34	\$1,270	Ha	0	0	0	0	\$363	0	0	\$5,680
South Korea	\$993	2	0	0	0	0	Ha	\$2,191	\$547	\$379	\$152	0	0	\$38	Ha	0	\$4,884
Thailand	\$445	3	3	0	0	0	\$82	\$1	0	2	\$463	0	\$730	\$142	0	0	\$3,592
Italy	\$2,465	2	1	0	0	6	0	\$23	\$10	Ha	0	0	0	\$425	0	0	\$3,194
Others	\$29,928	51	8	12	3	34	25	8	\$4	Ha	0	0	\$36	0	0	1	\$2,606
Total	376	145	91	111	16	92	75	\$2	\$379	\$1,259	\$214	\$165	\$18	\$18,943	\$113	\$489	\$113,414
	\$194,834	\$54,571	\$4,852	\$18,907	\$14,369	\$22,080	\$9,965	\$8,247	\$6,414	\$6,032	\$5,556	\$3,780	\$3,601	\$29,974	\$210	\$1,470	\$357,133

Source: Bortolotti, B., Fotak, V., Megginson, W. (2010). Sovereign Wealth Fund Investment Patterns and Performance. Working Paper. University of Oklahoma.

## Countries invested by SWF

For the economic objectification of the SWF investment strategy, it is not enough to look at the sectoral structure of investments, but it is also necessary to explore the territorial distribution of the countries invested by SWF. Therefore, Table 3 can serve us as the global distribution channel for SWF investments. As seen in Table 3. Singapore is the country that receives the “numerical” maximum investment (177) of the SWF (from its two funds), but the financial amount of these investments (\$ 13.23 billion) is insignificant and places it only to the sixth place.

The United States is the most popular destination for SWF investments in terms of total investment value (22.2%) of the value of all SWF investments and 10.9% of the total number directed to the US market.

China is the second country in terms of SWF’s investment value. The largest number of 79 investments, whose total value is 31 billion dollars, make domestic investments. China Investment Corporation is \$ 20 billion in December 2007 bought shares in the Chinese Development Bank (China Development Bank) and this represents the largest single investment in the observed database.

In addition to Singapore, the United States and China, other SWF-investing countries are the United Kingdom, the United Arab Emirates (mainly domestic investment), Australia (mainly foreign investment) and Malaysia (mostly domestic investment). In addition to investing in domestic companies, research shows that FNB buys real estate and shares in countries with English customary law: the United States, Great Britain and Australia.

## Conclusion

National wealth funds are an important segment of the global financial market. These financial institutions have their past, present and future. Over time, they have built their physiognomy, replacing themselves and the financial environment. The SWF portfolio has changed chronologically. Initially, SWF’s portfolio structure was dominated by government securities denominated in foreign currencies. With the globalization of the financial market, especially in the last decade of the 20th century and the first decade of the 21st century, SWF is transforming itself into “managers of surplus foreign exchange reserves” and other securities denominated in foreign currencies.

Although it is thought that SWF, most commonly, buyers of stocks in Western companies listed on the stock market, research shows the opposite. Namely, in the total capital of SWF, only one third are investments in shares of listed companies. The remaining two-thirds include the purchase of stocks of companies not listed on stock exchanges, private equity, initial public offerings and joint ventures. This is understandable, bearing in mind that SWF’s investment strategy with more significant investment in risky financial assets (stocks) is far more complex and includes a much wider geographic allocation of investments. Investments in private capital are the largest SWF investments, followed by real estate investments, and joint ventures are relatively small. Singapore SWF is an investment oriented globally, while Chinese SWF primarily focuses on the domestic market, especially since 2007, which coincides with the onset of the global financial crisis.

The survey shows that in the structure of sectoral investment, SWF is the leading financial company (54.6% of total investments), followed by real estate (11.9% of jobs, 15.3% of value), infrastructure (11.9% jobs, 15.3% of value). (7.5% of jobs, 7.7% of value) and industry (9.1% of jobs, 5.3% of the value). The USA are the most attractive country for FNB investments in terms of total investment value (22.2% of the total value of FNB investment goes to the US market.) China is the second country in terms of SWF's investment value, with domestic FNB dominating in the structure of overall investments, Singapore is the country that receives the most investment (117), however, the investment places it only in the sixth place. United Arab Emirates has attracted nor for FNB investments, mainly dominated by the domestic FNB, the same is the case with Malaysia, while Great Britain and Australia are more attracted to foreign FNB investments, Analyzes also indicate that the number of FNB investments in the country of origin is only 21, 6% of the total number and 16.3% of the value, all, of the FNB investment.

The investment strategy of FNB can contribute to the expansion of the long-term investment basis for risky assets, such as stocks, corporate bonds, private equity and real estate. Although in theory and practice there is a concern that a particular FNB may be prone to a sudden sale of funds, which may lead to financial market instability, the survey shows that there is no firm evidence of investment strategies that would adversely affect the market integrity. True, FNB can lead to excessive risk and deformation of property values, if they are guided by investment motives of FNB acquisition, which is most often politically motivated.

With the reference to the methodology of scientific research in the end of this paper, we point out: however much the obtained research results are relevant, they can not serve as a “credible” statistical-empirical basis for a reliable economic objectification of the financial performance of FNB and their investment strategies. Theory and practice agree that during the next period, the influence of FNB on the structure and stability of the global financial market will be envied by the motives behind the investment decisions of these funds. It is certain that the “well-meaning” and socially responsible investments of the FNB will positively influence the globe's financial stability, and that non-commercial motives (“risk”) may have a negative impact.

## References

- Aizenman, J. (2007). Sovereign Wealth Funds: Stumbling Blocks or Stepping Stones to Financial Globalization. *Economic Letters No. 38*. FRBSF.
- Allen, M., Caruana, J. (2008). Sovereign Wealth Funds-A Work Agenda. Prepared by the *Monetary and Capital Markets and Policy Development and Review Department*, IMF.
- Balding, C. (2008). A Portfolio Analysis of Sovereign Wealth Funds. Working Paper. University of California-Irvine.
- Bernstein, S., Lerner, J., & Schoar, A. (2009). The Investment Strategies of Sovereign Wealth Funds. *Harvard Business School*. Boston.
- Bortolotti, B., Fotak, V., & Megginson, W. (2010). *Sovereign Wealth Fund Investment Patterns and Performance*. Working Paper. University of Oklahoma

- Davis, J., Ossowski, R., Daniel, J. & Barnett, S. (2001). Stabilization and Savings Funds for Non-Renewable Resources: Experience and Fiscal Policy Implications, in Davis, J., Ossowski, R., and Fedelino, A., (eds), *Fiscal policy formulation and implementation in oil-producing countries*. IMF. Washington, pp 273-315.
- IMF, (2008). *Sovereign Wealth Funds- A Work Agenda*. February. Washington DC.
- Jen, S. (2007). Sovereign Wealth Funds: What They Are, and What's Happening. *World Economics* 8, no.4, IMF Survey online.
- Jen, S. (2007). How Big Could Sovereign Wealth Funds Be by 2015?. Global Economic Forum. Morgan Stanley.
- Johnson, S. (2007). The Rise of Sovereign Wealth Funds. *Finance and Development*, 44, No. 3. International Monetary Fund.
- Капор, П. (2008). Државни инвестициони фондови. *Пословна политика*, бр. 10-11, Београд.
- Квргић, Г. (2010). Управљање инвестиционим фондовима. Висока школа за пословну економију и предузетништво. Београд.
- Mikkelsen, W. H., Partch M. M. (1985). Stock price effects and costs of secondary distributions. *Journal of Financial Economics* 14. Rochester NY, p. 165-194.
- Mishkin, F. (2006). Монетарна економија, банкарство и финансијска тржишта. ДатаСтаргус, Београд.
- OECD Investment Newsletter, (2007). *International Investment of Sovereign Wealth Funds: are new rules needed?* Issue 5, p.4-5.
- Peaucelle, I. (2010). Sovereign Wealth Funds, BRIC and Sustainable Development. W.P. for IV Forum. *Environment, Innovation and Sustainable development*. Marseille.
- Rozanov, A. (2005). Who Holds the Wealth of Nations?. *Central Banking Journal*, Volume XV, Number 4.
- Schubert, W., Barenbaum, L. (2010). The Sovereign Wealth Fund Controversy: The Issues and Suggestions. *Journal of Applied Business and Economics*, Vol. 11, No. 2.
- Truman, E. M. (2007). Sovereign Wealth Fund Acquisitions and Other Foreign Government Investments in the United States: Assessing the Economic and National Security Implications, Testimony before the Committee on Banking, Housing, and Urban Affairs, United States Senate. November 14.
- Hertzel, M., Lemmon M., Linck J., & Rees L. (2002). Long-run performance following private placements of equity. *Journal of Finance*, Volume 57, Issue 6, p.2595-2617.
- Шошкић, Д., Живковић, Б. (2011). *Финансијска тржишта и институције*. Економски факултет, Београд.
- Washington Post, (2007). Crisis Comes to the IMF. October 19.
- Sovereign Wealth Fund Institute, <http://www.swfinstitute.org/fund-rankings/>

**Vladimir Dragojlović<sup>1</sup>**  
*University Business Academy, Novi Sad,  
Faculty of Applied Management,  
Economics and Finance, Belgrade*

SCIENTIFIC REVIEW ARTICLE  
doi:10.5937/ekonomika1804133D  
Received: October, 09, 2018  
Accepted: November, 05, 2018

**Branko Mihailović<sup>2</sup>**  
*Institute for Agricultural Economics, Belgrade*

**Srdan Novaković<sup>3</sup>**  
*University Business Academy, Novi Sad,  
Faculty of Applied Management,  
Economics and Finance, Belgrade*

## MARKETING ACTIVITIES FOR THE PURPOSE OF MARKETING CULTURE DEVELOPMENT IN EDUCATION AND EDUCATIONAL INSTITUTIONS

### Abstract

*Education, as one of the most complex human activities, cannot work and develop in contemporary conditions without the implementation of current knowledge from other sciences and scientific disciplines. There is an undeniable contribution which can be provided to education by means of marketing and development of marketing orientation. In this process, a special responsibility belongs to school management which should methodically run its organization from school to marketing culture, thus achieving goals related to greater efficiency and quality of school. Such management would enable the school to react more efficiently to changes in the environment, to new services offer, successful market operations and to perform activities in accordance with the requirements and expectations of internal and external users of services.*

**Key words:** education, management, marketing, culture, organization

**Jel Classification:** I29, M31

## МАРКЕТИНГ АКТИВНОСТИ У ФУНКЦИЈИ РАЗВОЈА МАРКЕТИНШКЕ КУЛТУРЕ У ОБРАЗОВНО-ВАСПИТНИМ ИНСТИТУЦИЈАМА

### Анстракт

*Образовање, као једна од најсложенијих људских делатности, у савременим условима не може функционисати и развијати се без имплементације актуелних сазнања из других наука и научних дисциплина. Неспоран је допринос који образовању може пружити маркетинг и развијање маркетиншке оријентације. У овом процесу посебну одговорност има менаџмент школе*

<sup>1</sup> dragojlov@yahoo.com

<sup>2</sup> brankomih@neobee.net

<sup>3</sup> srdjan.novakovic@mef.edu.rs



*који своју организацију треба плански да води од школске ка маркетиншкој култури чиме би се остварили циљеви везани за већу ефикасност и квалитет школе. Такав менаџмент би омогућио брже реаговање школе на промене у окружењу, на понуду нових услуга, успешно тржишно пословање и обављање делатности у складу са потребама и очекивањима интерних и екстерних корисника услуга.*

**Кључне речи:** *образовање, менаџмент, маркетинг, култура, организација*

## Introduction

The public education system has long been facing great challenges and changes, various reform attempts, tendencies and directions. We are witnessing constant reform measures in the educational system that range from original individual solutions to the imposed and dominant solutions in line with the educational policies of the European Union.

Public sector schools possess every characteristic of non-profit and service providing organizations. As such, they have suddenly found themselves in an environment characterized by the existence of an educational market and competitive business conditions. This entire ambiance is in particular determined by large demographic changes, which is clearly reflecting the reduction of the already limited education market. Also, the demands and expectations of internal service users are increasing. Both they and the educational authorities insist on the highest quality of educational services. All of the above mentioned is happening in a situation where financial resources for this purpose are increasingly limited and insufficient.

Characteristics and functions of marketing of the non-profit and service providing sector are also applicable to educational activity, of course with respect to certain specificities. Earlier schools have used some sort of marketing as well, often unconscious of the fact that the activities they were conducting were actually marketing activities. Such attempts were mostly unplanned and random. For many of the problems that today's Elementary Schools are facing, marketing has already provided complete solutions, therefore any speculation and search for solutions beyond marketing would mean "knocking at the open door". A school which is marketing-oriented and has a high level of development of marketing culture has all the prerequisites for domination in the education market. It will position itself in the local community as a prestigious school that successfully operates and has satisfied internal and external users of its services.

One of the main tasks of school management should be the specific marketing activities which would grow the existing school organizational culture into a marketing culture. It would enable teachers and professors to be more engaged in meeting the requirements, wishes and expectations of students, parents and the local community, while at the same time enabling them to meet their own needs as well as requirements of the school employed at.

Apart from the need to modify the current organizational culture in this direction, certain knowledge in the area of marketing is also required. Throughout this reform process, the importance and role of a school manager as a person who is most responsible for top quality and successful business of schools is vital. In that sense, dealing with marketing activities should become another one of his daily management activities. Of course, he cannot do this by himself or as a part of a certain professional team, but he must try to develop awareness among all employees about the need to accept the marketing orientation of his school and the necessity of developing a marketing culture.

## Changes in the school environment

Current educational practice requires the necessity of applying a marketing concept in educational institutions as a guarantee of their successful functioning in the education market.

Schools from the public sector completely share the fate of the society and the state in which they perform their activities and which had founded them. The numerous social, economic, political and globalization problems reflect the work and functioning of the Elementary School, whereby constant exposure to the public judgment only contributes to the increased critical attitude towards it, whether dealing with the concerned public or external and internal users of services.

The processes of democratization and transition that had occurred in our country in recent decades have opened the path for many social changes. Of course, these changes also affected the domain of education as one of the most complex and most dynamic human activities. Speaking about the process of transition P. Rado (2002, p. 13) discusses its three components:

- transition from a totalitarian system to a free, democratic system
- overcoming deep structural economic crises by moving from planned, state-owned economies to free-market economies
- modernization, adaptation to dramatic global changes

Education and education policy had to respond to the demands of all three components and the reform was mainly performed in terms of moving, striving for a type of role model, pattern. Mostly European models and European standards are becoming the main goals of the education policy, rather as a result of the proclaimed preparations for joining the European Union. This is also related to the emergence of the private sector in education and its functioning on typical market principles, which was first felt in the field of high and pre-school education and slightly in the field of primary and secondary education. Such a possibility was created because the transition in education enabled the transition from a conductive system to a demand-based system (P. Rado, 2002, p. 23), which among other things implies that students are the central point of educational policy, that the focus is on learning outcomes, improving the quality of the educational process and cost-effectiveness, that the system is decentralized and liberalized, that the number of interested parties involved in education has increased etc.

Also, along with the process of democratization of society, the process of decentralization exists as immanent. In the field of education, it means that certain powers are conferred to schools, providing them greater autonomy primarily in terms of independent decision-making about the content and offer of their service programs. This enables schools to more systematically analyze the needs of their immediate surroundings in new market functioning conditions and to respond more adequately to the identified needs.

Slovenian author Metod Resman discusses the organizational and political decentralization (2004, p. 14-15), where, under organizational decentralization, he considers a technical solution by which the central educational authority organizes its administrations throughout the entire territory of the state, and manages school system by means of such an administrative apparatus, while political decentralization implies the transfer of powers to local educational authorities provided that they are able to independently manage education in their territory and states that for this decentralization there are three key reasons:

- financial: more rational business using available funds,
- professional: greater participation of teachers, and therefore greater motivation for better work,
- ideological: adapting the program to the requirements of the school environment, respecting the culture of interpersonal relationships.

Marzano R., Waters T., McNulty B. define and summarize their observations on the school environment using a sentence that the school is not an island (2005, p. 58), and that it functions in a complex context to which special attention is to be paid if one wants its performance to be of high efficiency. The school Principal is required to show willingness to be a school representative and exponent in front of the people in charge of the school, which means that he must be willing and able to communicate with individuals inside and outside school. In short, the authors (2005, p. 58) insist on expanding partnerships outside the school framework, i.e. justifying their position by the fact that “for raising a child participation of all of us matters”, with the recommendation that the school has the obligation to follow all state and local laws and regulations, and that it is the duty of the director to be a school representative with the parents, within school management and the wider community.

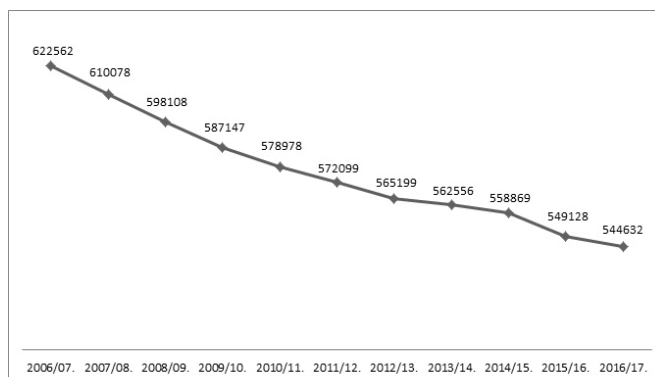
Although good relations of educational institutions with the environment were always important, and today they represent the existential requirement for their survival (S.Staničić, 2011, p. 59), in practice, schools continue to act in different ways towards the environment. Some schools view themselves as a closed system with no external influences. In contrast, some schools consider themselves as a wide open institution, and see the opportunity in the environment to present their values and attract users.

From a number of factors from the external environment that directly or indirectly influence to the functioning of the school as an organization and consequently to the overall results of the educational process, the demographic factor is the most important factor that is in line with the subject matter of this paper. The basic characteristic of demographic factors in our society relates to the rapid decrease in the number of inhabitants as a result of an ever smaller number of newborns, i.e. the extremely negative population growth. This reflects the school as it remains with an ever-decreasing number of enrolled students, generally smaller number of total service users, which undermines the survival of many schools and many public sector education jobs.

It is interesting that these negative trends and changes in the environment related to the smaller number of pupils in schools are more dealt with by the media, often with their sensational texts, than by the professional public and by the creators of the state education policy.

Exact and reliable data on the decline in the number of pupils in schools is published by the Statistical Office of the Republic of Serbia.

*Chart 1. Number of Pupils in Elementary Schools in Serbia by years*



Source: [www.rzs.stat.gov.rs](http://www.rzs.stat.gov.rs)

From the reliable data published by the Statistical Office of the Republic of Serbia, a rapid decrease in the number of students in Serbian Elementary Schools can be noticed. In the 10-year period, this number is lower for almost 80,000 students. The decline in the number of students per year goes straight to a negative trend and the assumption is that such a trend will continue.

The direct consequence of these changes is the phenomenon of the so-called technological surpluses in the area of primary education, the emergence of more and more teachers with insufficient number of classes, anxiety before every new entry of first grade pupils, attempts of schools to use their resources and make the school more attractive to potential students promoting their activities and offering special and specialized programs, with the ultimate goal of ensuring the survival of the school.

In such an environment, realizing the seriousness of the problem, some schools and their managers are directing their organization towards a new idea - the marketing orientation, aware that in the education domain only those schools which are market-oriented and focused on meeting the needs of the target market will survive.

### **Marketing culture and marketing planning at school**

The new problems faced by today's school have resulted in the need to develop more effective communication between the school and the beneficiaries of services, to build a good image and a positive climate and culture in the school, and to make the school itself as efficient organization as possible.

J. Pavičić (2001, p.103), adapting various definitions, defines the application of marketing i.e. the marketing orientation of a non-profit organization as: an organizational culture that shapes the behavior required for “creating superior value for users and for continuous superior performance”. Based on the results of some empirical research he says that organizations that are systematically using marketing, i.e. are “marketing-oriented” achieve better results in their performance compared to the target groups they address to than those who rarely or sporadically use or do not apply marketing at all.

One of the special forms of organizational culture is marketing culture. Marketing culture is reflected in the quality of work, the satisfaction of students, parents and teachers, in mutual relations, competitiveness, organization, internal communication and innovation (V.Logaj et al., 2006, p.6). The authors believe that marketing culture has particular practical value, which can play an important role in the prevention of some current problems in the school, such as various forms of violence, lack of instruction, lack of motivation and dropout of students, while at the same time it can increase the identification of teachers and pupils with school and strengthen the position of the school in the local community.

In education, marketing is an active and creative process. Due to its recent application it can be seen as a reform process and innovation. It involves engagement in the implementation of specific tasks, it includes a range of different activities, which requires quality strategic marketing planning in the school. Current school practice shows signs of implementing marketing activities, but the issue of their adequate planning is posed, thus imposing the necessity of urgently required training of teaching staff in the domain of marketing. Currently, the expectations of teaching staff are that the school Principal, as the most responsible for its successful functioning, should undertake an initiative in the field of planning and realization of marketing activities. In this area he can establish a team of marketing associates and carry out the redistribution of duties and responsibilities among employees, but it is most important to influence the awareness

of all of his employees regarding the importance of applying marketing activities and marketing orientation of school.

As much as schools plan well and realize their marketing activities, it will never be possible for all schools in the local community to be fully satisfied with the results achieved, especially when it comes to the number of students enrolled in school. This is the problem of a restricted market, as the case is with educational market, where the new number of pupils of the first grade will never be enough to satisfy all the schools. Some schools will be more successful, but at the expense of other schools. If any school makes a success in this activity, it automatically means that some other school has come to a problem situation. Herein a clear conclusion can be made that success will only be achieved by those schools that are more successful in the field of planning and realization of marketing activities.

In our country, each school is obliged to make place for a separate section to marketing in school in its Annual Work Plan which is the operational document of each school, in accordance with the envisaged structure of the said document. Although untrained for dealing with marketing matters and marketing issues, schools act in accordance with the instructions they receive from competent educational authorities. It is suggested that the section “The Plan for the Implementation of School Marketing Programs” should contain information on the planned activities in the field of internal marketing (information and presentation of school activities by means of site, announcements, school list, bulletins, yearbooks, bulletin boards, book notifications) marketing (information and presentation of school activities in the media, as well as cooperation with economic organizations, other schools and institutions). It is clear that schools adhere to such suggestions, which, unfortunately, only deepen the already existing gap in the correct understanding of the concepts of marketing, marketing communication and promotion. Hence we have come to complete equalizing these terms concerning their meaning. Therefore, in the school practice, in the Annual Work Plans section, specifically promotion and communication are stated, which is far from one of the simplest determinations of marketing, according to which the marketing process of communication between the organization and the target groups deals with satisfying the existing and anticipating the awakening needs of the target group and organizes market research in order to provide information on the needs and requirements of the target groups.

Planning, as a basic requirement for the successful realization of some activity, is an important segment of marketing activities in the school. In an attempt to obtain a clearer picture of the situation in our schools, by the random sample method web sites of over 50 elementary schools in Serbia were analyzed, namely their Annual Work Plans and planned marketing activities. The analysis shows that in most cases this topic is mainly about promotional activities and communication. Among the schools themselves, there are large differences in the way in which marketing is perceived, and some characteristic observations are distinguished:

- All schools distinguish the internal and external marketing
- Under internal marketing, they consider school boards, school site, fb site, and under external marketing they consider activities of informing the general public about everything that happens in school through local media, publishing student literary and artwork in children’s magazines
- Some schools have formed teams for school marketing, defined team members and coordinators, detailed action plan, method of realization, place, time and executors
- In most schools, among the planned pre-marketing activities events on the reception of pupils of first grade are predominate, as well as children’s

workshops, exhibitions of fine arts, handicrafts and artistic works, sports day, editing and updating of the site of the school and fb site, production of suitable materials representing school - brochures, badges, t-shirts, school supplies with school logos, issuing school leaflets, marking significant dates, participation in municipal, regional and republican festivals and competitions

- One school notes that school activity has to be presented with as much marketing as possible, that school marketing is very poorly developed mainly due to lack of funds, but also inadequately trained marketing staff and sees the solution in intensifying internal marketing by editing the site and by upgrading the information system of the school with automatic data processing
- The other school sees the opportunity in marketing for further development and improvement of the reputation and image of the school and its promotion not only in the local community, but also in the wider region; plans to pay special attention to cooperation with parents with an emphasis on improving the teacher-pupil-parent relationship and establishing a high quality cooperation with the social environment
- In external marketing, the school sees the chance to properly present the public everything that has been well done in school, and to center the interest of the local community and others to all problems related, for example, to the material position of the school, working conditions, etc.
- Some schools have fully delegated the planning of marketing activities and the responsibility for the implementation of the same to the person they designated as “school PR”
- Only one school has planned the activity of presenting itself in preschool institutions in order to attract a greater number of future users of their services, i.e. first grade pupils
- As promotional instruments schools mainly use written material and promotional events.

Such diversity in practical marketing approaches is at the same time a great possibility to create good and original ideas and a good opportunity for elementary schools, since some of them see a chance to solve some of their current problems and improve their work using marketing. Such a wealth of diverse approaches and ideas should only be accompanied by a unique layout of the marketing plan for each elementary school.

At the same time, by insufficiently broad and correct understanding of marketing, schools do nothing to implement the identification and attraction of future users of their services, as well as potential sponsors or donors. The essence in school practice is that the entire marketing activity is reduced to informing users of the various activities that the school implements, especially emphasizing successes and awards, which is reduced to the segment of public relations activities and to improving the image of the school in the awareness of service users and the wider local community. However, according to Grubor A. and Đokić N. (2014, p. 32) promotion has an unquestionable importance in image building, but “for its full realization, interaction is necessary, and even the synergistic effect of promotion with other marketing mix instruments.”

The analyzed status identifies, in a sense, the concept of marketing as a link between school and service users. To a certain extent, but not sufficient, this approach has satisfied some of the needs of both schools and users. However, these arguments prove that this is insufficient and does not reflect the true sense of marketing and marketing

activities. Also, in the analysis one does not find any indication that any school in the marketing activities has planned or realized any activity related to monitoring or research of changes in the environment, and therefore there are no plans or strategies to adequately address these changes.

One of the few authors from the region who studied marketing culture A. Bajrić (2008, p. 52), in his analyzes concludes that marketing culture is at a rather low level and that research in this field is extremely scarce. In practice, he concludes that some schools use certain marketing tools in marketing communication with the environment and target groups while some schools do it without knowing that it in fact is marketing communication. The intensity of this communication is particularly increasing between high schools and finishing elementary school pupils and their parents, with the aim of enrolling these students into their school. He notes that some schools are particularly skillful in marketing communication, using the achieved results in learning at municipal, republic and international competitions. Schools that do not enroll a sufficient number of students undertake some marketing activities mainly by offering new programs but without sufficient research and analysis of the needs of the users of their services. Marketing communication is mainly directed to advertising of some presentations, to distributing of written materials, etc., but in general, schools still leave the impression of sleepiness and do not respond adequately to changes in the wide and close environment.

### **Responsibility of school management in planning marketing activities**

Different documents, whether legislative or research ones, directly or indirectly foresee the head of the educational institution to deal with the issues of marketing in education, meaning that marketing activities are his own obligation within the stated field of work and the stated responsibility.

This way, dealing with marketing activities becomes another in a series of managerial activities of school Principals. And in this area he must plan, organize, manage, lead and evaluate. Through marketing activities, the Principal will successfully communicate with numerous users and in particular will easily identify and meet the needs and wishes of the employees. Precisely in all of his human resources he needs to look for associates and partners in the planning and realization of marketing activities in the school, so that the entire school can get a recognizable marketing orientation. It is unacceptable for all the care and marketing obligations to be reduced to the Principal or group of his closest associates. The obligation of all employees is to accept the proclaimed marketing plan of their school and to act in accordance with it. If only one employee acted contrary to the established internal marketing strategy, this would bring irreparable damage to the school.

However, school Principals often understand poorly the marketing (J. Kurević, 2007) and in most cases marketing is reduced to promotion. At the same time, the state and the competent educational authorities do nothing in terms of marketing additional training and education of Principals. The official program for training of Principals still does not exist, and the number of accredited seminars in the field of marketing in education is traditionally negligible. Thus, Principals are forced to act intuitively, randomly and experientially.

In order to perceive the current situation in our schools, data from 38 elementary school managers at the Moravian District level were collected. As a pattern and model for analysis, research conducted in Australian schools was used (Jeff Bromage, 2007)

and the aim was to examine the opinion of the Principal as a school manager in the field of promotional activities and marketing communication of the school that he manages.

In short, some of the basic conclusions are as following:

- Promotion and marketing activities are the tasks that principals are dealing with daily
- Principals apply many marketing activities without being aware of it
- They do not know the difference between the terms of promotion and marketing, they tend to identify them, i.e. to consider promotion as marketing
- In the Annual Work Plans of their Institutions, Principals mainly provide promotional activities in the “School Marketing” section
- In a small number of cases, Principals introduce or plan to introduce a new service
- Almost everyone thinks that the most effective promotion is “talk” promotion, i.e. personal recommendation
- They do not have planned budgets for promotional activities
- They did not have any systematic training or marketing seminar
- They believe that their role in promoting school is the most important, but they expect the help of all employees
- All Principals believe that promotion and marketing are important for their school
- The most common promotional tools are the website, brochures, Open Doors Day, student performances...

However, adopting the “Rules on the Standards of Principals Competence of the Educational Institutions” in Serbia, some clarifications and order have been introduced in the areas related to the role of Principals in managing marketing activities in education. Some of them belong to typical marketing activities, such as: promoting innovations; creating a positive working atmosphere; developing professional cooperation; constructive communication with employees, pupils and parents, etc..

The school Principal (V. Logaj, 2006, p. 21) has a special task to increase the identification of teachers and pupils with school by means of his activities, to increase the reputation of the school in the local community, to create a positive image of the school and to increase the engagement of teachers in terms of satisfaction of the needs of students, parents and other users. It should also enable teachers to better meet their own needs and the requirements of the school in which they are employed. In order to realize these efforts, the Principal needs a particular plan, since it is about domains interlinking, supplementing and connecting to all areas of the Principal’s work.

It is desirable for school management to adhere to certain recommendations that will enable it to efficiently model the marketing culture and effectively manage marketing in the school.

First of all, V. Filipović and M. Kostić Stanković (2009, 117) suggest that all school goals should be specifically established after defining the mission and directed to 4 areas:

- Efficient satisfaction of user needs
- Innovations, new content and enrichment of existing services
- Obtaining human, financial and other resources needed to provide good service
- Achieving high efficiency.

Based on these recommendations on the subject of marketing management, it follows that school management should conduct activities that directly act on the market, that it is in constant contact with the environment and should anticipate changes that



come from the market, but the authors also recommend the opinion of M. Milisavljević (2002), who considers marketing management as a process to initiate and direct marketing activities in order to meet needs, consisting of three phases:

- Planning - the management process stage in which decisions are made regarding the goals, policies, strategies, programs and plans of marketing activities
- Organizing - the management process stage in which the organizational structure is created and the immediate activity of the marketing function is organized
- Controlling - the stage in which the realization of planned decisions (goals, policies, strategies, programs and plans) is measured as well as the organization's efficiency, followed by corrective actions in the organization and operating of the marketing function of the organization.

American authors (J. Kouzes, B. Posner, 2012, p. 29) propose such a systematization that seems to be the most practical recommendation to Principals on how to act, or how to manage the school in order to achieve the goal of creating assumptions for developing an effective marketing culture. Within their recommendations, the authors list 5 preferred practices, behaviors, methods of work of the Principal and each proposed practice has 2 basic obligations. By realizing and implementing these practices and duties, the Principal will be positioned as a successful and exemplary manager. The Principal is primarily required to model the way that his school and employees will follow. In order to successfully model the path, he has an obligation to clarify the values that are fostered in school and to affirm common values, whereby all procedures at school need to be harmonized with those values. The Principal must inspire a common vision by anticipating the future, imagining exciting and refreshing challenges. In the process of building a common vision, he should involve other employees by referring to common intentions. During this process of building a common vision, the Principal should pose challenges by looking for opportunities to improve his work, taking the initiative, and openly seeking innovative ways to improve his work by experimenting and taking the risk to himself. It is desirable for the Principal to allow others to be active, to act, by working first on fostering cooperation, building trust and establishing close relationships. He will empower its employees by being personally an example of a commitment to improve their own professional competencies. Finally, the Principal is expected to encourage self-sacrifice, courage, sportsmanship among employees, to respect their contributions, to appreciate individual excellence and celebrate values and victories by creating a community spirit.

From the above the conclusion is that the Principal, through the realization of his role in various fields of work, and for the purpose of creating a successful school, actually creates a marketing culture that enables the attainment of that goal. By successfully applying his competencies and management method, the Principal creates the basic prerequisites for developing a marketing culture in the school. This is the reason for emphasizing the key role of Principals in this process.

## Conclusion

The marketing concept can improve the operation of educational institutions and it represents the most important condition for their survival in the education market. It is also possible to accept and act upon the model of an effective marketing culture that

would be applied in schools. By accepting such a model of effective marketing culture, the school would be able to achieve competitive advantage and better positioning in the local education market. If the school has a monopoly over the local education market, then the model of efficient marketing culture will have a priority effect on improving the quality of educational work and better meeting the needs of internal and external users.

In order to achieve a high degree of marketing culture, school management should primarily be engaged in the systematic evaluation and monitoring of the quality of work of employees and dedicated to providing full satisfaction to students, employees and parents. In such a school, all employees should strive for a common vision and plan carefully their work every day, while school management will appreciate employees who achieve top results, enable continuous professional development of teaching staff, and encourage a culture of dialogue among employees. Finally, such a school will be the first to introduce innovations into the educational process.

As this is a case with a set of interconnected and interacting elements, we can consider this marketing culture as a system, and components of marketing culture as parts of that system. This allows us to talk about the systemic approach to the theory of marketing culture in the school, since it is a unique whole of mutually dependent elements that function in harmony.

Throughout the entire reform process of developing a marketing culture in the school, the importance of the school Principal as well as of the overall school management is huge, as a function that is recognized as crucial for the quality and successful operation of a school. The Principal of the school, as a management authority in the institution, who according to the envisaged standards has the greatest responsibility for its quality and successful business, must take on new management activity in order to more completely realize the mission and vision of the institution it manages. This activity primarily relates to the establishment and development of a marketing culture. Since this is another, new tasks for the Principal, and there are more and more of them, this will definitely lead to an overload of workloads. The solution is in the redistribution of managerial tasks and the development of awareness among all employees about the necessity of developing a marketing culture in their organization, specifically in an elementary school.

From all of the above, it can be concluded that the developed marketing culture in school can be a crucial instrument for solving the most current negative phenomenon in our schools, and it refers to the phenomenon of bullying. Organizational culture characterized by intense communication among users, respect and satisfaction of their needs and expectations, is the main strategy that would preventively act on the suppression of bullying, abuse and neglect, which could be empirically checked by practical application.

## References

- Bajrić A., (2008). *Marketinško komuniciranje šole z okolico*, Master rad, Koper, Fakulteta za management
- Bandur V., Potkonjak N., (2002). *Istraživanje u školi*, Učiteljski fakultet, Užice
- Bromage J., (2008). *Leadership Fellowship Report*, <http://studylib.net/doc/8569387/promoting-and-marketing-your-school-effectively>, ( 28.11.2015.)
- Buch, T., (2003). *Theories of Educational Leadership and Management*, SAGE Publications, London
- Dragojlović V., (2010). *Modeli obuke i ispita za direktore obrazovno-vaspitnih ustanova*, Centar za marketing u obrazovanju, Gornji Milanovac

- Grubor A., Đokić N., (2014). *Korporativni imidž u globalnom marketingu*, Anali Ekonomskog fakulteta u Subotici, Vol.50 (32), 31-38.
- Kouzes J., Posner B., (2012). *The Leadership Challenge – How to make extraordinary things happen in organizations*, Jossey – Bass, San Francisco
- Ključni podaci o obrazovanju u Evropi* (2012). Izvršna agencija za obrazovanje, audiovizuelnu politiku i kulturu, EACEA Eurydice, [http://eacea.ec.europa.eu/education/eurydice/documents/key\\_data\\_series/134HR.pdf](http://eacea.ec.europa.eu/education/eurydice/documents/key_data_series/134HR.pdf), (17.12.2016.)
- Kurević J., (2007). *Marketing v srednjih šolah tuzlanskega kantona*, Master rad, Koper, Fakulteta za management
- Logaj V., Trnavčević A., Snoj B., Biloslovo R., Kamšek M., (2006). *Spreminjanje šolske kulture za povečanje identifikacije učiteljev in učenicev s šolo*, Šola za ravnatelje, Ljubljana
- Ljubojević Č., (2001). *Menadžment i marketing usluga*, Želind, Beograd
- Marzano R., Waters T., McNulty B., (2005). *School Leadership that works – From Research to Results*, Mid-continent Research for Education and Learning, Denver
- McConchie R., (1998)., *Challenges for Educational Leadership in the 21st Century*, [www.icponline.org/disclaimer](http://www.icponline.org/disclaimer), (28.04.2013.)
- Paterson K. D., Deal T. E., (1998). *How leaders influence culture of schools*, Educational Leadership, vol. 56., Alexandria
- Pavičić J., (2001). Ishodišne determinante strateškog pristupa marketing neprofitnih organizacija: teorijska razrada, Ekonomski pregled, Zagreb, Vol. 52., 101-124., *Pravilnik o standardima kompetencija direktora ustanova obrazovanja i vaspitanja*, Sl. Glasnik RS, 38/2013., Beograd
- Rado P., (2002). *Tranzicija u obrazovanju*, Pedagoški zavod Bihać, Bihać
- Republički zavod za statistiku, <http://webrzs.stat.gov.rs/website/public/ReportView.aspx>, (11.01.2018.)
- Resman M., (1993). *Management, šolstvo in šola*, Sodobna pedagogika, 9-10., Ljubljana
- Staničić S., (2011). *Menadžment u obrazovanju*, Centar za marketing u obrazovanju, Gornji Milanovac
- Strategija razvoja obrazovanja u Srbiji do 20202. godine*, Sl. Glasnik RS, 107/2012., Beograd
- Filipović V., Kostić Stanković M., (2009). *Marketing menadžment, Fakultet organizacionih nauka, Institut za menadžment, Beograd*
- Filipović J., Đurić M., (2010). *Sistem menadžmenta kvaliteta*, Fakultet organizacionih nauka, Beograd

## BOOK REVIEWS

Biljana Ilić, Nina Pavićević

RANKING THE ECONOMIC - ENVIRONMENTAL TOURISM DEVELOPMENT  
PROJECTS APPLYING THE MULTIPLE CRITERIA DECISION MAKING - CASE  
STUDY OF GAMZIGRAD SPA

Society of Economists „Ekonomika“, Niš  
(Monograph), 2018

Биљана Илић, Нина Павићевић

ИЗБОР ЕКОНОМСКО - ЕКОЛОШКИХ РАЗВОЈНИХ ПРАВАЦА ТУРИЗМА  
ПРИМЕНОМ МЕТОДА ВИШЕКРИТЕРИЈУМСКОГ ОДЛУЧИВАЊА –  
СТУДИЈА СЛУЧАЈА ГАМЗИГРАДСКА БАЊА

Друштво економиста „Економика“, Ниш  
(Монографија), 2018

The Society of Economists „Ekonomika“ from Niš published the monograph of national importance under the title „Ranking the economic - environmental tourism development projects applying the Multiple Criteria Decision Making - case study of Gamzigrad Spa“, written by Biljana Ilić and Nina Pavićević. The monograph is the result of many years researching and studying various aspects of decision making process in management. The study, as a part of doctoral thesis deals with the importance and the role of sustainable development directions in the tourism industry. Tourism industry is very close with destination management. Destination management is the coordination and integration of all of the elements of the destination mix in a particular geographic area based upon a defined tourism strategy and plan. The destination mix elements are the attractions and events, facilities (hotels, restaurants, etc.), transportation, infrastructure, and hospitality resources. The factors such as pleasure of tourists, satisfaction of holders offer, the quality of life of local community and environmental quality should be the main indicators of quality management destination. Tourism destination management involves the selection of the most appropriate way in which tourism destinations in the long term should ensure a competitive position in the tourism market. The monograph provides a social contribution, the specific calculation, according to the desired criteria in the selection of appropriate tourism development directions of tourism spa. For this purpose, authors used methods for decision making, ELECTRE and AHP for ranking proposed development projects.

Choosing of these projects with mathematical methods is further checked by using economic parameters, that include Net present value of the project and Repayment of the investment, for the first two ranked development projects, Recreational and Congress tourism. Based on applied economic indicators, the project of Congress tourism is the most profitable. Initial funding for its development are lower, the return on investment has a shorter period than Recreational tourism project, while the calculated Net present

value is also higher for the Congress tourism. The monograph provides a concrete contribution in terms of improving tourism in Eastern Serbia, in particular Gamzigrad spa as one of the tourist offer of this region.

Mankind has had a number of crisis, but a special place in the century that we are living in, belongs to the ecological crisis. The ecological crisis that mankind is already aware is not a new phenomenon. Since the 19th century, research efforts have pointed to the devastating consequences of capitalist production and its impact on the general population. When we talk about the crisis, monographs also gives the contribution in this part of the researching. The monograph applied modern methods of project management; management as a science serve ecology in environmental protection. Renewable energy resources are very important in the preservation of a healthy natural environment, because they do not have harmful effects on the environment.

Using of renewable energy also contribute in saving of non-renewable energy resources, and this is also a part that monograph pointed. Calculating the thermal efficiency of the building of Rehabilitation Center in Gamzigrad Spa, certainly represents a significant contribution in saving energy for its heating.

Finally, the monograph check the profitability of investments in a interesting way, through the placement of funds in the bank and through the returning of interest from the funding in the non-renewable energy resources. Characteristic of using the renewable energy resources is the level of financing investment when the capacity is installing. Characteristics of the renewable resources is the fact that installing plants, at the very beginning need higher investment per unit of power. Characteristics of non-renewable resources are that at very beginning they need lower investment. But through the time, renewable resources are more profitable than non-renewable because they are paid in time bringing prosperity to society and nature.

Regardless of the degree of development, it is necessary that each country has defined goals of overall economic development, as well as methods and instruments to achieve the development. In addition to the mentioned instruments, time is one of the important factors for the implementation of the envisaged measures for achieving the set goals. It is necessary to include the influence of the international situation which is characteristic for each region individually. The strategy of economic development should address and define the existing problems. In contemporary conditions of globalization and business, the question arises as to whether it is possible to do and implement an authentic economic development strategy at all. Modern economic development goes hand in hand with the new way of behavior of the society as a whole, as well as an individual. The new concept, which is increasingly heard today, when the question of survival of our planet arises, is called sustainable development. It implies that it should not be consumed more than planned and that it should be planned long-term and strategically, especially in the domain of the use of natural resources, i.e. resources. Natural resources and their preservation must be the priority of every modern state. Thus, the overall further development of the society and economy is based on the harmonization of economic and environmental components. Economy is placed in brackets when it comes to production volume because profit itself does not mean anything if the environment is damaged.

The natural environment is protected and preserved in many ways, and one of them is the use of renewable energy. The authors of the monograph are engaged in the study of natural potentials as well as the ways of their use in order to preserve the natural

environment. GamzigradSpa is the center of the research as one of the most important spas in this part of the country.

The authors successfully connect renewable energy, saving money by using it and economic category, reducing costs - raising research to a higher level for analyzing synergistic effects of Economy, Ecology and Management.

Milica Paunović  
Assistant professor  
Megatrend University of Belgrade  
Faculty of Management Zajecar



**Бобан Стојановић**  
*Економски факултет Ниш*

## IN MEMORIAM

### ПРОФ. ДР ИВАН СТОЈАНОВИЋ

Поводом обележавања 20 година од смрти проф. др Ивана Стојановића 19.10.2016. на Високој школи модерног бизниса (MBS), Београд, Теразије 27, организован је скуп на тему **ОДНОС ДРЖАВЕ И ТРЖИШТА У ДЕЛУ ПРОФЕСОРА ИВАНА СТОЈАНОВИЋА**

Намера организатора скупа је подсећање на личност и дело покојног професора, присутно код свих који су познавали овог скромног и ненаметљивог човека, али запаженог научног радника. Уводна излагања су поднели проф. др Чедо Љубојевић и проф. др Бобан Стојановић. У веома садржајној дискусији су учествовали: Душан Јањић, проф. др Јован Тодоровић, проф. др Бошко Живковић, проф. др Хасан Ханић, проф. др Љубиша Адамовић и прота Стојадин Павловић. Сви су истакли да је његово дело обиловало свежином и богатством мисли, идеја, увек актуелно и увек макар корак испред свог времена. Дobar доказ за то су радови који после више од две деценије нису изгубили на актуелности.

Време у коме је професор Стојановић живео и радио обиловало је низом теоријских контраверзи и експериментисања у практичним активностима. Економија је била изазов који су научни радници прихватили са више или мање дефинисаним основним начелима и јасним опредељивањем за препознатљиве полазне критеријуме. Полазећи од алтернативних облика организације економског живота, било је економиста који су, захваљујући својој аналитичкој интуицији, економију сматрали науком о рационалној алокацији ограничених ресурса, везујући ту рационалност за дејство тржишног механизма. Професор Стојановић се јасно и недвосмислено опредељивао за тржишну привреду, чак и када је то било анатемисано или чак подложно санкционисању. За то време смело је писао о профиту, тржишту рада, капитала и увек полазио од јасно дефинисаног вектора тржишног простора. Бирао је актуелне теме, студиозно их обрађивао и увек давао пројекције или препоруке за будућност. Одражано се упуштао у тумачење и осмишљавање економских токова, али увек уз критички прилаз. Верујући у ефикасност тржишта, он га ипак није глорификовао, већ је увек указивао на његову несавршеност.

Посебан смисао је имао за теоријску обраду економске политике. Реаговао је на актуелне економске и политичке процесе и покушавао да утиче на њих. Његове препоруке су биле теоријски јасно фондиране и оствариве. То је дошло до изражаја у његовом ангажману на изради пројекта “Реконструкција монетарног система и стратегија економског опоравка Југославије” и у студији “Структурно прилагођавање привреде СР Југославије” коју је завршио непосредно пре смрти. У свим истраживањима је приступао студиозно, искрено се надајући да ће свој и напор његових сарадника на пројектима резултирати прихватањем коректно образлаганих предлога. Био је неуморан радник и упорни истраживач.



Искрено верујући у потребу, па и нужност укључивања интелектуалаца у решавање проблема привреде и друштва, своје знање и искуство несебично је уграђивао у рад политичких тела увек остајући оно што јесте - достојанствени научни радник. Доказ за то су дела која су привукла изузетну пажњу научне и стручне јавности не само у области економије: *Социјализам и тржиште*, *Економска преиспитивања - ко раднике повезује лажним концима* (коаутор), *Куда и како даље*. Свако ко је пратио однос економије и политике зна да таква мисија научног рада често није била схваћена на прави начин. Доказ за то је његов временски кратак положај директора листа *Политика*. То је код проф. Ивана Стојановића повремено проузроковало резигнацију, али не и губитак вере да до оживотворења жељених промена мора доћи.

Импозантан је број радова професора Ивана Стојановића. Објавио је 18 књига из области микроекономије, тржишта и цена. Уз то, објавио је и преко 300 чланака у водећим домаћим и иностраним часописима. Био је маркантна појава и на свим научним скуповима на којима је учествовао. Њего опус се употпуњује и преводима студиозно одабраних дела са француског говорног подручја из области економије, филозофије, политикологије, социологије. Радови проф. Ивана Стојановића вредни су документи о стању економске мисли у Југославији у другој половини двадесетог века. Многи од њих су превођени на стране језике Уџбеник *Теорија цена* је кулминација педагошког рада. Студенти који су своје испите, семинарске и дипломске радове припремали по овом уџбенику осећали су лепоту почетничког бављења економијом. Она је увек била употпуњена задовољством праћења наставе у коју је професор Стојановић уносио све своје квалитете право ерудите. Последипломци, као и његове колеге у контактима са њим потврђивали су тезу да се универзитетски професор квалификује као добар ако уз преношење свог знања изврши добар избор тема за дискусију и трасира пут својим саговорницима за бављење научним радом.

Поседовао је широко опште знање на бази свог свестраног и перманентног образовања. То је нарочито дошло до изражаја кроз његов ангажман на уређивању часописа и амбициозних пројеката као што је *Економски лексикон*, *Економска енциклопедија* и *Економска и пословна енциклопедија*. Као главни редактор, окупио је око 400 аутора који су кроз 43 научне области и 5.500 одредница представили сва релевантна достигнућа у области економије. Издање на компакт диску, прво такве врсте у Југославији, поклопило се, на жалост, са прераном смрћу професора Ивана Стојановића.

Скромност, непосредност у комуницирању, брига за своју породицу - супругу Дору и ћерке Иру и Ивону - људске су особине које је изузетно успешно употпуњавао својим научним радом. Оно што научника чини великим није само велики квантум знања, већ и упорност у критичком трагању за истином. Професор Иван Стојановић је, захваљујући по много чему непоновљивим особинама научног радника, створио опус који је сложен, изнијансиран и богат, често визионарски и зато испред свог времена.

Боривоје Б. Прокоповић  
*Нишка пословна школа струковних студија, Ниш*

## IN MEMORIAM

### АКАДЕМИК НИКОЛА КЉУСЕВ (1928-2008)

Протекло је десет година од како су македонска и бивша СФРЈ економија остале без једног великана – академика Николе Кљусева (1928-2008). Биографија Николе Кљусева толико је богата и плодна да би и пуко побројавање различитих економских, научних и друштвених послова које је успешно обављао, заузело читаву страницу „Економике“, а да не би било исцрпљено. Довољно је само погледати реперне тачке његове блиставе каријере, од дипломирања на Економском факултету у Београду, где је и докторирао, рада у институтима у Скопљу, преко Института МАНУ, Економског факултета у Прилепу, Штип и Скопљу (чији је био и декан). Звање редовног професора стекао је на Економском факултету Универзитета у Скопљу, да би се након тога посветио раду у Македонској академији наука и уметности, чији је био редовни члан. Био је члан и функционер многих домаћих и међународних научних друштава, академија и економских институција.

Никола Кљусев је објавио преко 200 радова, међу којима су и књиге од капиталног значаја за српску и европску економију. Наднесен над проблеме македонске и бивше југословенске привреде, а посебно у периоду великих расправа о економској стабилизацији бивше СФРЈ (био је један од чланова Групе економских експерата), Кљусев је у теоријском погледу припадао макроекономији, али је био отворен и за другачије теоријске и методолошке основе ове науке, а за његов научни рад карактеристичан је дубоко промишљен привредно развојни приступ. Тазићева бројна економска истраживања, а поготову вишегодишња истраживања македонске привреде, имала су велики значај за њено функционисање и биле су праве економске школе, где су српски и југословенски стручњаци и студенти измењивали практична и теоријска знања са колегама из еминентних иностраних институција. У погледу организације научног рада, а поготову међународне научне сарадње, Никола Кљусев је сам обављао послове читавог једног института. Руководио је мноштвом научних пројеката, организовао серије међународних симпозијума и велике светске конгресе, уређивао часописе, приређивао зборнике и монографије... Својим млађим сарадницима је пружао ретку комбинацију ваљаног генералног усмеравања, пуне научне слободе и безрезервне подршке и помоћи. Никола Кљусев је, готово магично, са подједнаком лакоћом успевао да решава најозбиљније проблеме, било да је у питању одгонетање замршених проблема македонске привреде, управљања институтом, организација научног скупа, или руковођење највишом научном институцијом (Економски факултет) Македоније.

С обзиром да је мали број колега из наше средине имао такав углед и значај који је Кљусев стекао за живота, без претеривања се може рећи да смо његовим одласком изгубили једног од наших најумнијих и најчаснијих интелектуалаца. Временска дистанца ће можда само јасније и аргументованије потврдити ову оцену о којој је говорила његова популарност као својеврстан феномен нашег доба. Знајући

да су управо карактеристике тог доба у којем је проживео свој век различите и супротне од оних које су одликовале Кљусева, његов живот и остварено дело су јединствени подвиг који многима може бити путоказ и узор.

Иза Николе Кљусева остао је импозантан научни опис који ће се још дуго користити и неће избледети. Онима, међутим, који су имали срећу да га лично познају и сматрају пријатељем, то је само делимична утеха. Недостајаће им његова доброта, широка економска ерудиција, неисцрпна енергија, ведри оптимизам, али и велика храброст и бескомпромисна вера научног истрајавања у сталној борби за модерну економију. Наравно и његов увек присутан, љубазан осмех.

## ШАБЛОН / ТЕМПЛАТЕ ЗА ПИСАЊЕ РАДОВА

Име аутора (Font size 10 Normal) Times New Roman (SR-Cyrilic)  
*Факултет или институција и Град (Font size 10 Italic)*

### НАСЛОВ СРПСКИ (Font size 11 Bold)

#### Апстракт

*Текст апстракта на српском ...*

***Кључне речи:***

### NASLOV ENGLISKI ili neki drugi jezik (Font size 11 Bold)

#### Abstract

*Tekst apstrakta na engleskom ili na nekom drugom jeziku...*

***Key words:***

### НАСЛОВ (Font size 11 Bold)

Текст (Font size 10).....

## Литература

### 1. Списиак литературе

Veličina strane 170mm x 240mm  
Margine: Top 30mm Bottom 20mm  
Left 22mm Right 22mm

CIP – Каталогизација у публикацији  
Народна библиотека Србије, Београд

338 (497,1)

**ЕКОНОМИКА** : Часопис за економску теорију  
и праксу и друштвена питања / главни уредник  
Драгољуб Симоновић. – Год. LXIV. бр. 4 (2018) -  
Ниш (Максима Горког 5/36) : Друштво  
економиста ЕКОНОМИКА, 2018 – (Ниш :  
MEDIVEST). – 164 стр. : 24 cm.

Часопис излази четири пута годишње  
ISSN 0350–137X = Економика  
COBISS.SR-ID 26903

