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“SUSTAINABLE ECONOMIC TRANSFORMATION IN THE POSTPANDEMIC PERIOD“

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“SUSTAINABLE ECONOMIC TRANSFORMATION IN THE POSTPANDEMIC PERIOD“

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"SUSTAINABLE ECONOMIC TRANSFORMATION IN THE POSTPANDEMIC PERIOD"

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SUSTAINABLE ECONOMIC TRANSFORMATION IN THE POSTPANDEMIC PERIOD

Marko Malovic[1]

ECONOMIC AND HEALTH POLICY RESPONSE TO COVID-19 IN SERBIA AND THE EU: SHAPESHIFTERS OF FUTURE?

Abstract: As of recent, there has been over 144 mil. infected, 122 mil. recovered and more than 3 mil. people worldwide who passed away due to the COVID-19. In Republic of Serbia, we've had more than 670,000 infected and 6,095 deceased (704 per mil. inhabitants), whereas in the EU over 29.5 mil. people were infected and 662,622 met their death of COVID-19 (1,380 per mil. inhabitants). This paper attempts to compare the public policy mix (both health and economic measures undertaken) in Serbia and the EU together with their thus far recognized track-record. Even though the only way to eradicate COVID-19 is to eradicate it everywhere, international coordination as the singular globally rational response failed almost entirely. It appears that Serbia has been the frontrunner -through the first half of 2021 anyway- in what the EU has spectacularly messed up (procurement and administration of vaccines), while she fared more poorly in what the EU did a good job at (other health measures and economic support package). Paper further discusses three most likely common repercussions of apparent failure to sufficiently contain the pandemic in both Serbia and the EU, pinpoints alternative public policy junctions that haven't been chosen, and climaxes with ramifications that will in all likelihood make this contagion longer, dearer and more lethal than it otherwise could have been.

Keywords: COVID-19, health and economic policy measures, Serbia, EU.

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1. Introduction

Ever since the Spanish flu of the early XX century, COVID-19 has proven to be the gravest contagious disease in recent memory, costing us in millions of perished and trillions in hard currency. As of late, there has been over 144 million infected, 122 mil. recovered and more than 3 mil. people worldwide who passed away due to the COVID-19. In Republic of Serbia, by the end of spring of 2021, we've had more than 670,000 infected and 6,095 deceased (704 per mil. inhabitants), whereas in the EU over 29.5 mil. people were infected and 662,622 met their death of COVID-19 (1,380 per mil. inhabitants).

What should the optimal public policy look like and what are the macroeconomic implications of the assigned social planner's problem? What could be done in case of sub-optimally chosen policy response or suboptimal reaction by the general population to the measures administered in the public interest? This paper attempts to compare the public policy mix (both health and economic measures undertaken) in Serbia and the EU together with their thus far recognized track-record. Even though the only way to eradicate COVID-19 is to eradicate it everywhere, international coordination as the singular globally rational response failed almost entirely. It appears that Serbia has been the frontrunner -through the first half of 2021 anyway- in what the EU has spectacularly messed up (procurement and administration of vaccines), while she fared more poorly in what the EU did a good job at (other health measures and economic support package). The rest of the paper is organized as follows: section 2 analyses Serbia's economic and health policy responses to the COVID crisis, section 3 pinpoints the EU's economic and health policy response, section 4 zooms in on common repercussions of the failure to contain and extinct the pandemic, while in section 5 we bring ourselves to the conclusion.

Generally speaking, predictions derived from economic models often tend to go awry for they stubbornly rely on optimizing the behaviour of rational economic agents. Through the COVID crisis, more plainly than perhaps ever before, it becomes patently obvious that precisely these irrational moves -of those who partly or flat out oppose the instituted public measures- feed themselves into self-fulfilling prophecy of opponents' worst fears which in turn further complicates and raises the overall cost of pandemic.

2. Serbia's Economic and Health Policy Response

Due to the COVID-19 pandemic, Serbian leadership proclaimed the state of emergency on 15th of March 2020, initiated barrage of prophylactic moves in the public health sphere (with corollaries for businesses and employment) and soon after introduced an array of economic measures in respect to logistical and financial aid to the already frail economy and citizens in isolation.

Analysis of anti-crisis measures brought about during the state of emergency is threefold: 1) evaluation of the chosen strategy itself; 2) suggesting what could have been done differently and/or better; 3) attaching some grading to the results achieved.

1) In a nutshell, Serbian strategy through the lockdown could be characterized with hesitation to deploy fines for ignoring the public safety measures, with shortages of protection and sanitizing medical equipment as well as by obsession with procuring as many life-supporting machines (respirators) as possible at steeply rising cost [Malović, 2020]. Macroeconomic response expectedly if somewhat sluggishly tackled the usual three realms: fiscal stance, money and banking and external balance & exchange rate policy.
2) Pure fiscal stimulus could have made more sense if: a) its alimentation didn't require pro rata external indebtedness hike at interest, but instead should have been based to a larger extent and more bravely on tax holidays and/or temporary reduction of fiscal burden; b) it were distributed faster and more selectively, perhaps in the form of vouchers (intended for domestic goods and services) whose purchasing power depreciates if not used up through Q2, for example. Dilemma remains as to how much will guarantee scheme under the credit support to the economy which has been disbursed via commercial banks, and this is a large chunk of the entire support package, really help to the SME sector with chronically problematic books and underperforming corporate finance ratios even before pandemic (50% of SMEs in Serbia doesn't use bank credit lines at all). Moreover, at budget deficit of the last year's size, a) a portion of monetary-financial measures in a low inflation and overvalued currency environment could

have relied on controlled and fine-tuned primary emission, while b) another portion could have been comprised of spending official FX reserves, instead of accelerating external indebtedness in foreign currency at unfavourable interest rates (after which it's evident that promised growth of dinarisation of public debt is no more than a wishful thinking). In addition, instead of purely commercial borrowing (with exception of one loan by the World Bank), at least some funds could have been more favourably provided almost without any conditionality from official international creditors (IMF, EU etc.). On the other hand, one cannot but express concern due to antiprudential by-law during the lockdown enabling investment of FX funds from the cushion of Serbia's deposit insurance agency. Lastly, problems in the area of public procurement and communal services, as well as lowering of existing ecological standards under the excuse or blindfold of pandemic.

3) When it comes to evaluating the results of the chosen strategy, despite of superficially impressive figures, it is in order to remind the readership that when the entire world economy is blocked, lower rate of falling economic activity (as opposed to the world average) is merely the proxy for its economic backwardness. That said, even though Serbian economic downfall indeed was among the smallest in Europe, that fall in 2020 wasn't that microscopic as the official statistics claims, whereas the growth in 2021 might be achieved only at the expense of sky-rocketing budget deficit and accordingly unpleasant public debt rise.

Summa summarum, chief goals of the *First package of anti-COVID economic* measures, as sketched above, were only partially achieved. More or less sustained liquidity across economy (that couldn't have been praised for stellar liquidity even before COVID-19), temporarily preserved economic & business capacities and decreased or procrastinated unemployment impact are the cases in point. Macroeconomic response to the challenge brough by pandemic was apparently constructed on supposition that COVID-19 will be over by the end of 2020 with decisive growth sparked everywhere from 2021 onwards. Consequence of this obviously wrong premise was evident in swiftly spent injection of more than 12% of Serbian GDP, sum that would have lasted longer were it disbursed more selectively and were

fiscal measures leant more on manipulation of revenue side of the budget [NCEU, 2020].

In the second half of 2020 Government approved supplementary, so-called *Second package of measures against corollaries of pandemic* weighing some 66 billion RSD (564 mil. €) [MoF, 2020]. In essence it represents additional dosage of financial cum logistical support for the stalled economy with particular and hefty segment dedicated to enhancing effectiveness of the national health system and health protection of the medical staff and patients. Within undertaken, we welcome the replenishment of stocks of supportive medical devices and protective equipment both in COVID-zones and in pharmacies. When it comes to economics, it is commendable that the focus was relocated to financial and fiscal backup (on the revenue side) of SMEs and micro-firms. Moreover, we also approve generous one-time financial assistance to companies established between March 15th and July 20th, 2020. The additional moratorium on debt service (initiated by the NBS) could have been somewhat more selective, but this measure in principle has its justification too. However, it remains difficult to find valid arguments for a partial repetition of the first package measures in the second half of 2020, although there was room and time and reason for far greater selectivity in the lockdown execution (which - subject to ambitious short-term economic aspirations and economic priorities of certain interest groups - was almost non-existent in the second half of the year) as well as monetary and fiscal support of the state (which despite some progress stayed insufficiently focused on helping those sectors which are objectively the most vulnerable to the crisis).

The way in which macroeconomic stability has been preserved in 2020 will make it very challenging to maintain it in 2021 with further macroeconomic expansion apparently required. Victory over the virus was declared too soon (as early as the end of May), followed by boasting of a "half-time victory" both in terms of the smallest decline in economic activity and in terms of the effects on unemployment, while mounting clouds to that end were expected no sooner than Q1 of 2021. They indeed came a bit later in the face of closures and retreat of several foreign firms, but GDP trend in 2021 significantly improved for Serbia due to almost doubled budget deficit and increased public debt in comparison with official projections and politicians' vows at the time.

Indeed, the *Third package of anti-crisis measures* has been launched (as was badly needed) already in February, taking up some 249 billion dinars, yet again of overly broad populist circumference and mostly reprising structure. The total financial support by the state through three economic aid packages currently amounts to some 953 billion RSD (8 billion euros) [RAS, 2021], which is a serious money part of which could have arguably been saved or spent more wisely. Be that as it may, at least some additional funds were spent on logistically pretty impressive procurement and administration of vaccines from various producers (even though not without faults and offside traps for government officials there).

3. Economic and Health Policy Response of the EU

As early as March, the EU offered logistical assistance to agriculture and tax breaks under the Provisional State Aid. In April, the EU earmarked €540 billion anti-crisis package broken into unemployment benefits (€ 100 billion), business aid (€ 200 billion) and aid to member states (€ 240 billion) which are above average and most directly affected by the pandemic. Furthermore, majority of EU members were swift and strict in cancelling public events even after initial lockdowns (unlike Serbia), which is the measure that stands out the most in cross-country efficiency studies. Health and sanitary measures in the EU were on average removed more gradually so as to avoid resurgence of epidemic [Bricongne-Meunier, 2021]. The overall economic reaction was by and large faster, more precise and more efficient than in Serbia.

Unfortunately, the Schengen agreement turned out to be one of the first actual victims of the corona virus (cynics would say because of the associated comorbidities from before) …

After the initial nervousness and turmoil in the field of health policy (each member for itself), vaccines on the horizon as well as the seminal step in financing the economic battle against the pandemic (the so-called NGEU) raised hopes for a good outcome… But cumbersome federalisation in both dimensions (health and economic) brought yet another disappointment.

In comparison, to put things into perspective, EU average health balance fares somewhat better than the UK or the US, however, Hungary, Czech Republic and Belgium when it comes to number of deceased per 100,000 inhabitants passed much worse than Americans or British. In terms of economic growth, PRC and the US grow steadily from Q4 2020, whereas the EU still fights recession. Part of the EU's apparent doom is an unfortunate timing of the crisis, her unfavorable demographics and higher population density than many other parts of the world, but there's also a lot of bad or at least clumsy politics. In an attempt to get out of this crisis stronger than before, the EU spectacularly failed with last year's decision to give the European Commission exclusive authority in the procurement and distribution of vaccines for roughly 450 million people. Understandably, it was certainly reasonable to concentrate the finances and bargaining power of the 27 countries in procuring vaccines (a similar synergy in R&D brought us the vaccine after all), but overly bureaucratic, inexperienced and timid Commission officials (including its president) demonstrated that the Commission wasn't exactly up to the task it was set to carry out. There has been too much trembling over procedures for too long, too much time has been spent trying to bring down the price whilst too little on the security of timely and uninterrupted delivery [The Economist, 2021].

At last, but not least, financially respectable lending mechanism for giving loans and donations (to regions and member states asymmetrically hit by the crisis) was finally agreed: The New Generation EU Fund weighing some € 750 billion over the period of five years (some 5.6% of the EU's GDP). It is intended primarily for financial support to the EU Periphery, while the EU as a whole is the obligated debtor to financial markets for all the loans disbursed, which is desirable only if the borrowing members remain individually obliged by contract for their portion of the entire debt - this is not the case so far?! Thus, the Germans who did not agree to the federalization of credit conditions for years now turn out to be supporters of the debt federalisation! What's more, the word is that half of the alimony should be transfers or aid of some kind!? Fortunately, or not, the rabbit is still in the woods, funds have not been obtained on a large scale yet, let alone approved & donated, there are pockets of resistance to the NGEU especially in the EU's Core, plus the architecture of conditionality may well make the *operandi* next to impossible… That notwithstanding, it

is fair to say that compared to the average fiscal expenditures of the contemporary sovereign, EU fiscal interventionism still falls fairly short, suggesting the proverbial lack of trust among the member states… [*Ibidem*]

Consequences for the EU: by the end of 2022, the volume of economic activity of the EU will stagnate compared to the pre-crisis 2019. The return of the physical volume of EU production to the level before the pandemic should not be expected before Q2 or Q3 2022. And that Rubicon will be difficult to cross because such borrowing must be followed by fiscal restriction (which, by the way, awaits Serbia too). This in turn brings us to the main common consequences of the pandemic and its suboptimal management for the EU and Serbia.

4. **Common Repercussions**

During this period of the global pandemic, several measures have been put in place to contain the spread of COVID-19. Such containment measures include quarantine, travel ban and restrictions, social distance enforcement and lockdown— closure of public places and cancellation of public events [Gautam-Hens, 2020], [Sarkodie-Owusu, 2021].

Common repercussions of the COVID crisis for Serbia and the EU are at least three-fold: 1) protracted border controls and on-and-off restrictions to the so-called four freedoms; 2) periodic smaller scale renewal of lockdowns (though less expensive in terms of economic activity loss) or else occasional surges in infected and deceased and 3) sovereign debt pandemic as well as lasting changes in the structure of both supply and demand.

In addition to voluntary reduction of social and commercial contacts, economic activity is *sui generis* affected by protracted, heterogeneous and time-varying border controls for people, but also by bending and severing of global supply chains. Alas, this seems to be an inevitable consequence of failure to execute an early, much more stringent and thus relatively shorter lockdown that would nip the virus into the bud. Similarly, there's still a trade-off between honouring health & sanitary measures on one hand and the extent of economic activity achieved on the other, such that those who ignore the short-run trade-off pay the economic price in the medium run,

let alone the immediate toll in human lives if COVID ends in fatality. Regardless of preferences chosen in Serbia or in the EU, some areas of economic activity shall remain heavily affected over the long term and may dwindle or disappear altogether. Blue collars are being much more vulnerable to those structural breaks than the white collars, since they typically cannot work remotely and have lower salaries as consumers. Even though vaccination turnout is considerably better in the EU as opposed to that in Serbia, antivaccine lobby and great deal of geopolitical as well as health confusion around their efficiency worldwide will probably require either mandatory vaccination, or different kind of therapy. Alternatively, we might have to wait for another generation of improved vaccines to completely eradicate COVID-19, in as much as the natural course of the pandemic doesn't pacify the virus enough to make cohabitation of corona and mankind a sustainable one.

Finally, exploding public indebtedness in both developed and developing countries increasingly represents (to a varying degree) a cause for macroeconomic concern. The COVID-19 pandemic has pushed debt levels to new heights. This must increase the future fiscal pressure before too long. Compared to end-2019, average 2021 debt ratios are projected to rise by 20 percent of GDP in advanced economies, 10 percent of GDP in emerging market economies, and about 7 percent in low-income-countries. While many advanced economies still have the capacity to borrow, emerging markets and low-income countries face much tighter limits on their ability to carry and service additional debt [Georgieva-Pazarbasioglu-Weeks-Brown, 2020]. Extension of Debt Service Suspension Initiative and increase in global liquidity through additional SDR creation are welcome moves since sovereign QE practice simply won't do the trick much longer, while national fiscal exposure already ranges from alarming to clearly untenable.

5. Concluding Remarks

Serbia has been caught on the right foot in terms of economic capability to face this crisis, but simultaneously suffers from a hazardous growth model in the long run (if subsidies are gone, some if not many FDI might evaporate). In the face of the aforementioned

adversity, debt to GDP ratio currently well below 100% may quickly enlarge to uncomfortable levels. Worse still, conspiracy theories are seriously undermining the initially stellar vaccination logistics and turnout dynamics ever since late spring 2021. COVID-19 (this time around driven by delta breed) is once again tightening its grip in Serbia.

The EU has pursued an overly conservative fiscal policy for more than a decade, which, together with other construction errors (the euro, megalomania of regulations, the migrant crisis, political economy heterogeneity and the absence of an unquestionable EU identity), faced a pandemic in a rather groggy state. On the positive note, the EU's vaccination drive has considerably improved in the second half of 2021, whereas on the negative - monetary and fiscal room for endless expansion is wearing thin.

Unless our leaderships come to senses and make some bold decisions soon, something deeply irrational in human nature will make this pandemic longer, more expensive, and more lethal than it otherwise had to be. For the time being, corona virus is shapeshifting way smoother and much faster than our economic and health policy response.

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Aca Jovanovic[2]

AN OVERVIEW OF THE POSSIBILITIES OF HYDROGEN PRODUCTION AS THE FUEL OF THE FUTURE

Abstract: The work presents an overview of available technologies for the production and storage of hydrogen. The possibility of producing so-called Blue Hydrogen from biomass and natural gas and producing the so-called Green Hydrogen by electrolysis of water was discussed. In the case of Blue Hydrogen production, using of residual combustible gas also considered for the production of electricity and thermal energy

Key Words: Hydrogen Production, Blue Hydrogen, Green Hydrogen

1. Introduction

The production and consumption of energy sources, among which the dominant electricity in the Western Balkans (WB) is mostly based on mineral raw materials, and in the case of electricity is based on coal.

The problem of electricity production from coal, in the case of Serbia from coal-lignite, is reflected in the high emission of greenhouse gas carbon dioxide (CO2), which emissions from the combustion of lignite coal are approximately:

- Combustion of 1 kg of cola-lignite ~ 820 gr CO2
- The production of 1 MWh of electricity requires about 1,49 t of cola-lignitea
- The production of 1 MWH of electricity from lignite is emitted: ~ 1.220 kg CO2

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- Thermal power plant with one block of 300 MW of installed power:
  - Burn the annual: ~2.300.000 t uglja lignita
  - Emissions into the air annually: oko 1.800.000 t CO2
  - The amount of the fee is currently: 57 EUR/tCO2

2. Current State of Electricity Production in the WB Region

The current installed electricity generation capacities in the Western Balkans are shown in Figure 1 (1).

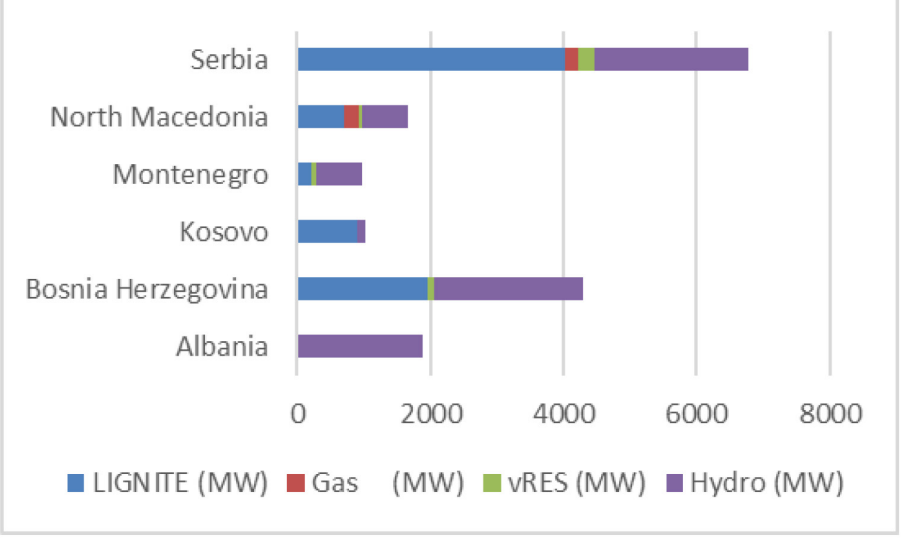

Figure 1. Installed capacities for electricity generation at WB

3. Reply of the European Union-ETS Mechanism

ETS - Emissions Trading System presents:

- Explicit carbon instrument that limits or caps the allowed amount of GHG - Green House Gases emissions,

- The EU ETS mechanism works by setting an upper GHG emission limit for each company that it is allowed to emit, if it exceeds that limit, that company pays a fine,
- A company in the EU has a number of licenses to emit 1 t of CO2 or equivalent amount of other harmful gases,
- If the company does not have enough licenses, it must improve its technology to reduce GHG emissions.

For companies outside the EU, starting in 2023. And with full implementation from 2026. CBAM - Carbon Border Adjustment Mechanism is introduced, which is implemented through:

- Electricity, steel, aluminum cement, fertilizers, etc. will have to buy CBAM certificates based on their CO2 footprint during production,
- The amount payable in the third country is deducted from the amount of the required CBAM certificates,
- The number of CBAM certificates is reduced by the share of free certificates received by the same industry in the EU.

Countries of WB has the status of EU ETS implementation or under consideration or under development and most of them has defined intention to use international carbon pricing, like is shown in table 1 (1) and (2).

Table 1. Carbon Price proposed rate in Gradual Scenarios

Carbon Price EU ETS and proposed auctioning rate in Gradual Scenarios	2025		2030		2035		2040	
WB6 country	**EUR/tCO2**	**%**	**EUR/tCO2**	**%**	**EUR/tCO2**	**%**	**EUR/tCO2**	**%**
Albania*	26.500	100	32.00	100	53.00	100	80	100
Bosnia and Herzegovina*	6.625	25	16.00	30	39.75	75	80	100
Kosovo	3.975	15	11.20	35	34.45	65	68	85
Montenegro**	7.950	30	20.80	65	45.05	85	80	100
North Macedonia*	7.950	30	20.80	65	45.05	85	80	100
Serbia**	6.625	25	16.00	30	39.75	75	80	100

*under consideration and intention to use international carbon pricing
**under development

4. Forecast of Future Electricity Production in the EU

The current structure of electricity production by sources in the EU countries is shown in Figure 2 (3), while the structure of future electricity production is shown in Figure 3 (4).

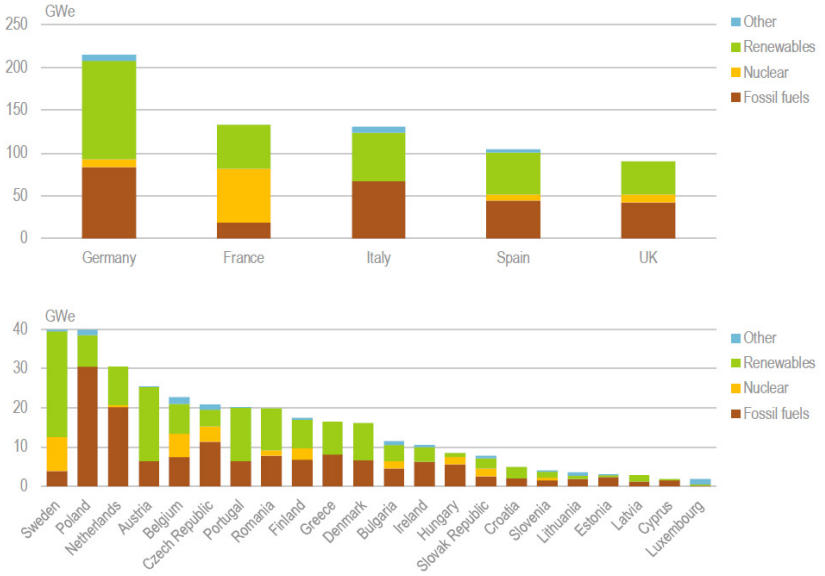

Figure 2. Structure of installed capacities for electricity production in the EU

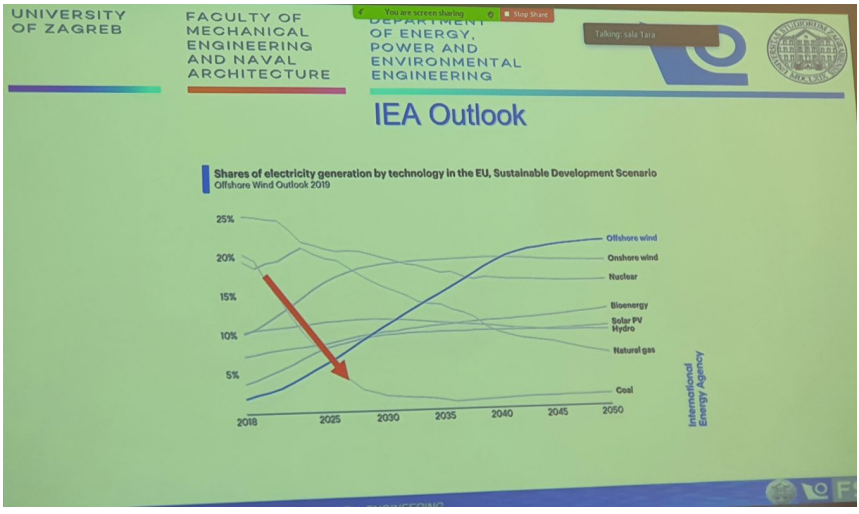

Figure 3. Forecast of future electricity production in the EU

The expected end of the "coal age" and the status of the "Coal phase" are shown in Figure 4 (4)

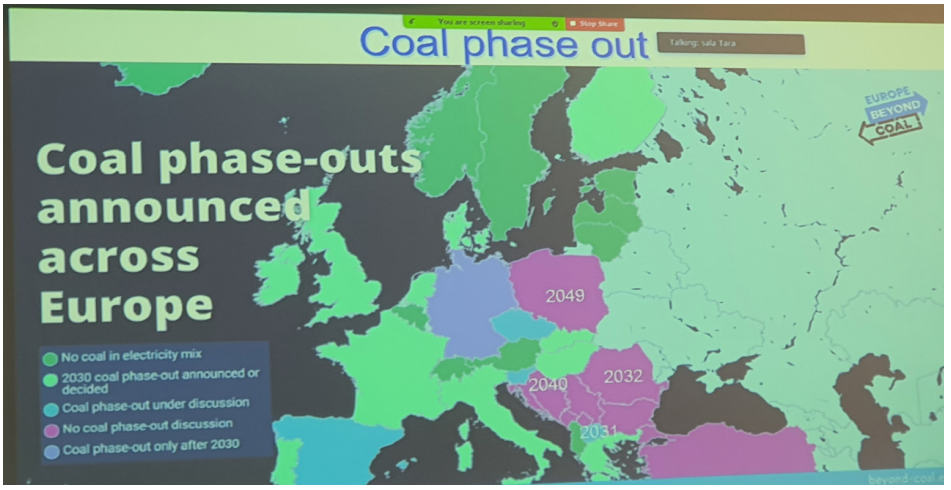

Figure 4. Planned end of the "coal age" in Europe

The production of electricity from renewable sources is characterized by its variability, that is, at some point we have more energy than consumption, while at other times we have less energy than needed. The classic way of solving this problem was reflected in the construction of back-up plants, thermal power plants or reversible hydroelectric power plants that were supposed to cover the shortage of produced electricity.

Excess electricity was resolved only partially, through the filling of lakes of reversible thermal power plants during the period of excess electricity produced.

The modern solution is to use the excess energy produced for:

- production of thermal energy,
- storage of excess energy in large battery farms,
- production and storage of hydrogen.

Uneven production of electricity from renewable sources (RES), as well as the possibility of its use is shown in Figure no. 5 (4)

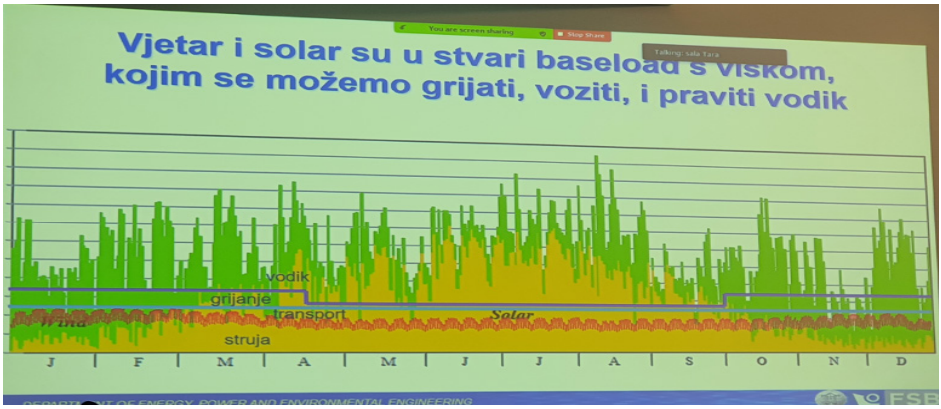

Figure 5. Electricity generation from RES

This paper will discuss possible ways of producing and using hydrogen as the fuel of the future.

5. Hydrogen Production and Storage

Possible ways of production and classifying these procedures with respect to their impact on the environment are shown in Figure 6 (5).

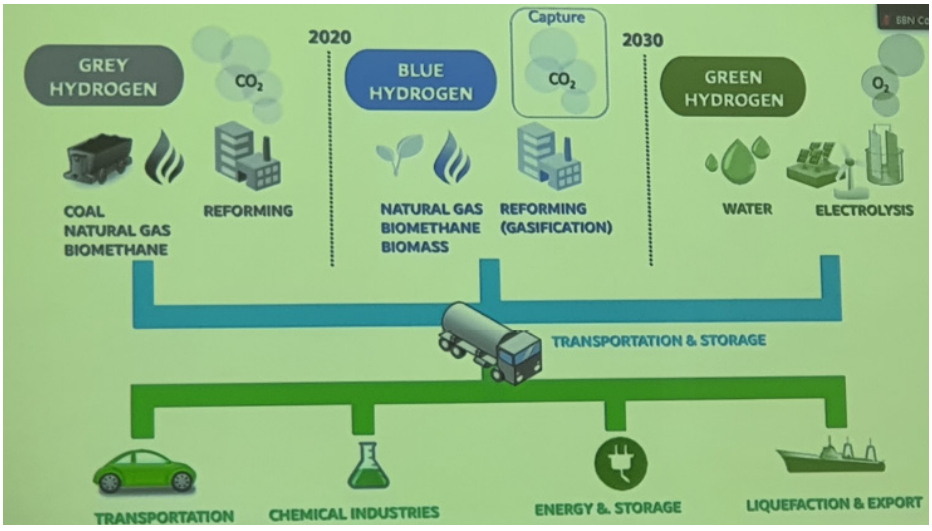

Figure 6. Possible ways of hydrogen production

In this paper, the production of Blue and Green Hydrogen, i.e. the production of hydrogen from biomass and water, which are also renewable energy sources, will be described as environmentally friendly methods.

6. Green Hydoegen Production by Electrolysis of Water

Hydrogen production by water electrolysis is an old process, which has been brought to industrial application by modern technology. Figure 7 shows the appearance of a standard Silyzer 300 cell, manufactured by SIEMENS, Figure 8 shows the development of these cells by nominal power, while Figure 9 shows the possible future appearance of a hydrogen production plant with storage (5).

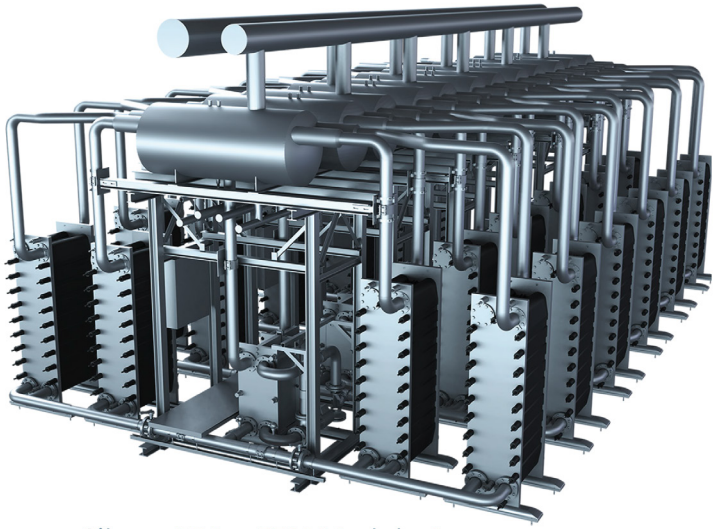

Figure 7. Appearance of a standard cell for the production of hydrogen from water

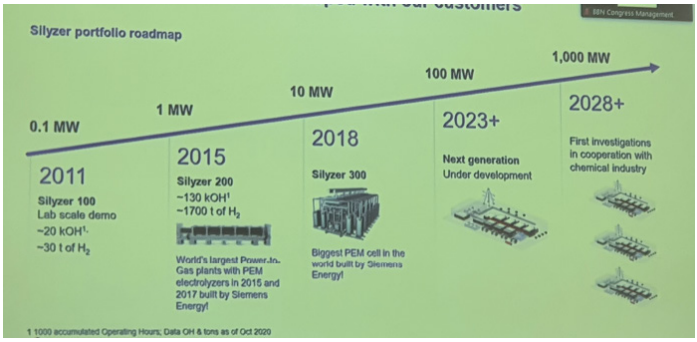

Figure 8. Predicted development of cells and cell blocks by installed power

Figure 9. Possible future appearance of the hydrogen production plant by electrolysis of water with storage

7. Production Blue Hydoegen - Biomass Gasification

The production of synthetic gas (product gas) from biomass has been known since the beginning of the last century. A modern installation for gasification of biomass in a fluidized bed, without the presence of oxygen (Fluidized bed gasification) is shown in Figure 10 (6). This is a CHP Plant that produces electricity and heat based on the synthetic gas produced.

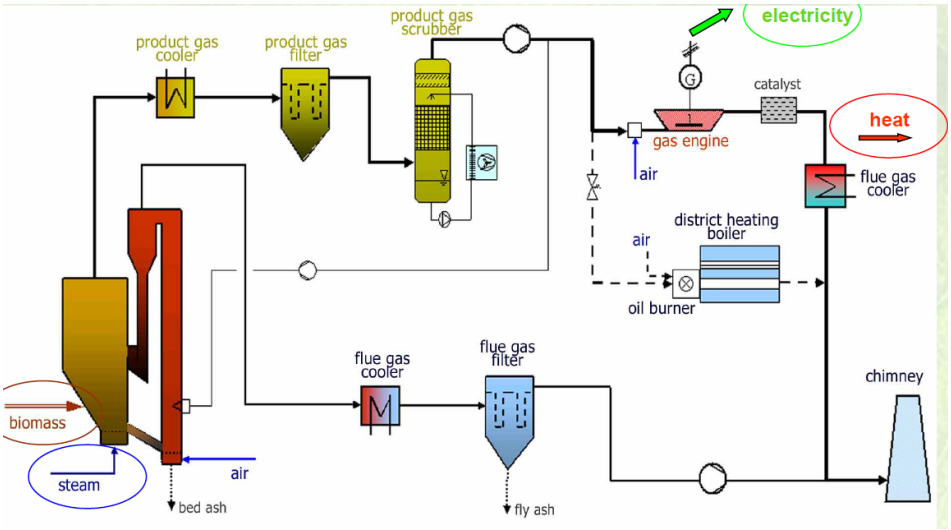

Figure 10. Schematic representation of a plant for the production of systematic gas

The composition of the product gas from such a plant is given in Table 1.

Tabela 1. Product gas composition

Gas components		
CO_2	%	20-25
C_2H_4	%	2-3
C_2H_6	%	~0.5
C_2H_2	%	~0,4
H_2	%	35-45
O_2	%	< 0,1
N_2	%	1-3
CH_4	%	~10
CO	%	22-25
C_6H_6	g/m³	~8
C_7H_8	g/m³	~0,5
$C_{10}H_8$	g/m³	~2
TARS	mg/m³	20-30

Possible poisons		
H_2S	ppm	~100
Org. S	ppm	~30
HCl	ppm	~3
Dust	mg/Nm³	< 20

H_2:CO = from 1.5:1 to 2:1

As can be seen from the table above, Product gas already contains up to 45% H_2. The proposed additional product gas treatment is shown in figure 11 (7), i.e. BioH_2 production consisted of three operational units:

- catalyzed water–gas shift (WGS) reactor
- gas drying and cleaning by reconstructed RME scrubber and added glycol scrubber-dryer,
- H_2 purification by pressure swing adsorption (PSA),

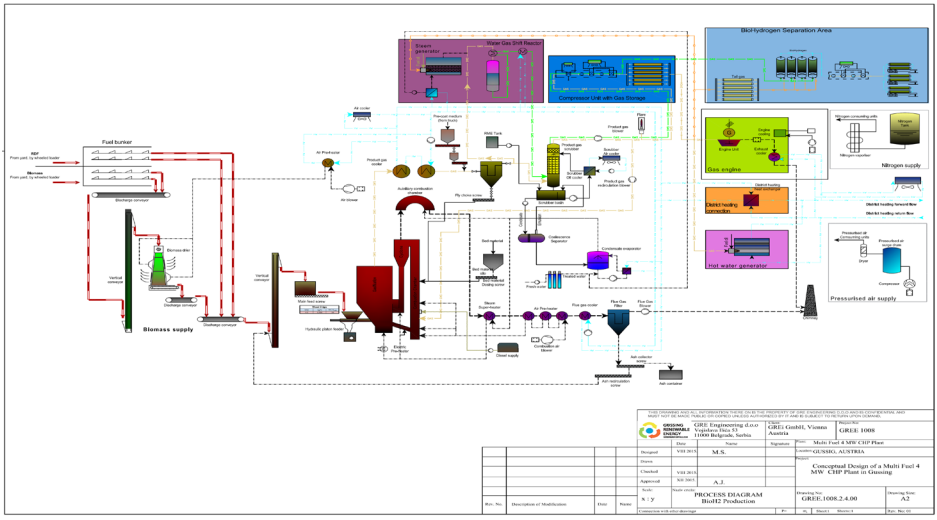

Fig.11. Process diagram of Bio-H_2 production plant

The look of the future Plant for Bio-H2 production is shown in figure 12 (7).

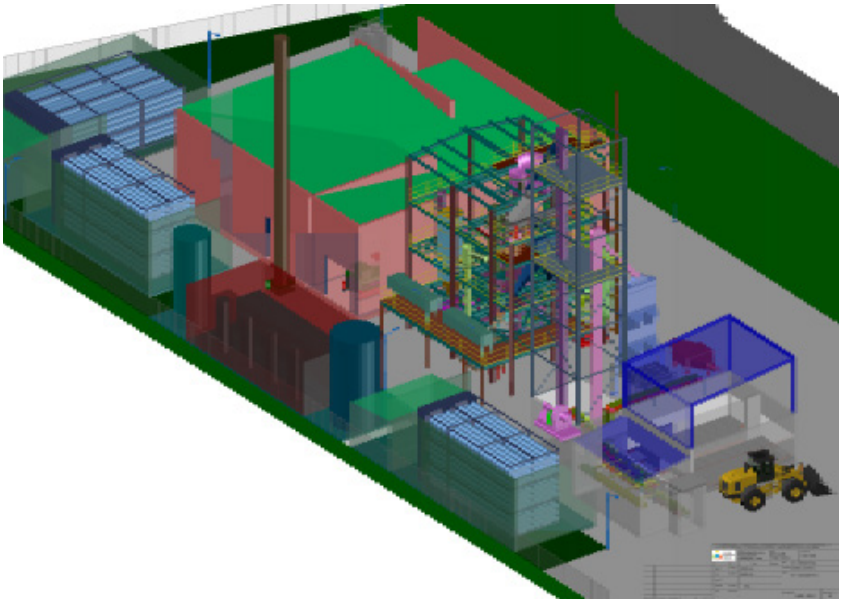

Fig. 12. The look of the future Plant for Bio-H_2 production

8. **Hydrogen Use**

Possible uses of hydrogen as the fuel of the future are:

- Storage of surplus electricity by hydrogen production, when there is more electricity from RES than needed,
- Production of electricity in peaks when there is not enough,
- As a propellant in transport, in the first place for driving a truck.

Hydrogen can be used as a fuel for gas turbines that run generators to generate electricity. Figure 13 shows the results achieved by SIEMENS in replacing Natural Gas with hydrogen (5).

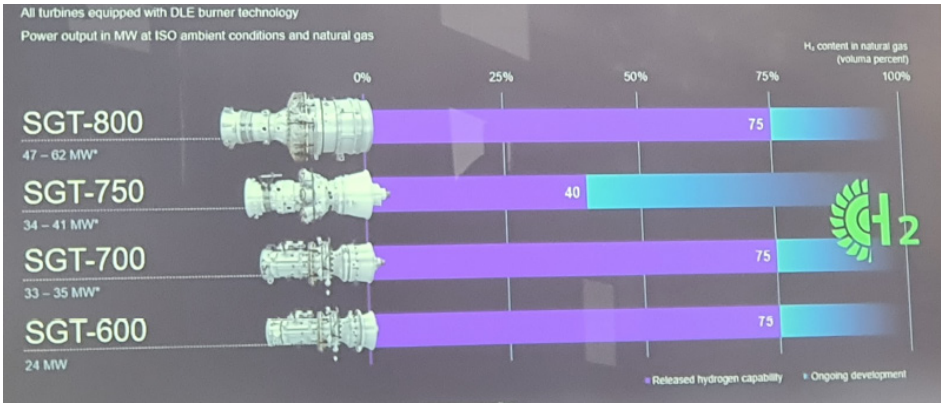

Figure 13. Possibility of using hydrogen as cash in gas turbines

Also, hydrogen is used as a propellant for the fuel cells shown in Figure 14, which can be of different sizes, primarily intended for electric propulsion of transport trucks and electric cars in the future.

Fig.14. Different sizes of fuel cells

9. Conclusion

Hydrogen (Blue and Green) production is technically possible today and is constantly evolving. Hydrogen use is in its infancy, but is evolving rapidly. Hydrogen can be used to store electricity when there is a surplus, as well as to produce electricity for the needs of the electricity grid, when electricity is lack. Also, hydrogen has great potential as a fuel for transport, primarily for the propulsion of heavy trucks that will be equipped with fuel cells and with electric motor propulsion.

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CHALLENGES OF HUMAN RESOURCE MANAGEMENT DIGITAL TRANSFORMATION IN THE POSTPANDEMIC PERIOD

Abstract: In the context of digital transformation, there is a lot of pressure on the human resource sectors of companies of all sizes and activities. Modern development of human resource management practice implies strengthening its strategic role by providing support to the company to attract, develop and retain the best employees, to use their full potential and connect them with the vision and purpose of the business. Accelerated development of IC technologies based on disruptive innovations, their mass application further encouraged by pandemic business conditions which have drastically changed the working environment, the growing number of millennials in the labor market, lead to the situation where the connection between human resource management and digitalization is not only a necessity, but an imperative of the sustainable development of this practice. In this regard, the main purpose of this paper is to point out the importance, problems and challenges of human resource management digital transformation. The actuality of the topic is especially related to the postpandemic period, if we take into account that the further strengthening of the strategic position of the human resource management function depends on its digital transformation. Human resource management practices must be transformed and new tools and practices (digitization products) must be adopted in order to find new

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ways of working in accordance with the new requirements brought by the postpandemic period.

Keywords: Human Resources, Human Resource Management, Digital Transformation, COVID-19 pandemic.

1. Introduction

"Modern companies, in order to survive and be competitive, must strengthen the process of digital business transformation, respectively transformation that requires new ways of communicating with companies'partner, new models of cooperation with customers and consumers, redesign of business processes and the establishment of completely new organizational models" (Čelik, 2020, p.26). From the above, necessarily arises and need for digital transformation of human resource management (HRM) in the direction of further strengthening its strategic importance necessarily arises. This is especially important if we take into account the fact that human resources are "the only active element of digital transformation, i.e. its key subjects, because they are the bearers of the role of initiators, creators and executors of that demanding process. The implementation of that process and the realization of the final results largely depend on the interests of employees (which influences the formation of certain attitudes towards changes as a consequence of digital transformation) and their work potential (knowledge from various fields, abilities, innovative performances, etc.). That is why HRM has a very important role in that process" (Ćamilović, 2019, p.94), and the need for digitalization of HRM practice is becoming increasingly crucial.

The digital transformation of HRM is especially becoming a topical issue after the outbreak of the Covid-19 pandemic and the restrictive measures which have contributed that the digitalization being perceived as a necessity for the business of all companies. During the Covid-19 pandemic, consumers turned exclusively to online sales and communication channels with companies, employees did not go to offices but worked from home using various applications, Internet and IT solutions. Consequently, the Covid-19 pandemic has accelerated the digital transformation of business at all levels, including the HRM

function itself. The potential of digital transformation of HRM soon became obvious and it is expected that in the post-pandemic period its further digitalization will be treated not only as an additional possibility, but as a realistic solution for its sustainable development. It can be pointed out that "the Covid-19 pandemic has shaped extraordinary demanding conditions for digital transformation of human resource management. The emerging technologies including digital platforms, Artificial Intelligence, robotics, augmented reality, and blockchain – would change the functions human resource professionals perform. Since the future will bring more flexible, remote-friendly, digital working norms, the changes in human resource management in direction of its digitalization are of increasingly urgent importance" (Gigauri, 2020, p.1). Therefore, the main goal of this paper is to describe the key challenges and problems related to the digital transformation of human resource management in the postpandemic period.

2. Digital Transformation of Human Resource Management Practice

Many researchers emphasize the importance of the digital transformation of human resource management in the direction of strengthening its strategic role in the digital business of enterprises (Parry, Strohmeier, 2014), (Priya, 2021), (Sotnikova et.al., 2020), especially in pandemic and post-pandemic conditions (Gigauri, 2020), (Bennett, Whorter, 2021), (Am Nurzman et.al, 2020). "Ever since digitalization was introduced in the HR function, many terms have been used to describe the 'nature, role and contribution of technology' in managing people. These terms include Web-based HR, e-HRM, Virtual HR, Human Resource Information Systems (HRIS), and recently, Digital HRM and Smart HRM" (Mohan, 2019, p.7).

The topic of digital transformation of human resources management, although undoubtedly very current and relevant for the further development of practice and theoretical thought in this area, was not in the focus of broader scientific observations, much less theoretical and empirical research. By reviewing the relevant literature in this field in our country, only two papers can be highlighted. The first is by Đorđević-Boljanović, Dobrijević, Đoković and Živojinović - "Digital

Transformation of HR Management", in which the digital transformation of human resources management means "all the changes that this practice suffers under the influence of information technology and includes four phases: the first phase which has in order to answer the question to what extent is technology used to simplify administrative work in the HR sector ?; a second phase that aims to answer the question of the extent to which IT is used to innovate HR practices ?; the third phase which aims to answer the question to what extent is information access technology used? And the fourth phase, which aims to answer the question to what extent is technology used to create social experiences and connections? " (Djordjevic-Boljanovic et.al, 2019, p.130). The second is by Berber, Đorđević and Milanović - "Electronic Human Resource Management (e-HRM): A New Concept for Digital Age", "in which the digital transformation of human resource management means "the use of IT to provide various services from the human resource management domain in an organization and which approach has a wide range of stakeholders, starting with HRM department, through managers, employees, potential employees, and other stakeholders "(Berber, Đorđević, Milanović, 2018, p.23).

The digital transformation accompanied by exponential technological development has become of strategic importance for the further development of human resource management. Digital transformation of human resource management does not represent a simple use of digital tools and technologies in human resource management, but represents a way in which those tools and technologies change this practice, respectively improving the practice of human resources management with available digital IT solutions. "In this sense, the 2017'Deloitte' survey is illustrative, which the results show that more than half of the companies have already redesigned their HR programs to use digital technology and mobile tools, 41% of HR teams are actively creating mobile applications to provide human resource management services , and 33% use some form of artificial intelligence to provide HR solutions. In fact, the task of HR managers is to lead the entire organization in three directions of its digitalization. The first direction is the digitalization of the workforce and the creation of the so-called digital DNK, which presupposes the establishment of a culture of innovation, knowledge sharing and networking among talents; the second direction is the digitalization of the workplace (creating a pro-

ductive and engaged work environment that allows the use of modern communication tools such as Slack, Workplace Facebook, Microsoft Teams) and the third direction is the digitalization of the function of human resource management. We can conclude that in this sense, the task of HR managers is much broader than simply introducing information technology into the business environment. Their task is not only to digitally transform the practice of human resource management, but also to help the organization to be digital, and not only to do business digitally "(Đorđević-Boljanović et.al, 2019, pp.129-130).

Researches Parry and Strohmeier point out that "while a broader discussion and categorization of digital changes of HRM is missing at present, reviewing the literature yields three focal areas that might be briefly labelled as "digital employees", "digital work" and "digital employee management". As a first major area, the concept of "digital employees" figuratively refers to assumed larger changes in the core subject matter of the HR profession: labelled with various terms such as "digital natives", "millennials" or "net generation". It is assumed that the early, intimate and enduring interaction with digital technologies has shaped a new generation of people with distinctively different attitudes, qualifications, behaviours and expectations. It is obvious that HRM should react to such changes and align its strategies and activities to this new labour market cohort, and search for adequate ways to recruit, develop, compensate, etc. such "digital employees" and moreover to integrate them with previous generations of employees. A second major area might be called "digital work", referring to the content as to the organization of work. Relating to work content the ongoing digitalisation implies an increasing automation of manual and routine work, and a slow but steady change of remaining tasks towards "brain and information work". In order to enable both individual employees as entire organizations to keep up with the digital change, HRM has thus to systematically prepare, accompany and often also cushion this enduring change of work content and corresponding qualification demands in its multifarious facets. A third and final area of digital change might be labelled "digital employee management" and refers to the planning, implementation and in particular application of digital technologies to support and network the HR profession, a phenomenon also known as digital HRM" (Parry, Strohmeier, 2014). "In line with digital trends, organisations need to overhaul the key HR functions,

including recruitment and selection, performance and reward management, career management and learning and development. It's not just about re-skilling but creating a genuine transformational change to people management architecture" (Mohan, 2019, p.12).

3. Benefits and Problems of HRM Digital Transformation in the Postpandemic Period

In the pandemic business conditions benefits of human resource management digital transformation became obvious and their importance is expected to be emphasized in the post-pandemic period as well. "Therefore, companies urgently need to establish a highly efficient HRM model in order to improve the linkage of HR information, reasonably use the scientific managing tools, standardize the HRM procedure, and to provide high-quality service to company's development strategy" (Lei, Jing, 2016, p. 471).

Researches Samson and Agrawal support the view "that digital transformation of HRM results in increased productivity to the organization. This is seen in reduction in HR staff, cost savings and less administrative burden due to automation. Digital HRM also helps in achieving relational goals viz., the provision of high-quality services to the internal customers of the organization, through increasing the timeliness and improving the client-service orientation of HR professionals. There are four factors providing evidence of the value of digital HRM: cost reductions, return on investment and better employee communications. It may help reduce costs and improve productivity, also improve communication, reduce paperwork, and above all increase productivity, also some ways create an organization without boundaries" (Samson, Agrawal, 2020, p.4084.4085).

Similar benefits of HRM digital transformation point out authors Berber, Đorđević and Milanović who stated that "the key advantages of such a system are the faster, more accurate and easier processing of information about employees, cost savings, the release of HR managers from administrative tasks, increased access to HR data, standardization of HR processes within the company, more consistent and up-to-date data on employees and their performance, and the like.

In short, using the e-HRM concept, this function is able to achieve a significant positive impact on the entire operation of the organization, as its application increases the efficiency and effectiveness of its work" (Berber, Đorđević, Milanović, 2018, p.30).

"Although the benefits of digital transformation of HRM practice are significant, it has several disadvantages which are mainly attributed to the system's inflexibility, the accuracy of the data entered, the confidentiality of information and legal issues, such as system abuse and internet networks during working hours. It is necessary to pay attention to all these potential hazards, since e-HRM should primarily facilitate and speed up the HR process, rather than slowing it down and caving" (Berber, Đorđević, Milanović, 2018, p.30).

"Because of company's complex personnel structure, enforced policy of HRM work, and the diversity of professional skills of HR practitioners, the information construction of HRM falls far behind that of other parts. Specifically speaking, the current reform of HRM digitization and standardization is now facing problems resulted from the following aspects:

- Positioning Deviation - the positioning of HRM system digitization of some companies is still limited to the electronization of current business workflow, but not positioned on the actual contents of HRM, which is to systematically collect, gather and analyze the human resource information through management under the historical background of big data, and to deeply act on strategic direction planning of human resource, optimization of organization structural construction, projects' leading team establishment, precise positioning of elites, planning and development of employees' career, and management of employees' training information, etc.

- Poor Integration - the fragmented business system causes inefficient information, lack of overall data planning and failure to be integrated into the complete management information platform. Separation from personnel planning to actual production, from annual budge to financial management, from human resource to other business systems results in that the relation-

ship between different businesses or even the different works of same business is mostly independent, fragmented and segmentary, and difficult to realize the information sharing.

- Lower-level Standardization of Data and Business Process – digital HRM still has less analysis functions, inefficient decision support and corresponding management and control ability, so the decision process relies more on the already-learned experience, and the company's management level depends more on the quality of managing personnel with higher uncertainty" (Lei, Jing, 2016, p. 472).

4. **Conclusion**

Providing quality products and adequate customer support is no longer enough. Consumers now expect to receive products and services in the fastest and easiest way. In addition, companies must ensure a seamless user experience and be available to customers through all communication channels. And, given the inevitable advancement of digital technologies, expectations can only continue to rise. The digital transformation of business has certainly not started due to the Covid-19 pandemic, but it has significantly accelerated and become an inevitable factor of sustainability and competitiveness. Even after the pandemic, companies will have to constantly adapt to new needs and expectations.

The above, requires competent employees, primarily from the aspect of digital skills. More than ever before, human resources managers' task is to be strategists, initiators of changes, to take over the role of business consultants, to manage talents in the right way, and to create a flexibly designed work environment oriented towards adequate use of information technologies. They are expected to know and accept new digital technologies which will put talents, competent people, in the foreground, thus meeting the requirements for the creation of sustainable competitive advantage. It means that the people performing this function are expected to use and develop digital tools, applications, to continuously experiment and innovate.

When it is the question of the application of digital solutions in HR tasks, then the HR function faces several challenges:

- "Redefining the HR mission – providing the needed help so that managers and employees can adapt to the digital way of thinking;
- Introducing modern and simpler technology for HRM practice. When choosing the technologies and solutions which will be used in the HRM processes, it is very important that HR managers look for such a technology which will be entirely suitable for the company, that they take into account the value-price rate of software they get, but also the practical benefits which the correct use of technology brings to these activities;
- Developing an HR strategy which includes the development of the digital way of performing these activities;
- Innovations in digital solutions for HR activities should be the basis of HR strategy;
- Building HR team – people who have knowledge, skills and abilities to conduct business in a digital wa;
- Investing in training HR professionals to perform HRM activities via digital technology;
- Changing the values of HR culture – orienting it towards accepting the benefits of digital HRM vs traditional HRM;
- Creating metric tools which can be used to measure and analyze the results of these processes in a digital way, so that they can be further improved" (Vilini, 2017).

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ECONOMIC SYSTEM IN THE FUNCTION OF REVITALIZATION FINANCIAL POSITION OF THE CORPORATION

Abstract: Due to propulsive, now, and chronically existing illogicalities, which come to us from the direction of the economic system, as an external factor of influence on the business and financial position, the principle of adjustment, corporations, for initial survival, organize various forms of fraudulent activities. Inadequate measures of economic policy, realistically, will imply a negative reaction from corporations, but not a justification of the phrase: "generated, vicious circle of poverty", in which, given, any, that is, any socio-economic environment, and find, precisely, the moment of reaching the "saturation point" on the way to ruining the value of business systems. Economic measures of "loosening" the imposition on employers, and, in the name of paying contributions for pension, health, social insurance, as well as in case of unemployment of workers, in a given branch, would result in significant reliefs for corporations. More burdened tax contributions, in the name of wages, would have the effect of continuing lower levels of corporate operating costs, and thus increasing economic (financial) effects. Conducting a less restrictive monetary policy, that is, a policy of "cheaper money", would also enable a decline in the cost levels of corporate operations. Optimized

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devaluation of the national currency, that is, controlled "devaluation of the value of money", would avoid investing in the zone of hyperinflation, as another extreme of conducting macroeconomic policy. Both blatant macroeconomic policy measures would reflect on the improvement of the corporation's financial position.

Keywords: financial situation of the corporation, due diligence, revitalization, fiscal policy, monetary policy.

1. Introduction

We are witnesses, but also actors, of the general state of inhibition, first of all, economic, social, finally, and, other, no less relevant aspects of human activities. Primarily, the economic - financial - financial blockade of the similar activities is the result of the accelerator spread of the viral infection. However, it is necessary to emphasize that this crisis has exclusively deepened the already identified indicators of a slowdown in economic and financial activities. On the other hand, the positive circumstance, by announcing the presence of a viral infection, is manifested through the transparency of neuralgic points, namely, the (non) functioning, first of all, of the economic department, but also of the holistic system on which it is based. Given that corporations are an immanent part of the economic, that is, holistic system of the state, we assume that the inaugurated and then implemented economic policy measures, although of external provenance, will significantly, de facto, affect their financial positions, In the explicit, current circumstances of the "new" crisis, the creators of the economic system, which generate economic policy measures, especially sophisticated, should approach the given circumstances, especially, taking into account the fact that corporations, as economic units, they cannot influence them, but must adapt. Therefore, expertly trained, ie ethically likened, creators of the economic system, consciously approach the analysis of the macroeconomic environment, with respect to the specific per se viral crisis, with the intention of a real, objective, timely, and fair way to respond to impulses that beat from the direction of corporations. By analyzing the subject context, we have derived two elements from the package of economic policy measures, which will, in particular,

sensitively affect the consolidation, and then the growth and progress of the financial condition of the corporation. One is from the sphere of fiscal, that is, taxation policy, and the other is from the sphere of monetary, ie, exchange rate management policy.

2. The Impact of the Global Economic Crisis on the Financial Position of the Corporation

To a significant extent, it is complex, in a definite way, to map, that is, to profile the financial position of a corporation.

According to Pierre Conso, a French author (Vidaković, 2001, p. 16), financial condition is profiled as "the ability of a corporation to maintain a level of liquidity, plausible from the angle of continuing equilibrium of monetary fluctuations". In the following, the definition indicates "confrontation of the level of liquidity of active balance sheet positions, on the one hand, as well as the level of maturity of passive balance sheet positions, on the other hand, which implies the financial - balance sheet position of the corporation. Assuming that liquidity represents the ability to settle short-term, ie, received bonds, then, from the aspect of the corporation, it is necessary to provide a counterpart to the sum of cash outflows in the equivalent sum of cash inflows.

According to prof. Dr. Mihailo Kovacevic's financial-balance sheet position of the corporation is plausible, assuming "sufficient funds for the realization of the generated business task; then, more harmonized relations between fixed and short-term assets, in a holistic sense; then, continuity of normal relations of constitutive segments; then, shorter maturity of receivables; then, more intensive dominance of own in relation to other sources of financing; then, longer maturities of other sources of financing; also, smaller (more modest) interest rates on behalf of quieter sources of financing; et cetera. ". (Vidaković, 2001, p. 17).

Definition of the financial condition of the corporation, according to prof. Dr. Mihailo Kovačević, more than transparently, points to its broader aspect in relation to the position of Pierre Conso, that is, the French author. However, regardless of the degree of dubiousness, precisely when profiling the very relevant economic category, called the "financial situation" of the corporation, at a given moment, the

targeted definition may indicate a significant level of plausibility, again, having in mind, ad hoc symptomatic observed, economic phenomena. Ultimately, the definitions of the "financial situation" of a corporation are complementary, that is, they are able, thanks to scientific premises, to de facto complement each other, generating a "financial picture" of the corporation, as high a resolution as possible.

Although, by a concise explication of two, in a number of other, also inherent definitions of "financial condition", we determined the relevance of the need for disciplined behavior of economic entities, precisely when disposing of financial balance sheet positions, as, in particular, a sophisticated area of management. Business management, in a holistic sense, largely depends on the management of financial assets, that is, the financial condition of the corporation.

The latest, blatantly, still, current, global, economic crisis, which was officially declared on August 19, 2007, with the initially manifested "mortgage crisis", further prolongation, de facto, got the connotation of a "financial crisis". In the inherent understanding of the circumstances of the outbreak of heterogeneous forms of crisis, at the core of all is, indisputably, the one that bears the prefix "financial". Like the "Great Depression", that is, the global economic crisis of 1929, which, among other things, is called the crisis of "misery of abundance", basically current, we find that, on the market, there are many, and heterogeneous, goods, but, there are fewer and fewer customers. In respecting the chain of causal-consequential relations, it is logical that the reduction of aggregate demand for goods will, ultimately, be reflected in the deterioration of the financial positions of corporations, that is, on the macroeconomic platform.

In the given circumstances, that is, the resulting, and, increasingly, deepening, global, economic - financial crisis, corporations, that is, its consequences, cannot even stop, exclusively, by mass job losses, or by reducing the volume business, regardless of the nature of the business. The biggest paradox, in the observed, negative, economic phenomenon, is the fact that, by the governments, most of the countries of the world, stubbornly insist on rigorous austerity measures, while the excessive money supply, through the prism of, above all, issued financial derivatives, remain far from being available, on the side of economic structures, which could, de facto, revitalize the devastated, economic - financial situation, taken as a whole. Without the release

of financial resources, that is, spilling over to the largest part of the planet's population, it is impossible to anticipate consolidation, that is, overcoming the global, economic-financial crisis.

The roots of the above, the exodus of scale, the consequences, can be found in the international document, inaugurated, the Bretton Woods Agreement, from 1944. The stumbling block (Parnicki, 2021, p. 3) of the world vs. national economies, analyzed through the prism of financial fluctuations, and after 76 years, we are increasingly establishing in the imposed acceptance of the dollar as the American national currency, at the same time, by the world. The agreement defines the imposed international monetary order, with the dollar as the leading currency, that is, the currency to which the exchange rates of other currencies will be pegged. This means that all countries are obliged to peg their own currencies, to a certain extent, de facto, to the dollar. In return, the United States guaranteed that it would replace all dollars with gold. However, on August 15, 1971, the Bretton Woods Agreement collapsed, that is, the "gold standard" collapsed, but the US dollar is still the world's reserve currency.

Since the collapse of the "golden dollar" system, the United States has continued to print it, according to the mathematical principle of geometric progression. If the US dollar had been printed exclusively for the US market, the crisis would have been largely theirs. However, inflation, which the United States has continuously, realistically, generated since the collapse of the "gold standard", thanks to the fact that the dollar is still the world's reserve currency, has not yet completely broken its, the domestic economy, that is, did not lead to the collapse of the "financial system". However, a transparent sign of the impending collapse of the American financial and banking system is, although consciously done by the most powerful individuals, the current, global, economic and financial crisis, on the one hand, and the increasingly frequent cancellation of the use of the US dollar, as world, reserve currencies, of individual, economically powerful states, on the other hand. Namely, a huge amount, and we can, quite freely, use the term "amount" of money against the US dollar, especially in the last 50 years, that is, since the official declaration of bankruptcy of the institution "pegging the dollar to the gold base", year after year, an increasing rate of inflation, not exclusively, on a domicile basis, but also on a global scale.

We emphasize that the flagrantly printed amount of the American dollar, instead of being a generator of growth and progress, not only of the American, but also of the world economy, was finally inaugurated by the Bretton Woods Agreement, ie, in order to optimize the financial situation, first of all, macroeconomic, and the corporate aspects of business, unfortunately, have metastasized into generated, catastrophic, social differences. Thanks to this type of fraudulent activity, the United States (ie, the most powerful individuals), precisely the current, consciously caused, above all, their economic and financial crisis, through the aspect of implementing the principle of "concentric circles", will globalize it, ie "contaminate" economy, on a global scale. The proclamation of the Covid - 19 pandemic, a constellation of explicitly devastated, national and world economic and financial systems, was to serve as a means of concealing catastrophic consequences, precisely by selective interpretation and implementation of the Bretton Woods clauses. All the countries of the world, signatories to the Bretton Woods Agreement, which, at some point, used credit and financial resources, for example the IMF, that is, the International Monetary Fund, became "financially dependent", demanding, in the succession of time, all higher "financial doses", but without the possibility of consolidating the economic and financial position. On the contrary, the like-minded states sank into even deeper "debt slavery".

3. Economic System as an Assumption Coming out of the Crisis VS Quick Recovery

Following the analogy of the principle "he who sins in the small, will sin in the big", that is, vice versa, we come to the conclusion that the economic and financial situation in the Republic of Serbia is especially complex. Eclatantly, taking into account the comparison of minor, ie, modest dimensions of national, economic potential, and, in relation to many, dinosaur economy, the Republic of Serbia, however, can recognize a comparative advantage, precisely in the intention to intensify the consolidation of "ruined" economic and financial conditions of corporation.

Creating a positive economic system, as an external factor in the financial position of the corporation, as well as giving up international

funds, and, consequently, winning and achieving economic - financial autonomy, is more than a real possibility to revive their business activities. Trivial rejection, that is, professional vs moral ignoring of the identified business - financial problem, in a critical number of corporations, by the creators of the economic environment, is absolutely inadmissible. Creators of the business environment should, through adequate economic analyzes, looking for a foothold, primarily in the due diligence concept, ie, through the aspect of protection and preservation of human resources, find the key to consolidating the resulting business and financial nonsense. (Parnicki & others, 2020, p. 606).

Extremely frequent, and in the environment of implicit, epic scale of economic and financial consequences, superficially and consciously devastating, first of all, understanding, and then implementation of due diligence model, analyzed through the aspect of satisfaction of "personal interests", ie, exclusively, one, simultaneously, the doing of harmful circumstances, on the other economic side, inviolable, indicates the collapse of the qualitative vs optimal management of the financial situation of the corporation. (Vidaković & others, 2017., p. 117). The crucial dangers to quality due diligence imply from the expediency of its financial aspect. Namely, during the explication of derived figures, the analyst should emphasize the inherent side of business - financial data, ie, to deal, to a greater extent, with the identification of paradoxical, ie, business - financial abnormalities, namely, with the intention of finding solutions to overcome "financial barriers". (Buble & others., 2006., p. 250 – 270).

Constellation of diagnosed, distinctly ruined economic and financial situation of corporations, viewed through the prism of the phenomenon of mass, the most plausible, from the "buffet" of business environment creators, would be to take measures of economic activities, from the sphere of fiscal and monetary policy. (Muhi & others, 2020., https://www.youtube.com/watch?v=pjgQ21LWXak).

4. Conclusion

Given the current negative context of economic resources of corporations, and, consequently, the macroeconomic environment in the Republic of Serbia, fiscal activities should be aimed at relaxing tax, as well as other parafiscal levies directed at corporations. Absolutely, it is not the time, neither for increasing the estimates, but for the existing fiscal duties, nor for cutting new forms. On the contrary, the "just in time" model of fiscal relief is more than plausible, regardless of whether it is a corporate income tax, or a tax on contributions for pension, health, social insurance, or, in the case of unemployment. A more empathetic attitude towards the "chronically ill" financial condition of corporations, by the macroeconomic management of the establishment, would enable, in the succession of time, the propulsiveness of the spiral of positive feed back. A more relaxed tax system, by the very act of inauguration, will contribute, to a significant extent, to the prompt motivation of both employers and employees, which will work through the chain of positivity.

By constellation of the need to "pull" corporations, from the problematic financial situation, we also suggest pursuing, at this moment, a significantly smaller, restrictive, monetary policy, that is, a policy of "cheaper money". The sudden, that is, sharp devaluation of the national currency, regardless of the necessity of an urgent reaction, precisely at the moment of the decision, would not be rational to do so. Although, for a long time now, from the moment of inhibition, that is, the artificial maintenance of the value of the national currency, at a very high level, it would still be reckless to react "quickly". Suddenly, the "large" devaluation of the domicile currency could be repercussed on the inflation rate, which, from its currently "galloping" or "double-digit" rate (estimated between 25% and 30%), would easily slip in "hyperinflation", that is, in its "three-digit" variant. The necessity is the dosed devaluation of the national currency, precisely in order to stimulate economic and business activities, primarily of domestic corporations. It should be noted that foreign corporations have been more than "generously" stimulated by our macroeconomic "experts".

Corporations cannot influence the measures of economic policy, economic system, but, exclusively, adapt to them. The employers of corporations also cannot influence the consciously recommended

management policies, both the "more relaxed fiscal" and the "cheaper money", which also come to us from the macroeconomic milieu. Following the similar claim, to the representatives of the macromanagement establishment, we are pointing out the necessity of respecting the explicit scientific research conclusions. Respect for the same would be an expression of the care of a rational person, on the way to achieving business targets, in an environment of not harming other people, as well as their property. Finally, in addition to stabilizing the "financial position", the question of the continuity of a "healthy nation" is even more inherent, precisely through the prism of the premise of civilization, of more humane, that is, more humane living.

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MARKETING ACTIVITIES OF HEALTH TOURISM IN THE POST-PANDEMIC PERIOD

Abstract: The period of the pandemic, caused by the Corona virus, is known to have had a significant impact on the economy both globally and locally. Normalization and stabilization of business in the post-pandemic period is a very serious and difficult task. Tourism was one of the most endangered industries during this period, which not only suffered huge losses but also certain changes in the way of doing business. The health tourism services market had a high potential for growth and development even before the pandemic, and in the post-pandemic period it is certain to expect an increase in demand and interest in this form of tourism. AP of Vojvodina has a wide range of services in the offer of health tourism. It is necessary to precisely target and successfully communicate with the target groups in order to present the offer of health tourism in AP of Vojvodina. Marketing activities will require a high level of innovation and creativity in order to attract tourists and promote AP of Vojvodina, as the destination of health tourism.

Keywords: *health tourism, marketing activities, post-pandemic period*

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1. Introduction

Even though people include tourism into their lives for many reasons (business, congress, ecology, visiting friends, cultural and/or spiritual enrichment), the most common and oldest reason to travel as a tourist is medical i.e. with a goal to improve one's health.

Many authors who did research on health tourism point out the fact that this is the "limited field of medicine and tourism" or "shared field of healthcare and tourism". There are many different reasons for travelling for health care. According to Guy et al. (2015), the most frequent arguments to travel for health care are lower costs, getting treatment that is not available in the home country, shorter waiting times, better quality and attractiveness of combination of vacation and medical treatment abroad. Tseng (2013) adds shortage of insurance, non-affordability as a result of high prices and different language and culture.

AP of Vojvodina due to its natural characteristics, as well as capacity has the potential for the development of health tourism. This paper deals with the topic of health tourism, as well as the specifics of the tourist offer of the AP of Vojvodina. An overview of marketing activities that were applied in order to promote the tourist offer of AP of Vojvodina before the Corona virus pandemic is given, as well as proposals of marketing activities that should be applied in the post-pandemic period in order to affirm and successfully position the offer of health tourism of AP of Vojvodina.

2. About Health Tourism

The resource base of health tourism consists of natural healing factors (medicinal thermo-mineral waters, medicinal clay, crude oil, healing climate, medical infrastructure, professional staff). The content of the stays is often supplemented with local monuments and cultural and gastronomic programs.

While following modern trends in health tourism, it is also important to mention the emerging term that is wellness tourism. Wellness is, above all, a lifestyle that leans towards optimal health and

well-being[14] where the body and mind become one. Wellness can be considered a state of well-being that combines the harmony of body, mind, and soul with self-responsibility, physical activity, cosmetic care, healthy eating, relaxation, meditation, mental activity, education and social contacts as its fundamental elements. Wellness tourism is treated as a subcategory of health tourism by some authors. Mueller (2001) defines wellness tourism as the "sum of all the relationships and phenomena resulting from a journey to a different place to proactively pursue activities that preserve or promote personal health and wellbeing".

One of the subcategories of health tourism is also medical tourism. The combination of medicine and tourism is a relatively new type of tourism which is reaching a high rate of growth worldwide. Smith and Puczko (2009) have defined medical tourism as "traveling to destinations to undergo medical treatments such as surgery or other specialist interventions". Therefore, medical tourism is described as the travel to a distinct place to achieve a specific cure for a disease, ailment or condition, taken by patients who are looking for lower costs, higher quality, better access and/or different health care. This definition highlights the 'requisite' to travel for medical purposes, i.e., being illness-oriented because the primarily travel motivation is related to cure or treatment of a particular illness or medical condition. According to Connel (2008) medical tourism is "where people travel, often long distances, to overseas destinations to obtain medical, dental and surgical care while simultaneously being holidaymakers, in a more conventional sense".

Today, programs of health tourism are one of the fastest-growing segments of the world's tourism offers. That is so not only because of the demographic changes, especially the aging of the baby boomer generation that is the biggest consumer of today's health tourism, but also because of some general changes in social values that put more emphasis on a healthy lifestyle.

Health and medical tourism of today generate a significant number of travelers and significant financial traffic on the international level, and their development affects the development of national healthcare systems. Thus, health and medical tourism also have a strong economic significance for the destinations where such a type

[14] The term wellness is coined by blending two terms - *well-being* and *fitness.*

of tourist activity can be organized. The significance includes direct financial effects (paying for services) and indirect effects (increase in existing accommodation capacities, the consummation of different hospitality services, etc.)

3. Health Tourism in AP Vojvodina

There are very few environments, not only in Europe but in the entire world, which can be proud of their diversity, and that fact is exactly the potential advantage of tourism in Vojvodina. The diversity of Vojvodina is not only shown through its demographics and social culture but through its geography as well. Vojvodina has everything, from plains with a lot of boweries and farms, lakes and rivers, with the Danube being its most famous river, to green slopes of Fruška Gora, which is filled with natural breathtaking beauties, as well as a large number of monasteries, i.e. cultural, historic and religious sights. Vojvodina has many good natural and anthropogenic values and resources, it is rich in natural and cultural heritage; in urban environments with unique architecture and lifestyle; in watercourses, lakes, networks of canals and thermo-mineral springs.

In Vojvodina, the offer of health tourism is mostly located in spas (Junaković, Kanjiža, Vrdnik, Rusanda, etc.) and bigger cities (mostly Novi Sad and Subotica). Modern private polyclinics, wellness/spa centers and accommodation of higher categories represent the health tourism offer in bigger cities of Vojvodina. The activation and sustainable use of the thermo-mineral springs and balneological potential is of extreme importance as stated in the Program for the Development of Tourism in the APV. When talking about it on a grand scale, the balneological potential presents itself as a developmental opportunity for all natural healing factors (thermal water, gas, peloid, air) which are present widely throughout the entire province. It is assumed that each of the 45 municipalities and cities of Vojvodina has one or more aforementioned healing factors.

4. Marketing Activities of Touristic Offer AP Vojvodina before Pandemic Period

The current practice when it comes to promotional activities of the health and medical service offer in the AP of Vojvodina is mainly oriented towards promotion through fairs and the Internet.

Health and medical service providers have their own websites where users can find information about certain services, prices, medical teams, and contacts. Additionally, they are present on social media, so interested users can reach out easily and get additional information about their services. Service providers that already actively provide their services to international users often offer additional trip planning services on their websites (accommodation, transport, and excursions, e.g. dental tourism).

On the provincial and national levels, there are websites that offer information to existing and future users of health and medical services. These websites are focused on the promotion of health and medical services to its users but also offer information and the means of communication for all existing, future and interested service providers in the field of health and medical tourism.

Ministry of Health, National Tourism Organization of Serbia and Tourism Organization of Vojvodina are active participants in various fairs, both in the region and in European countries (current data available on their websites). By analyzing the promotional activities of Tourism Organization of Vojvodina at fairs, it can be observed that the organization usually appears with a joint tourist offer of Vojvodina.

By analyzing the promotional activities as instruments of the marketing mix, it can be observed that there are significant efforts invested in health and medical service promotion (especially via the internet and fairs), but those efforts need to be intensified and aimed towards informing the potential users and pointing them in the direction of health and medical service providers. The current situation states that health and medical service providers individually work on their own promotion, which is normal (word-of-mouth promotion is also present—service users trust other satisfied users and user recommendations). Promotion on the AP of Vojvodina level by the Tourism Organization of Vojvodina is intensive but it is obvious that the promotion of the joint tourist offer of Vojvodina is in focus

(which is justified from the standpoint of the Tourism Organization of Vojvodina). On the national level, there are noticeable positive steps when it comes to the support as well as the promotion of health tourism by the Ministry of Health.

5. Positioning AP Vojvodina as Health Tourism Destination in the Post-pandemic Period

Suggestions for marketing activities that can contribute to the market positioning of the AP of Vojvodina as a destination for health tourism are given:

- Creating a joint offer of health tourism in the AP of Vojvodina;
- Offer package deals in the field of health tourism;
- Branding of the AP of Vojvodina as a health tourism destination;
- Presenting the AP of Vojvodina as a health tourism destination on travel blogs;
- Presenting the health tourism offer of the AP of Vojvodina by the Tourism Organization of Vojvodina at international fairs (especially at online fairs);
- Collaboration with international tourist agencies which offer services i.e. health tourism deals;
- Health tourism fair organization in Novi Sad;
- Presenting the AP of Vojvodina as a health tourism destination in minority media (Magyar Szo, RTV 2, etc.);
- Intensifying of cooperation between the Tourism Organization of Vojvodina with tourist organizations on the municipality levels in the field of health tourism in the AP of Vojvodina;
- Intensifying the general activities of the Cluster of medical and health tourism of Vojvodina (in order to achieve better promotion towards target groups of users and establish better promotion towards existing and potential stakeholders);
- Raising the consciousness levels on the significance and potentials of health tourism in the AP of Vojvodina;
- Using digital and online platforms to gather information on the health tourism offer in the AP of Vojvodina and ways to make reservations;
- Introduction of gift vouchers in the offer of health care providers (within the activities where it is appropriate);

- Monitoring satisfaction levels of health tourism users in the AP of Vojvodina;

- Introducing section called Visitors' Experience on the site of the Tourism Organization of Vojvodina, where anyone who visited AP Vojvodina for any reason, could state their impression, experience, describe reasons for their satisfaction or dissatisfaction with the visit, give some suggestions or recomendation;

-Activating a special Internet site that would present the overal health tourism offer of AP Vojvodina (multilingual);

- Optional setting of info-call line, in the future, which would enable further directing of people showing interest enquiring and gaining more detailed information on specific destinations and tourist offer;

- Building long-lasting connections with users/tourists in the health tourism field in the AP of Vojvodina.

6. **Conclusion**

Suggested further marketing activities refer to creating a joint offer of the health tourism in the AP of Vojvodina, in addition to offering package deals in the field of health tourism as well as branding of the AP of Vojvodina as a health tourism destination with an aim to attract foreign tourists and organising their visit. Extremely important are also suggested activities directed to increasing the level of consciousness of stakeholders about the significance and potentials of the health tourism development, together with importance of providing quality service (not only those refering to health care but also additional ones such as accommodation, transport, sight-seeing, etc.)

Promotional activities, which are suggested, point at active promotion via the Internet aiming at target market, in order to make the health tourism offer of AP Vojvodina more visible and at reach of foreign tourists. Promoting this offer at fairs is also significant for building communication with potential users of the services and foreign stakeholders, with a goal to create long-term relationship with them.

The health tourism offer in the AP of Vojvodina has potential to develop in the future under condition to become recognizable in the market, present and available at international market in order to successfully position itself in the consciousness of the foreign tourists, thus affirming its position on the market.

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ECONOMIC ASPECTS OF THE COVID-19 PANDEMIC IN THE WESTERN BALKANS REGION

Abstract: The global pandemic COVID-19 caused the adaptation of the world to the new living conditions. As the pandemic continues in 2021 with strong repercussions on the world economy, the question is what will be the economic consequences on small, dependent region as the Western Balkans. The aim of this paper is to summarize the economic consequences of the first year of the COVID-19 pandemic in the Western Balkans, based on a review of relevant macroeconomic indicators, which will show the current state of the region. The paper is thematically divided into three parts. The first part gives a brief overview of the economic aspects of the COVID-19 globally with a focus on the eurozone. The second part is based on a review of key macroeconomic indicators affected by the pandemic in the Western Balkans region. The third part presents a comparative review of the economic impact of the COVID-19 on Serbian and Macedonian economy, through the effects, implemented mitigation measures, priorities of economic development, perspectives and recovery strategy. Research results clearly show that the economic performance of the Western Balkans since the beginning of the COVID-19 recorded huge losses, and that there is still a risk of failure to achieve the planned growth rate in a short term. With smart decisions it is necessary to maintain production and trade in order to strengthen liquidity, which will be an imperative for the upcoming challenges and lead region to a better economic perspective.

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Keywords: COVID-19 pandemic, economic consequences, Western Balkans, Serbia, Macedonia

1. Introduction

The coronavirus pandemic, in addition to health consequences, has severely threatened the global economy - production has stopped, some services have almost disappeared, some production chains have been irretrievably broken, companies have collapsed, jobs have been shut down, and all countries have seen dramatic GDP declines (Kisin, Ignjatović, 2020). In order to prevent the spread of the infection, during 2020 many countries closed their economies and tried to mitigate the negative economic consequences of the COVID-19 crisis with strong fiscal and monetary stimulations (Ignjatović, Kisin, Osuch, 2020). Global fiscal support, measured in large financial resources along with lower interest rates and the purchase of securities by central banks, has saved national economies from collapse. Although the future is still uncertain, many analysts believe that the end of the past can be predicted at the end of next year, while the economic recovery will certainly continue in the coming years. Certainly, for the sustainable recovery is necessary greater international cooperation, while states should distribute income to vulnerable spheres.

The reasons why the pandemic has strongly affected the economy are multiple. One of the reasons is the disappearance of financial markets, which contributed to the closure of many companies, and which further reflected on the growth of unemployment and the decline of economic activity. Thus, the consequences of the COVID-19 pandemic had a double impact. In addition, the pandemic has had a negative impact on the human population due to mass diseases, high mortality globally and reduced activity (social, cultural, sports and others). Then, there was a general decrease in individual incomes and an intensification of the presence and size of the poverty gap (Munitlak Ivanović, Vujić 2021).

Globally, the COVID-19 pandemic has significantly changed global economic perspectives and led to a turning point in future economic developments. Due to the nature of the epidemic, preventing physical contact in order to slow the spread of the infection, many

economic activities had to be stopped. The price of the suspension of economic activities paid by all world economies is the economic decline, to which all world countries are adapting. In order to stop the spread of the virus and deepen the recession, countries were in a position to keep their economies semi-closed, but also to stimulate themselves economically by international financial institutions and other countries. Namely, central banks around the world are allocating large financial resources for the "immunization" of economies with the aim of stopping the wave of bankruptcies of unimaginable exchanges and the sinking of the global economy. Precisely for that reason, the countries have opted for various strategies to defend the economy, in order to preserve economic activity at the highest possible level. National policies implied the adoption of various packages of measures to help the economy and the population to mitigate the consequences caused by the pandemic (Kisin, Ignjatović, 2020), which continued in the current year. However, as economic policy is not able to respond to the recession, even after several months of applying various methods of combating the spread of infection and interventions in the field of economy, which are applied in countries around the world, no reliable model stands out that gives optimal results (Praščević, 2020).

In accordance with the current circumstances, this research, from the economic point of view, is focused on the Western Balkans region in the conditions of the COVID-19 pandemic. The starting hypothesis is that the pandemic has negative economic consequences in terms of deteriorating key economic indicators and slowing down the economic development of the Western Balkans region. The subject of the research is the effect of the COVID-19 pandemic on economic growth and development in the countries of the Western Balkans, with special reference to the situation and consequences in Serbia and North Macedonia. The focus of the empirical part of the research is on the review and analysis of basic indicators of macroeconomic trends in order to summarize the achieved results and economic consequences of the first year of the pandemic. This research is based on data analysis and synthesis of theoretical and empirical facts. The methodological framework is based on the desk research method, the method of collecting primary data, the analysis of the content of scientific papers and documents related to the economic consequences of the COVID-19 pandemic, as well as the systematization of collected

information according to research goals. The significance of the research is reflected in the theoretical and analytical knowledge about economic changes due to the crisis caused by the pandemic in the Western Balkans region. The conclusions are based on independent research and interpretation of statistical data about changes in macroeconomic indicators caused by the pandemic. Contemporary literature, relevant scientific papers and databases of national and international statistical institutions with real - time data were used to prepare this paper.

2. The Covid-19 Effects on the World and Eurozone Economic Sector

The coronavirus pandemic, which has spread to almost all countries in the world, has infected millions of people and has almost led to the interruption of economic activities from a complete lockdown to a relatively normal functioning economy. Forecasts of global economic growth at the end of 2019 indicated a possible slowdown in the global economy and the economies of leading countries (United Nations, 2020) in the coming years. Numerous authors agree that the COVID-19 pandemic triggered the deepest economic recession in almost a century. There is no way to pinpoint the economic impacts of the crisis, but the fact is that it will have serious negative consequences for the global economy. The countries have opted for various strategies to defend the economy, all in order to preserve economic activity at the highest possible level. Early estimates predicted that the global economy would decline by about 3% during 2020, but as events unfolded, this forecast changed to a 4.5% drop in GDP, amounting to nearly $ 4 trillion in lost economic output in just one year. (Szmigiera, 2021). From the forecasts came the real situation. Given that the pandemic has led to a slowdown in the global economy (Filipović, Ignjatović, 2021), data from the International Monetary Fund (IMF) estimate that the global decline is -3.3%, along with a decline in global trade in goods and services of -8.5%, which is listed as the largest economic decline since the Great Depression of the 1930s. Advanced economies recorded a decline of -4.7%, among which the most affected are Italy (-8.9%), Spain (-11%),

France (-8.2%) and the United Kingdom (-9.9%). The USA (-3.5%) is in line with the global average, while Germany (-4.9%) is closer to the Eurozone average (-6.6%). Growing markets and developing countries (-2.2%) have a far better result, led by China, the only global economy to grow in 2020 (2.3%) (IMF, 2021a).

The dramatic declines in global stock markets and historical records in the losses of the tourism, catering, hotel business or air transport sectors, with millions of jobs lost, many companies bankrupt, are just part of the economic damage caused by the COVID-19. On the other hand, in the first year of the pandemic, records were achieved in the increase in the value of shares and expansion of the volume of business of certain companies, in the field of the pharmaceutical industry and e-commerce. Unemployment rates have risen in major economies. Reduced demand conditioned the dismissal of workers, in order to reduce costs, i.e. to compensate for lost income, while shifts in stock exchanges can affect the value of pensions or individual savings accounts. Many people lost their jobs or had reduced incomes. All of this is only a small part of the global economic consequences that can have a long-term character. The depth of the economic consequences of the pandemic, as well as the length of the recovery, cannot yet be reliably predicted. For many industries, such as air transport and tourism, a return to pre-crisis levels is not possible before the start of 2024. Although, forecasts based on initial indicators and current circumstances indicate a further slowdown in global economic activity (Ignjatović, Kisin, Brajković, 2020), the forecasts are cumulatively observed, optimistic. It is estimated that the global economy will have strong growth in 2021 (6%) and 2022 (4.4%), primarily driven by countries such as China and India, which are projected to grow at around 8.4% and 12, 5% during this year. Recovery will be much slower in large service-dependent countries that have been hit hard by the pandemic, such as the UK, Spain or Italy (IMF, 2021a).

However, the question is constantly asked when and what the recovery will look like. The global economy is in clear danger. Such a picture could change with the change of the ruling economic policy (Ignjatović, 2019), because it has been learned from previous economic crises which effects driven by demand can be opposed by government spending. In order to achieve economic growth, governments are increasing the providing of financial assistance

to citizens and companies. The specificity of this crisis is that some sectors will benefit from it (e-commerce, food retail and healthcare industry), which directly affect economic growth, while the transition to online activities provides an opportunity for the IT sector to increase its market share (Szmigiera, 2021).

3. The Covid-19 Pandemic and Macroeconomic Situation in Western Balkan Region

By 2020 and the beginning of the pandemic, the dynamics of economic development in the Western Balkans region had a positive growth trend. The period 2016-2019 called the period of stable economic growth, in which, according to the World Bank, the Western Balkans region achieved an average growth rate of 3.4%, while for the European Union average was 2.1%. Observed by countries individually, certain differences were noted. In the same period, before the outbreak of the pandemic, Montenegro was the most successful with an average economic growth of 4.2%, while North Macedonia recorded the lowest rate of 2.5%. Other countries Serbia (3.4%), Albania (3.3%) and Bosnia and Herzegovina (3.2%), achieved growth in line with the regional average (World Bank, 2021a).

As of 2019, on average, these countries have not reached even 40% of European development, although over the last ten years the region has grown at an average rate of 1.4% and the European Union at 1% (PKCG, 2020). Prior to the outbreak of the pandemic, most Western Balkan countries made progress on all key macroeconomic indicators, from poverty reduction to increasing household income.

Indebtedness has been brought to a sustainable level of public debt of the region of about 46% and external debt of about 76% of GDP. The trend of growth in exports of goods and public consumption has been achieved, while great progress has been made in reducing unemployment, which decreased by about 5% in the period 2016-2019 years.

March 2020 and the beginning of the coronavirus pandemic in Europe, dramatically changed the established trends and the achieved results. The consequences of the first year of the pandemic has brought the countries of the Western Balkans into recession. Regionally, there

has been a decrease in economic activity, i.e. a fall in GDP of -3.4% in 2020. The primary reasons for the decline in economic activity are the decline in domestic and foreign demand as well as disruptions in supply chains due to the closure of economies. According to almost all key economic indicators, the negative consequences of the coronavirus pandemic have been recorded (Table 1).

Table 1. Western Balkan Region, Key Economic Indicators, 2019-2020.

	2019	2020
Real GDP growth (%)	3.6	-3.4
Consumer price inflation (%, period average)	1.4	0.9
Public expenditures (% of GDP)	37.3	43.2
Public revenues (% of GDP)	35.8	35.3
Fiscal balance (% of GDP)	-1.3	-7.8
Public debt (% of GDP)	46.7	57.5
Public and publicly guaranteed debt (% of GDP)	50.4	61.2
Goods exports (% of GDP)	28.5	27.5
Trade balance (% of GDP)	-13.6	-14.1
Current account balance (% of GDP)	-6.2	-5.8
External debt (% of GDP)	76.1	64.5
Unemployment rate (period average, %)	15.9	n.a.

Source: World Bank, 2021b.

The entry into the recession has worsened labor market conditions and halted the improvement of social protection, although all governments have tried to mitigate the blows of the crisis with certain national measures. The crisis has interrupted, and in some countries reversed, the process of reducing poverty and increasing household income. The World Bank estimates (2021b) that in Albania, Montenegro and Serbia alone, the crisis has pushed more than 300,000 people into poverty. In addition to the above, the consequences of the pandemic have led to an increase in the balance of payments deficit, a decline in imports and exports, and a decline in production. According to available data, the crisis has hit the budget and the level of indebtedness of the region the

hardest. The balance of payments deficit in the Western Balkans region increased significantly from 1.3% in the pre-crisis period, to 7.8% of GDP in 2020. In the conditions of such extraordinary conditions, the indebtedness of each of the countries in the region has drastically increased. According to the current report of the World Bank (2021b), the region had a Public and publicly guaranteed debt of 61.2% of GDP in 2020, which is an increase of about 11% compared to 2019. Life in the pandemic has led to reduced demand for goods from the EU and other trading partners, but also for products from the Western Balkans region, which has resulted in reduced levels of imports and exports. However, according to the World Bank data for the Western Balkans region, trade indicators have not changed significantly and have fallen by only about 1% in 2020. An interesting fact is that the region's external debt has been reduced by about 12% in 2020. Individually, the biggest problems are faced by the economy of Montenegro, whose decline is estimated at -15.2%, which is not unusual, given that this is a characteristic of all countries with a large share of tourism in the economy. Serbia, unlike the rest of the region, achieved the smallest decline in GDP of -1.0% in 2020.

Although economic activities were suspended in line with epidemiological risk, the Western Balkans region maintained the level of employment at approximately the same level as in the pre-pandemic period. There are still no official data on the region's unemployment rate for 2020. According to preliminary data, there is no significant decline, while some countries have even had an improvement, i.e. a continuation of the trend of decreasing unemployment rates, such as Albania, Serbia and North Macedonia. Despite this, Montenegro recorded the largest increase in unemployment by about 3% during 2020.

The fact that there has been no significant increase in unemployment in the Western Balkans region has certainly been positively affected by the implemented state aid measures. Namely, in order to mitigate the negative effects of the crisis caused by the pandemic and the inevitable economic shock, measures were implemented to support the economy as part of national strategies for maximum preservation of jobs, poverty reduction, preservation of production and exports. In accordance with that, all the countries of the Western Balkans proposed mass economic packages to the economy

and the population. Individual Government measures, in each of the Western Balkan countries, through certain assistance to employers, have tried to limit the decline of the labor market and thus reduce unemployment and increase poverty. It is inevitable to point out EU support to Western Balkans in tackling COVID-19. The EU, together with the European Investment Bank (EIB), mobilized over 3.3 billion EUR to support Western Balkans in tackling coronavirus health crisis and post-pandemic socio-economics recovery. EU for socio-economics support provided (European Commision, 2021a):

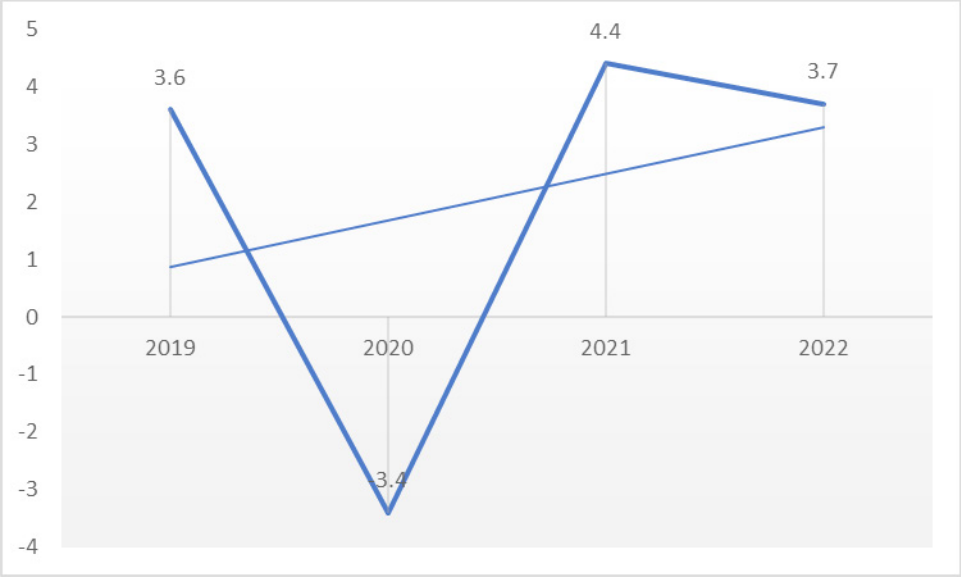
- "761.5 million EUR to support recovery from the social and economic impact of the crisis with special attention to the most vulnerable and to providing a lifeline for Western Balkans businesses (including €385 million of non-repayable assistance to ensure survival in the short-term, and recovery in the medium-term of businesses in the private sector.)
- 750 million EUR in macro-financial assistance, in tandem with the International Monetary Fund, to support Western Balkan governments that requested help with balancing the payment crisis
- 1.7 billion EUR for additional loans for public sector investments, and further credit to enterprises, to help safeguard jobs for the many people working in SMEs in the region".

Focusing on SMEs, start-ups and innovative companies, this EU assistance will in particular be available for green businesses, farmers and agri-businesses, rural and tourism enterprises, as well as women- and youth-led businesses. It will provide a lifeline for many people all over the Western Balkans, especially those working in vulnerable and small-scale enterprises. Also, the EU extended the EU Solidarity Fund to the Western Balkan partners that have started accession negotiation. (European Commision, 2021b).

Although the prospects for recovery remain uncertain in terms of a return to pre-pandemic levels, the current 2021 brings better economic results in the Western Balkans region, with the hope that they will continue. Most countries in the region have already adapted to the epidemic crisis and the way they work in such circumstances. On the other hand, there is a visible abandonment of the policy of strict suspension of economic activities, rigorous restrictions, a far greater degree of openness of the economy and freedom of movement. There is an objective reason that the Western Balkans do not have as much economic opportunity to be in lockdown as was applied during 2020. Analyzing the perspectives of the countries in the region, we come to the conclusion that they are not at all encouraging, but on the

contrary, very pessimistic. In the short term, the pace of recovery will depend on the development of a pandemic, while a delayed recovery in the region's main trading partner, the EU, could slow economic normalization by reducing trade flows and remittances (World Bank, 2020a). The analysis of the perspective for the macroeconomic indicators of the region indicates a recovery of economic growth after a difficult pandemic year, to as much as 4.4% in the current year (Chart 1). Recovery is also forecast in the case of imports, exports, unemployment and investment, as well as falling inflation and balance of payments deficits (IMF, 2021b). It is also predicted that in 2022, industrial production will fully recover from the impact of the crisis, which further points to the possibility of establishing sustainable growth and continuing development through structural reforms.

Chart 1. Real GDP growth (%), Western Balkan Region, 2021-2022. (forecast)



Source: IMF, 2021b.

Structural reforms themselves must include more efficient public spending and better management of public investment, renewal of fiscal space through increased tax compliance, greater spending efficiency, new fiscal instruments (digital taxation, etc.), building strong,

independent and accountable institutions and enforcing the rule of law (World Bank, 2021a). Also, by stimulating trade, the accumulation of capital increases, which in turn stimulates the total production of one country (Belkania, 2020). In addition to reducing unemployment and poverty, restoring fiscal sustainability will be a high priority for recovery across the region. The reason for this is that falling revenues and rising spending have put a strain on the fiscal balance.

4. Serbia and North Macedonia in Terms of the Covid-19 Pandemic - Consequences and Prospects

The period before the pandemic was valid for the advanced age of the Serbian economy. Serbia was among the most advanced countries in the Western Balkans region, whose GDP recorded an upward trajectory, with as much as 4.2% in 2019, while the average for the period 2016-2019 was 3.5% (Table 2). In general, in the same period, all macroeconomic aggregates were successful. Foreign exchange reserves averaged around EUR 11.1 million, while the highest level with as much as EUR 13 million was recorded in 2019. Imports growth rate recorded an average of 10.7%, while exports growth rate, although lower than imports, with 10.3% had a steady growth trend. Despite that, the Current account balance reached -6.9% in 2019, which influenced an increase in the average for the period of -4.95%. Inflation varied in the same period, averaging 2.1%. Unemployment in 2019 decreased to as much as 10.4%, while in the observed period it averaged 12.9%. Macroeconomic and financial stability have led to strong FDI inflows, which amounted to almost EUR 12 billion gross in the period 2016-2019. However, although public debt decreased to 57.8% in the mentioned period, there is a possibility of growth due to the unpredictability of the pandemic.

Table 2. Macroeconomic trends in Serbia and North Macedonia, 2016-2019.

	Serbia				North Macedonia			
	2016	**2017**	**2018**	**2019**	**2016**	**2017**	**2018**	**2019**
Real GDP growth (in %)	3.3	2.1	4.5	4.2	2,8	1.1	2.9	3.2
Consumer prices (growth rate in %)	1.6	3.0	2.0	1.9	-0.2	1,4	1,5	0,8
Foreign exchange reserves (in EUR million)	10.205	9.962	11.262	13.378	2613,4	2.336,3	2.867,1	3.262,6
Imports, (growth rate in %)	5.1	14.0	13.0	10.7	6,5	10,7	12,3	10,0
Exports (growth rate in %)	10.5	11.1	9.6	10.3	7,4	14,3	17,0	9,5
Current account balance (in % of GDP)	-2.9	-5.2	-4.8	-6.9	-2.9	-1.0	-0,1	-3,3
Public dept (in % of GDP)	67.8	57.9	53.7	52.0	48,8	47,7	48,6	48,9
Budget deficit / surplus (in % of GDP)	-0.2	0.7	0.6	0.2	-2,7	-2,7	-1,8	-2,0
SDI, EUR bill. (SRB)/mill. (N.MAC)	2.1	2.5	3.5	3.8	338	182	614	399
Unemployment rate (in %)	15.3	13.5	12.7	10.4	23,7	22,4	20,7	17,3
Wages (average in EUR)	374.5	394.5	419.7	465.9	363,3	404,4	394,7	410

Source: National Bank of Serbia (2021b, 2021c); National Bank of Republic of North Macedonia (2021b), Ministry of Finance of Republic North Macedonia (2021a, 2021b), State Statistic Office of Republic of North Macedonia (2021a).

As for North Macedonia, in the period 2016-2019, the country faced a series of challenges in the dynamic and changing political and development context. Namely, the unstable political scene, as well as the major migrant crisis, marked 2016. Improving relations with neighbors has resulted in a change in the constitutional name in 2018, followed by NATO membership and intensified efforts to advance the Euro-Atlantic integration process. All of this culminated in the global COVID-19 crisis in early 2020 (United Nations, 2021).

Before the Covid-19 pandemic, projections of the economic prosper of North Macedonia were optimistic. Solid economic growth was registered, followed by declining rates of unemployment and poverty. Moreover, a situation on the political scene was supportive. In this period, North Macedonia has become the 30th member of NATO, which contributed to strengthening the country's political stability. Furthermore, just before the onset of the pandemic, the country got approval from the EU to start accession negotiations which meant significant progress in its independent history (United Nations Development Programme, 2020). Despite all the challenges, before the outbreak of the pandemic, during 2019 in a condition of a stable domestic environment and significantly reduced inflationary pressure, North Macedonia provided higher economic growth of 3,2% compared to 2,9% in 2018 and other analyzed years. Moreover, a better structure of the realized growth was noticed with a greater contribution of the investments after a period of two years of consecutive reduction. Financial stability was supported by satisfactory stability of public finances and a sustainable level of public debt as well as a certain growth of foreign reserves (National Bank of the Republic of North Macedonia, 2021a).

Compared to other macroeconomic indicators (Table 2), in the period 2016-2019, foreign exchange reserves averaged about 2770 million euros, reaching the highest level of 3262,6 million euros in 2019. In the analyzed period, the imports growth rate averaged 9,9%, reaching 10% in 2019, which is a slight decline compared to 2018 when it was 12,3%. On the other hand, the exports growth rate reached the highest level in 2018 of 17% compared to 2019 when it decreased by as much as 7,5 percentage points. The current account balance registered the largest decline in 2019 of -3,3%, while the inflation rate in the same period varied and averaged 0,9%. The unemployment rate

tended to decline, reaching the lowest level of 17,3% in 2019. Due to the significant challenges, in the analyzed period, the amount of FDI varied, and a decrease was registered in 2019 compared to 2018, i.e. from 614,1 million euros in 2018 to 398,8 million euros in 2019. The public debt tended to vary and reaching its highest level in 2019, namely 48,9% of GDP.

According to the NBS (2021a), the COVID-19 pandemic and the global slowdown in economic flows had less impact on Serbia than most European and developing countries due to the achieved macroeconomic and financial stability, previous growth dynamics, created fiscal space, timely and comprehensive package of measures, as well as the structure of the economy. The economic consequences of the pandemic in Serbia are characteristic of all other economies and are reflected in the decline in production and foreign trade, but also in the growth of state indebtedness, while certain sectors have been severely affected. However, summarizing the economic consequences of the pandemic so far, Serbia has not had a dramatic economic decline. The reason is the favorable structure of the Serbian economy, which is less affected by the negative effects of the crisis. Agriculture, food industry, i.e. production of existential products, i.e. sectors that were not affected by the crisis, have a high share in the Serbian economy. In addition, activities severely affected by the crisis, such as tourism or the production of durable consumer goods, have a small share in the structure of Serbia's GDP. The smaller fall in GDP was influenced by the fact that Serbia entered a pandemic with a high growth rate, unlike most European countries. The smaller decline in GDP was influenced by the fiscal stimulus through the state aid package to the economy and citizens, which resulted in a significant increase in the budget deficit (Arsić, 2021).

Based on the analysis of macroeconomic indicators, the research results show that the economic consequences of the pandemic in Serbia became visible as early as March 2020. The choice of macroeconomic indicators presented in Table 3 helps to qualify and understand the economic impact of coronavirus in 2020, on pandemic-affected economies. The data show that in 2020, Serbia recorded a decrease in GDP of 1.0%, significantly less than the global average and the average of developing countries (Table 3).

Table 3. Basic indicators of macroeconomic trends, Serbia and North Macedonia, 2020.

	North Macedonia	Serbia
Real GDP growth (in %)	-4,5	-1.0
Consumer prices (growth rate in %)	1,2	1.3
Foreign exchange reserves (in EUR million)	3.360	13.492
Imports, (growth rate in %)	-10,2	-5.8
Exports (growth rate in %)	-10,0	-4.9
Current account balance (in % of GDP)	-3,5	-4.3
Public dept (in % of GDP)	60,2	57.4
Budget deficit / surplus (in % of GDP)	-8,1	-8.4
SDI, EUR bill. (SRB)/mill. (N.MAC)	240	3.0
Unemployment rate (in %)	16,4	9.0
Wages (average in EUR)	442	510.8

Source: National Bank of Serbia (2021b, 2021c); National Bank of Republic of North Macedonia (2021b), Ministry of Finance of Republic North Macedonia (2021a, 2021b), State Statistic Office of Republic of North Macedonia (2021a).

According to detailed official data from the Republic Bureau of Statistics, the growth of the GDP of Serbia in the first quarter of 2020 amounted to 5.2%, while the second quarter recorded a decline of -6.2%, which indicates the consequences of the crisis. In the third quarter of last year, there was a gradual recovery of economic activity, confirmed by a decline of -1.4%, which is significantly better than in the second quarter, but far below its values in the previous year. The fourth quarter of 2020, despite the strongest wave of the epidemic in November and December, recorded a decline of -1.1%, which is a consequence of a different approach to measures to prevent the spread of the pandemic compared to the beginning (RZS, 2021). Comparing the results of macroeconomic indicators for 2019, during 2020, the deterioration of most macroeconomic indicators is evident, as a consequence of the crisis caused by the coronavirus. Despite that, the previously presented data show globally worse indicators for 2020,

but in that sense, Serbia was less affected by the crisis. Although it recorded a decline in GDP, a trade deficit and a decline in foreign direct investment, Serbia managed to preserve economic activity in the given circumstances through the implemented epidemiological and economic measures. In line with that, it is surprising that growth was achieved in 2020 for certain indicators. Micro and small enterprises are the backbone of the Serbian economy and directly employ the largest number of people, while indirectly they have a wider social impact on the quality of life for over three million people in Serbia. This is the reason why it is a great economic challenge to preserve liquidity and jobs in pandemic conditions (Janković et al., 2021). Preservation of employment is the primary economic goal in the conditions of the pandemic, so it is important to point out the success of Serbia in this sphere, because according to official data, the unemployment rate dropped to 9%, which is contrary to current trends. Such a favorable situation on the labor market, despite the pandemic effects, was contributed by the state package of economic measures which was conceived to ensure sustainable economic activity, exclusively in terms of preserving jobs. The average gross salary in dinars increased by 10% in 2020 compared to 2019. In 2020, FDI inflows remained strong despite the coronavirus pandemic, with an inflow of 3.0 billion euros. Serbia has attracted about 60% of total FDI to the Western Balkans region. Regarding the fiscal deficit, Serbia has significantly reduced the same in the last five years, but the favorable trend could not continue in 2020. According to the presented data, the biggest concern is precisely because of the large growth of the budget deficit, and the fully expected increase in public debt, which increased to 57.4% of GDP by the end of 2020. This increase is directly related to the consequences of increased expenditures for the needs of the health system and the realization of state aid to the economy and the population.

Regarding the consequences of the Covid-19 pandemic, North Macedonia recorded a significant decrease in real GDP of -4.5% in 2020 compared to the registered growth of 3.2% in 2019. This decline is due to the economic crisis resulting from the Covid-19 pandemic, which contributed to the reduction of external demand, disruption of production chains and reduced activity of economic entities. These circumstances contributed to the reduction of domestic and export

demand. From the aspect of the production side, the decline of the Macedonian economy during 2020 was dispersed, but most noticeable in the part of the industries from the group "trade, transport and hospitality ", i.e. the same sectors that were significant for the growth in the previous years. (National bank of Republic of North Macedonia, 2021a).

Based on the estimated data of the State Statistical Office, the Macedonian economy suffered the biggest blow in the second quarter of 2020, when the GDP growth rate was -12,7%. As a result of the previously realized fiscal space and the rapid economic measures for supporting the economy, the decline in the GDP rate decreased by -3,3% in the third quarter, while a decline of -0,7% was recorded in the fourth quarter of 2020. In the same line, the largest decline in export and import of goods and services was registered in the second quarter of 2020, i.e. exports of goods and services decreased by 32,0%, while imports of goods and services by 30,2%. Improvement of the indicators was registered in the fourth quarter, i.e. the export of goods and services increased by 4,5% in nominal terms, while the import of goods and services decreased by 5,7% in nominal terms (State Statistical Office of Republic of North Macedonia, 2021b).

Compared to other macroeconomic indicators for 2020 (Table 3), the average inflation rate remained stable at 1.2%, while the unemployment rate decreased by 0,9 percentage points (from 17,3% in 2019 to 16,4% in 2020) as a result of government support measures. In conditions of a significantly increased budget deficit, the total public debt reached 60,2% of GDP at the end of 2020 which resulted from the increase of external public debt (from 33,1% to 40,2% of GDP) and the growth of domestic public debt (from 16,3% to 20,1% of GDP). Regarding the external sector, the current account deficit was 3,5% of GDP with a lover trade deficit. As a result of instability and lost investor confidence, FDI decreased significantly at 239,8 million euros in 2020 (National Bank of Republic of North Macedonia, 2021c).

Thanks to the macroeconomic and fiscal stability achieved in the previous period, Serbia had enough space to use monetary and fiscal measures to help the economy mitigate the negative effects of the pandemic. The Serbian government has taken proactive measures to suppression the negative effects caused by the pandemic by supporting the local economy. Serbia entered the crisis with a strong

fiscal position and low public debt, thanks to credible fiscal measures in recent years. The first program of economic measures to reduce the negative effects caused by the pandemic and support the Serbian economy during 2020 included several groups of measures (Ministry of Finance of Republic of Serbia, 2021a):1) Tax policy measures (disposal of payment of taxes on salaries and contributions for the private sector, disposal of advance payments of income tax, exemption of donors from the obligation to pay VAT, etc.); 2)Direct assistance to the private sector (in the amount of 3 minimum wages to entrepreneurs, payment of aid to large companies in the private sector in the amount of 50% of the net minimum wage, etc.); 3) Measures to preserve liquidity (financial support to the economy through the Development Fund of the Republic of Serbia, guarantee scheme for economic support) and 4) Other measures (moratorium on dividend payments, salary increase measures and other direct financial assistance to adult citizens).

Then, during July and August 2020, an additional package of measures was implemented, which included the payment of aid in the amount of 60% of the minimum wage to entrepreneurs, micro, small and medium enterprises, deferral of taxes and contributions and direct support to the hotel sector. The adopted economic policy measures amounted to about 5.8 billion EUR (close to 13% of GDP, 2020) (Ministry of Finance Republic of Serbia, 2021b). The effect of the implemented program of economic measures was positive, as evidenced by the presented macroeconomic indicators for last year. Assistance to the economy and the population in the conditions of the crisis minimized the fall in GDP in 2020 and prevented the increase in unemployment. On the other hand, the package of measures had significant fiscal costs, which was reflected in the increase of the fiscal deficit, the growth of public debt and the limited space for aid packages that were realized during 2021.

In response to the World Health Organization (WHO) declaration regarding the COVID-19 pandemic, North Macedonia has also taken five packages of economic measures worth more than 1 billion EUR in total to mitigate the negative impact on the economy. The first package of economic measures was approved as early as 2020 and included a fiscal package (0,2% of GDP) to prevent job losses and support business liquidity. The measures started to be implemented in April 2020 and were aimed at the sectors most affected by the pandemic,

namely transport, hospitality, and tourism. One month later, in May 2020, the Macedonian government classified the packages of economic measures into three categories. The first two packages of measures were implemented in the period from March to May 2020 and were aimed at reducing the effects of the health crisis on the Macedonian economy and the population. The third package of measures, which started in May 2020 and whose value is estimated to cost around EUR 355 million, aims to support economic recovery and stimulate consumption and industry. This package included three major pillars: 1) the distribution of means of payment to the population; 2) direct support for the economy and 3) support for the agrarian sector. Few mounts later, in September 2020, the government launched the fourth package consists of 31 measures and an estimated value of EUR 470 million (United Nations Economic Commission for Europe, 2020).

In 2021, the government extended the measures to support the economy from the previous year and introduced new measures that include announced credit lines to assist the most affected and most endangered by the pandemic as well as support for faster recovery of the economy (Ministry of Finance of Republic of North Macedonia, 2021c). In this line, in February 2021, the Macedonian government approved the fifth package of economic measures aimed at stabilization and growth of the economy. This package includes a total of 29 measures divided into four pillars: 1) Direct financial support for sectors most affected by the pandemic (transport, hospitality, tourism, etc.); 2) Direct financial support of liquidity of private sector companies; 3) Crating favorable business environment and 4) Direct support for the citizens (China-CEE Institute, 2021).

Finally, the uncertainties present regarding the duration of the pandemic, the efficiency of vaccination, as well as the possible needs for additional assistance to the economy, affect the model and speed of economic recovery. Real growth of gross domestic product in the first quarter of 2021 in Serbia, compared to the same period last year, amounted to 1.7%. (RZS, 2021). Mid-term analyzes of Serbia's recovery project a gradual stabilization of public finances and directing fiscal space to the highest possible level of capital investment. The growth of domestic consumption and the realization of planned public investments are a key factor in creating the basis for dynamic economic growth and development in the future. According to the

NBS (2021a), in the first five months of 2021, a current account deficit of only 176 million euros was recorded, with a continuation of high FDI inflows (1.4 billion euros). The positive effects of the previous program of economic support were transferred to the beginning of 2021, but the prolonged pandemic with an uncertain duration, conditioned the need for a new package of support to the economy and the population. Therefore, in the first half of 2021, an additional package worth 2.2 billion euros (about 4.3% of GDP) was adopted, which should contribute to further GDP growth and return to the path of sustainable growth of about 4%. The structure of this package of measures includes:

1. Direct support to the private sector - 3 months 50% of the minimum wage to all entrepreneurs, micro, small, medium and large enterprises;
2. Targeted support to the most vulnerable sectors (hotels, catering facilities, travel agencies, carriers, self-employed artists);
3. Measures to preserve liquidity (extension of the old and introduction of a new guarantee scheme);
4. Measures to stimulate consumption (payment of funds to adult citizens and additional payment to pensioners and the unemployed).

According to current macroeconomic projections, the cumulative GDP growth rate in the period 2021-2023 will amount to 14.6%, i.e. on average it will grow annually at a rate of 4.7%. Strong growth of about 6% is projected for the current year, while in the next two years it will stabilize at about 3% of GDP growth. According to the alternative scenario, which incorporates the potential materialization of risks related to the prolonged uncertainty regarding the course of the pandemic, a slower recovery of foreign trade and investment activity is manifested. Such trends would primarily cause a lower rate of economic growth in 2021, at 3.2%, or 3% in the medium-term scenario in 2022 and 2023 (Ministry of Finance of Republic of Serbia, 2021c).

Also for North Macedonia, according to the forecasts of the National Bank of the Republic of North Macedonia for the period 2021-2023, a gradual recovery of the domestic economy is expected. Namely, during the whole of 2021, the economic activity is expected to

recover after the vast losses in 2020 and to return to the pre-crisis level during 2022. Regarding the risks, they are still linked to the COVID-19 pandemic. The outlook for economic recovery is uncertain due to the presence of new waves of infection as well as new variants of the virus. Consequently, the main economic risk is related to the success in dealing with the pandemic, which will certainly affect economic growth, fiscal deficit, and the labor market. In accordance with the anticipated external environment and domestic factors, economic activity growth of 3.9% is expected in 2021 and 2022. As a result of the accelerated process of vaccination globally and domestically, it is expected faster resolution of the health crisis and improvement of the economic situations of the major trade partners of North Macedonia which will contribute to the stronger recovery of the Macedonian economy in 2022 and upward revision of estimates for GDP growth. In this line, the economic growth will continue in 2023 with a projected rate of 4% (National Bank of Republic of North Macedonia, 2021c).

The composition of the economic growth of North Macedonia shows that investments will play a significant role in the recovery and gradual intensification of the economy. The real growth of gross investments is expected to be 8% in 2021 in conditions of the expected growth of public and private investments. In terms of consumption, real growth of private consumption is expected at 4%, while the growth of public consumption is projected at 4.3% in real terms due to expenditures made to deal with the health crisis. Export of goods and services are expected to increase by 10.6% in real terms, which, followed by the recovery of domestic demand, will contribute to increased imports of goods and services by 11%. The gradual return of investor confidence conditioned by the expected improvement of the health condition, as well as active measures and programs for employment and job creation, will contribute to the growth of labor demand. As a result, in 2021 the number of employed persons is projected to increase by 1%, which will contribute to the increase of the employment rate to 47.5%, and the decrease of the unemployment rate by 15.8%. Finally, regarding the issue of inflation, the inflation rate is projected to be 2.1% in 2021, which is a slight increase compared to 2020. In 2022 and 2023, the inflation rate is expected to be around 2%. (Ministry of Finance of Republic of North Macedonia, 2021c).

5. Conclusion

In 2020, the world faced the great consequences of the health crisis caused by the coronavirus pandemic. The main measures against the spread of the infection are the reduction of people's movement and social isolation, which reduces the consumption of the population and business investment. Reduced demand brings a drop in revenue and reduced liquidity of companies, which, if prolonged, conditions the dismissal of employees, and this will further intensify the impact on demand. The economy has suffered, so the state will have to take care of its health through direct interventions, which are contrary to market principles, but which are now inevitable. The longer the epidemic lasts, the deeper the economy will fall into crisis. There are analyzes according to which the economic problems caused by the COVID-19 pandemic cannot be solved by traditional means, i.e. fiscal and monetary measures will not create the resilience of the economy. Incentives of this kind cannot save organizational capital, which many companies will lose as the most valuable resource during an epidemic. That is why it is primarily important to raise awareness that in the conditions of strong state interventionism, it is necessary to preserve the entrepreneurial spirit, but above all freedom. The time of crisis can also be seen as a time of opportunities that open up in the new circumstances, also for North Macedonia and Serbia.

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LABOR MARKET DURING THE COVID-19 CRISIS: A REPORT ON THE SERBIAN LABOR MARKET DURING THE PANDEMIC

Abstract: The COVID-19 outbreak has severely disturbed the global economy. Governments are trying to mitigate its effects through various financial and non-financial interventions. This article focuses on the negative effects of the pandemic to the labour market in Serbia and its impact to the most vulnerable workforce groups. It provides an overview of the pandemic effects in general, discusses the situation on the Serbian labour market in particular, analyses the perception about the implemented measures, and offers a more precise set of measures to better address the most endangered workers. Exploratory methodology was used to review the related literature, followed by an online questionnaire to collect some empirical evidence. The researchers examine whether the results vary by employment status, education level, industry sector, and monthly income.

Keywords: labour market, covid-19 crisis, Serbia, covid measures

1. Introduction

The ongoing COVID-19 pandemic triggered a global health crisis, which quickly became a major economic crisis of unparalleled magnitude. In recent years numerous epidemics occurred in different parts of the world, severely disturbing the affected countries.

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However, none had such a detrimental effect on the economy as the COVID outbreak (McKibbin & Fernando, 2020). Despite the fact that numerous public health experts have long warned about the upcoming pandemic, majority of the policymakers did not invest any time or resources to address the possibility of a worldwide crisis. Therefore, majority of the world was unprepared for such a vast public health threat (Frieden, 2020). It largely influenced every aspect of people's lives, significantly disrupting labor markets around the world.

The effects of the COVID pandemic suddenly became an immensely popular topic among researchers. However, a few actually dealt with the most critical area - labor markets and work disruptions. This research is directed towards the most vulnerable workers on the Serbian labor market, assessing the government-implemented measures in that regard. It evaluates if the current social assistance programs compensate enough for the negative effects of COVID on the aforementioned group, and offers a modification to the existing set of measures, to better address the most affected. The goal is to show that a minor modification of the measures set could influence the perception among the general population, making the set perceived as more reasonable. Its contribution to the theoretical knowledge on the labor markets lies in the fact that very few developing countries have attempted to target their population that was most affected by the pandemic- the informal workers. In practice, implementing any of the measures heavily focused on the poorest population would have a tremendous impact on the Serbian labor market performance, as well as on the economy in general.

2. Literature Review

2.1. Macro Effects of COVID 19 Pandemic on the Economy and the Labor Markets

The COVID-19 virus has spread around the world with tremendous speed, bringing the economies to a standstill. To fully understand the effects of COVID pandemic to the economy, it is important to understand behavior of people during the pandemic. Three key COVID-related causes of stress were identified: Threat/fear

of infection and death, Economic hardship, and Disturbed routines/ isolation (Kira et al., 2020). This research focuses on the second group of stressors, related to economic burden. According to Jue et al., the households investments have significantly decreased in general by nearly 10 % (Jue et al., 2020). In addition, people became highly averse to risk, and lost confidence in the economy and the government.

Developing countries have been impacted more due to weak health systems, deteriorated trade and tourism, decreased cash flow, and eventually less taxes collected (The World Bank, 2020). Moreover, it significantly increased unemployment within those countries (Adams-Prassl et al., 2020). Researchers pointed out a strong possibility of pandemic impacting the developing countries more than the developed ones, mostly due to higher informality labor market rates (Sanchez-Paramo, 2020).

Labor markets around the world have gone through major changes, and those changes are certainly going to be long-lasting. Obvious, direct effects include: Increased unemployment rates, lower average incomes, general impoverishment, social welfare declines, increased social inequality gap (Kadar & Nagy, 2020). Given the nature of employment and the active pandemic, any prediction related to the number of people involved includes high level of uncertainty (Lee et al., 2020). According to the International Labor Organization, the global number of employed is expected to drop around 8,8% in 2020 and 2021, while the loss in working hours is estimated to 12,5% globally, four times more than during the 2009 recession. Loss in working hours means significant decline in labor income, estimated to 8,3% globally (ILO, 2021)(ILO, 2021).

In general, three key factors determine employee vulnerability: Job security, Income, and Education (Center for Advanced Economic Studies [CEVES], 2020). Although the pandemic impacted almost every individual on the planet, its heaviest influence was directed towards the most vulnerable group- the informal workers, youth, and women (Khalid & Shahnaz, 2021a; UNU-WIDER, Institute of Statistical Social and Economic Research, University of Ghana, 2021). Hussmanns describes the informal workers as disproportionately concentrated in poor households, they do not have any access to social insurance, and the firms they are employed at are not likely to receive any financial support (Hussmanns, 2004). The informal workers make around

2/3 of the global workforce, and they have suffered the heaviest consequences in terms of job loss, pay cuts, increased income risk (Lee et al., 2020). As previously mentioned, the emerging countries have been affected significantly more by the pandemic, largely due to high percentage of the informal workers within their labor force (up to 71%). On the other hand, developed countries have mostly formal employment, with only 18,1 % of the informal workforce (International Labour Organization, 2018.) The informal workers are vulnerable since they largely rely on daily functioning of regular markets, they lack mechanisms for collective bargaining, and they tend to be involved in jobs that largely depend on human contact (HoReCa, personal services) (Balde et al., 2020). Furthermore, young workers were largely impacted by the COVID crisis in three ways: 1. Disruption of education, training, 2. Increased difficulties for jobseekers, 3. Job and income losses, decreased employment quality (Lee et al., 2020). Therefore, adjusting support to cover as many vulnerable workers has been a priority for most, primarily form the governments of under- and moderately developed countries (Gentilini et al., 2021).

Certain sectors and the people working within those sectors are going to benefit from the pandemic (healthcare, information technologies) (Zsigmond & Kovacs, 2020). On the other hand, other sectors have been impacted tremendously- HoReCa, personal services, certain areas of manufacture, transportation, professional services (Center for Advanced Economic Studies [CEVES], 2020). In addition, those sectors traditionally employ majority of the non-formal workers, making the situation even worse. Further, Lakuma and Sunday have noticed that micro and small enterprises have experienced a significant activity deterioration, comparing to medium and large enterprises (Brookings Institution, 2020; Shafi et al., 2020). Attempting to determine key vulnerability factors, Campa et al. pursued a thorough research, taking into consideration four major demographic factors: gender, wage, age, country of birth. They have confirmed that the pandemic increased an existing socio-economic inequality gap worldwide, affecting primarily the poorest citizens. They have also found a strong connection between employees' age and increased vulnerability, recognizing the younger population as the most affected (Campa et al., 2021). Moreover, Overman stresses increasing inequality as the key problem in the future, focusing on

the difficulties to predict the impact of COVID to the most vulnerable groups (Overman, 2020). He suggests immediate short-term actions, targeting those groups as precise as possible, in order to prevent hysterisis- a depopulation process that lasts years after the crisis ends (Hershbein & Stuart, 2020).

Further, the researchers from McKinsey Global Institute developed a method to quantify the proximity required in occupations, grouping them into ten work arenas. This method provides a better picture of the infection risk for those occupations, based on the required number of interpersonal interactions. They suggest that the arenas with higher proximity scores involve the most endangered workers, predicting that those arenas will go through the biggest transformation (Lund et al., 2021).

According to the researchers in OECD, the key for crisis mitigation is policy adaptation throughout the recovery process. They also state that the international attention should be directed towards the developing countries that are fighting the pandemic with weaker healthcare systems, large percentage of informal workers, and fragile economies in general (Organization for Economic Co-operation and Development [OECD], 2020).

Governments around the world have implemented various packages, depending on the strength of their economies. The importance of the government measures is immense, through supporting companies, preventing bankruptcies, and maintaining the employment rates as high as possible. Depending on the size, length, and direction of each measure, it can largely aid the targeted group to mitigate the negative effects of the pandemic. However, majority of those measures have failed to address the most vulnerable groups. Nevertheless, the governments have to ''Act fast and do whatever it takes'' to flatten the recession curve and reduce the damage to the economies (Baldwin & Di Weder Mauro, 2021)(Baldwin & Di Weder Mauro, 2021). Ideally, governments would step in and provide the vulnerable companies and entrepreneurs with enough funds for meeting the payroll and other fixed expenses, possibly in the form of a non-repayable transfer. Unfortunately, such strategy is impossible since it would certainly cause numerous problems for the governments in the near future, forcing them to raise taxes and increase the debt burdens (Gali, 2020)(Gali, 2020). Regarding cost-effectiveness, not

all measures are effective as previously thought. According to Haug et al., some of the costly measures are proven to be ineffective, (eg. sanitization of streets and public spaces), while other measures that require almost no cost by the government, eg, small gathering cancellation, turned out as largely efficient (Haug et al., 2020). Therefore, resources spent on some measures could be transferred elsewhere, where they will have larger impact.

Researchers from Bruegel group discretionary fiscal measures into three main categories: 1. Immediate fiscal impulse, which include any government spending (medical, employment, SME subsidiaries, public investments), and foregone revenues (taxes and social security cancellations); 2. Deferrals, including postponing certain payments (taxes, social security contributions, utility bills; 3. Other liquidity provisions and guarantees, such as export guarantees, liquidity assistance (Anderson et al., 2020). This research will focus mostly on the Immediate fiscal impulse measures since they directly affect the labor markets.

2.2. Effects of COVID Pandemic to the Economy and the Labor Market of the Republic of Serbia

Many low- and middle-income countries have institutional and fiscal capacity to deliver some direct financial relief to their population. On the other hand, those countries have high level of informality within their labor force, being extremely vulnerable to the lockdown measures. The key problem is that most of those workers are invisible to the system, therefore difficult to target with the measures (Bassier et al., 2020)(Bassier et al., 2020). Wealthier countries could allow themselves to invest larger percentage of their GDPs to relieve negative effects of COVID. However, developing countries were often constrained into a debt, making their COVID relief funds highly limited. That added to the importance of precise and targeted measures, especially for countries with scarce budgets. According to the World Bank, Serbia belongs to Upper-Middle-Income countries (The World Bank, 2021)(The World Bank, 2021).

Serbia implemented virus prevention measures slightly later than the other countries. As recommended by the WHO, it started in

mid-March with closing the borders, cancelling flights, closing schools, kindergartens and universities, enforcing a nationwide curfew. Significant portion of the workforce started working from home. Further, Serbia implemented the rest of the recommended measures, strictly enforcing the crucial ones like quarantine, travel restrictions, gathering cancellations.

Despite the expectations, the formal employment in Serbia has been relatively stable during the crisis. Only 1,1% of companies and 2,2% of entrepreneurs have terminated employees, while none has lost more than 10%. In contrast, the informal employment officially dropped by 37%, while the estimation about the total drop during the peak of the pandemic, in April 2020 is around 80% (Center for Advanced Economic Studies [CEVES], 2020).

Primary reason for implementing majority of the fiscal measures was to support labor market through decreasing forced layoffs and temporary terminations. Most measures implemented by the Serbian government can be categorized as cash-based transfers, either conditional or unconditional. Among others, one action caused numerous controversies, causing a significant unrest among the citizens. One-off payment of 100 EUR for all adults over the age of 18 was the measure that forced the country into a significant debt with unpopular interest rates, while having questionable effects. In general, such measure is popular amongst the developing countries since large percentage of their citizens are considered poor, and this measure makes a strong positive impact on their wellbeing. However, this research discusses that a significant sum of that money could have been spent elsewhere. Other cash transfers include: Extended cash transfers for the Financial Social Assistance, Caregiver allowance, Child allowance, Maternity leave benefits, as well as another 4000 RSD (equal to 37 EUR) for child recipients of the Caregiver allowance (Gentilini et al., 2021). Another significant measure that affected a large number of people was enforcing moratorium of payments for any ongoing loan with the banks in Serbia. Citizens had an opportunity for a 90-days delay for their credit payments, which turned to be highly popular (National Bank of Serbia, 2020)(National Bank of Serbia, 2020).

One of the key measures of the Serbian government, implemented at the very beginning of the pandemic, was paying the total of three minimum wages for each employee over the period of

three months. This measure is important since it saved numerous (fully employed) workers' jobs. Companies that received those payments had to maintain the same number of employees for another six months, which prevented certain percentage of the endangered workers from being terminated. Such measure mostly affected SMEs, which actually employ most of the informal workers (Ćeha & Ćeha, 2020). Another significant measure was providing funds in the form of credits through the Development fund of the Republic of Serbia, for maintaining liquidity of the SMEs within the trade, services, or agriculture sector, with the total cost of around 204m EUR. With largely popular terms, this measure also aided targeted SMEs, preventing many from declaring bankruptcy (Fond za razvoj Republike Srbije, 2020). Further, Serbia had another measure to support the economy through boosting the SMEs by providing funds for necessary equipment purchases for the qualifying companies (Ministry of finance of the Republic of Serbia, 2020). The two SME support strategies had indirectly affected the labour market by helping some companies to survive, therefore saving some jobs and income sources. Other than the two, no other measures strictly related to the labor market were put in force, in regards with Employee activation, Labor market regulations, or Reduced work time procedures.

According to the vast research conducted in 39 developing countries, workers experienced severe disruptions since the pandemic started. Around 34% reported stopping work, 20% reported lack of payment for the performed work, 9% reported certain job modifications, and striking 62% reported some income loss in their household (Khamis et al., 2020). On the other hand, a major job seeking website, Infostud.com, has conducted a significantly smaller survey about the Serbian labor market, sampling around 4300 respondents and 580 legal entities. Among those, 12% respondents stated that they lost their jobs due to COVID, of which a half due to temporary closure of the entire company, and another 37% due to decreased working hours. Around 15% of the respondents stated cost-cutting as the reason for the termination. Around 40% have expressed serious concern about job loss in the near future. The results have confirmed Tourism and hospitality, Trade and Transportation as the most affected sectors (poslovi.infostud.com, 2020). Further, Serbian Association of Employers has conducted a survey, focusing on corporate entities. The

results show that 90% of the companies managed to stay in business during the pandemic, either remotely or within the facilities, half of them with the full capacity. Again, the most endangered sector is HORECA and Personal services. Average decrease in profits is around 25%, while impacting micro and small enterprises the most. Regarding the measures, 33% of respondents have described the government measures as too broad and imprecise, 37% as positive, while 8% stated that the measures have completely saved their companies.The best ranked measure is certainly employee wage subsidies, followed by tax delays (Unija Poslodavaca Srbije, 2021).

2.3 Measures in Other Countries as Possible Solutions

Serbian labor market was seriously disrupted by the COVID pandemic. To implement measures, the Serbian government has decided to issue 2b worth of Eurobonds for the 7 years period, with 3.375% interest rate, which turned out as very expensive comparing to the neighboring countries (Croatia 1.32%, Montenegro 2.5%) (Ćeha & Ćeha, 2020).

This research focuses mostly on the policies related to the supply side of the labor market- the workers (La Flor et al., 2020). Four major groups of measures directed towards the workers are: 1. Wage subsidies, 2. Labor market regulations, 3. Shorter work arrangements, 4. Activation policies (Gentilini et al., 2021).

As previously mentioned, vulnerable workers are difficult to target. One way to reach those workers would be through careful selection of the most vulnerable companies, using several factors: Size, Industry, Percentage of income from export, etc. As suggested by Therion, another way to target the vulnerable workers could be creating some form of the entrepreneurial organization, a collective organization based on a culture of self-reliance and solidarity (Theron, 2010).

Designing a special program for restoring livelihoods for both informal and formal workers who lost their jobs due to COVID should be the key task for the governments. Support through affordable loans for micro and small enterprises, market linkages, short-term temporary employment opportunities, especially for the lower-skilled

workers is the way to protect the most affected citizens (Khalid & Shahnaz, 2021b). Gaspar and Mauro provide a step-by-step plan on how to protect people and firms. Besides usual increase of the healthcare expenditures, they call for a timely, targeted cash flow relief for the most affected through wage subsidies, expanded and extended financial transfers for the most endangered citizens, tax relief plans (International Monetary Fund, 2020a). The key goal is supposed to be to flatten both the economic and pandemic curve through discretionary targeted fiscal measures and programmes for supporting economic activity. Gourinchas also suggests that each country needs striking policies to control recession, primarily through ensuring the workers to cover basic payments. (CEPR Press, 2020) Furman expresses his idea about the response through six points: 1. Better to do too much rather than too little; 2. Use existing mechanisms as much as possible, 3. Invent new programs where necessary; 4. Diversify and do not fear duplication or unintended 'winners' in the response; 5. Enlist the private sector as much as possible; 6. Ensure the response is dynamic and persistent. He also suggests establishing a ''Kurzarbeit programme'' to support short-term employment facilities (Furman, 2020). Liu and Gupta argue that the crucial step for the developing countries should be the implementation of a comprehensive reform package, as a part of the post-COVID reform. Reconsidering their revenue-raising strategy, including reversal of some poorly targeted COVID-response measures, should garner public support and be perceived as fair (Gupta & Liu, 2020).

As highly impoverished country, Ghana has implemented several measures that precisely targeted its poorest citizens. For example, the government absorbed the electricity bills for the poorest households that use between zero and 50 KW of electricity per month (Danquah et al., 2020). Similar measure could be implemented in Serbia, adjusted to the local electricity norms. Further, Gopinath suggests specific measures implemented in Italy, Korea and China, which might be applicable to Serbia. Italy has extended the tax deadlines and expanded funds for supporting terminated workers. Korea has introduced significant subsidies for the small merchants, while expanding the allowances for job seekers (International Monetary Fund, 2020b). Chinese institutions implemented numerous measures to support SMEs, such as reduced interest rates, increased debt rollovers, specific

credit lines for production improvements. Similar measures were implemented in Serbia. However, China also had certain tax deduction and fee-waiving policies, targeting the companies in the most affected industries- medical services, public transportation, tourism, hospitality. This policy also included companies who voluntarily supplied critical medical products (Huang et al., 2020). Another option could be the implementation of the sliding scale policy for the COVID-related benefits, like in the United States. The point of such idea is to pay low proportion of the salary to the high-income workers, and vice versa (Harvard Business Review, 2020.).

Activation (training) measures could be implemented to help workers switch careers. Such measure has been vastly popular among the high-income countries. However, it showed some success in the developing countries, like Albania, Bosnia and Herzegovina, and Montenegro (Shehaj, 2020). The labor market benefit would be twofold- less workers in the affected sectors, more in the sectors in need.

Hypothesis

1. Government measures did not aid the most vulnerable workers enough. Precise targeting, focused on the poorest citizens, would have significantly larger impact on the most vulnerable
1a. Measures focused on the most vulnerable would be perceived as fair amongst the general population, increasing trust in the Government's guidance during the crisis

3. Methodology

This research was conducted through the method of random personal interviewing, using Google forms for collecting information. The survey consisted of 25 questions, divided into three groups: Demographic information, Employment information, and Attitude towards measures. Links for the survey were sent through email, and social media platforms (Facebook, Linkedin). Statements were modelled after the work of Khalid and Shahnaz (Khalid & Shahnaz, 2021b), and Nguyen et al. (Nguyen et al., 2020), and adapted for the purposes of this research. Respondents answered the total of 21 open-

ended questions with multiple answers, followed by 4 measures-related questions with 5-degree Likert scale answers. The survey was conducted between the 3rd and 8th of September 2021, with the total of 434 respondents. The Google forms survey was set to collect all answers from all respondents. Therefore, the total number of responses is 434 for all questions.

The data was processed through SPSS (Statistical Package for the Social Sciences), using the descriptive analysis, internal reliability, simple regression, and Chi-squared analysis. The research uses Pearson's $\chi 2$ (chi-squared) test as a non-parameter technique used to compare groups, when the dependent variable is categorial. In addition, chi-squared independency test was conducted to assess the connection between the two categorial variables.

3.1. Population

Respondents' socio-economic data is presented in the Table 1.

Table 1. Socio-economic characteristics of respondents

Socio-economic characteristics (N=434)	**f**	**%**
Sex		
Male	184	42.4
Female	250	57.6
Age		
18-25	62	14.3
26-35	126	29.0
36-50	178	41.0
51-65	64	14.7
Over 65	4	0.9
Education		
Elementary school	34	7.8
High school	108	24.9
Higher education	292	67.3
Monthly income per household		
Less than 30.000 RSD	10	2.3
30.000 - 60.000 RSD	102	23.5
60.000-100.000 RSD	138	31.8

100.000-200.000 RSD	146	33.6
More than 200.000 RSD	38	8.8
Area of living		
Urban area	280	64.5
Semi-urban area	98	22.6
Rural area	56	12.9
Employment status		
Employed (Full time)	250	57.6
Temporarily employed (part-time, short-term contract)	108	24.7
Unemployed	16	3.7
Student	16	3.7
Retired	8	1.8
Informally employed	36	8.3

4. Results

As shown in table 2, majority of respondents have rated their Trust in the government-implemented measures low (2.09), while ranking the Financial help package for the poorest significantly above the average (3.20).

Table 2. Descriptive statistics regarding the measures tested

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Trust in measures	434	1	5	2.09	1.328
Moratorium rating	434	1	5	2.73	1.423
Direct financial help 100+60 EUR ranking	434	1	5	2.55	1.419
One-time financial help for the most vulnerable	434	1	5	3.20	1.505
Valid N (listwise)	434				

Table 3 shows generally negative attitude towards the Serbian government's set of measures, as stated by 69.1% of the respondents

(No trust and Some trust cumulatively), proving highly negative mindset throughout the nation in that regard. The largest percentage has zero trust in the government, while less than 10% fully trust their actions.

Table 3. Amount of trust in the Government-implemented measures

On a scale from 1 to 5 rate the amount of trust you have into the Government's guidance and the set of measures during the COVID-19 pandemic	**(N=434)**				
	f	**%**	**X^2**	**df**	**p-value**
No trust at all	210	48.4			
Some trust	90	20.7			
Undecided	64	14.7	234.884	4	.000
Mostly trust	28	6.5			
Fully trust	42	9.7			

To precisely present the respondents' opinions, Chi-squared test was conducted on the questions related to the Serbian Government's key measures for tackling COVID-related damage to the economy: Bank loan moratorium, Direct funding of all citizens 100+60 EUR (''Helicopter money"), Cumulative set of measures for the most endangered (One-time financial aid for the unemployed, social aid program beneficiaries, retired with low average income, totaling around 37 EUR). Since for all four tested measures (Tables 3-6) p-value is lower than 0.05, statistical significance is confirmed.

Table 4. Opinion on the Bank loan moratorium

On a scale from 1 to 5 rate the effectiveness of the BANK LOAN MORATORIUM as part of the measures set implemented during the COVID-19 pandemic	**(N=434)**				
	f	**%**	**X^2**	**df**	**p-value**
1 (Not effective)	136	31.3			
2	40	9.2			
3	126	29.0	80.885	4	.000
4	68	15.7			
5 (Highly effective)	64	14.7			

Based on the results shown in the Table 4, there is statistically significant difference in regards with the respondents' stance about the Bank loan moratorium. Large portion of the respondents rated this measure as not effective (40.5%), while a significant number had no clear opinion.

Table 5. Opinion on the Direct payment for all adults

On a scale from 1 to 5 rate the effectiveness of the DIRECT PAYMENT FOR EVERY CITIZEN OVER THE AGE OF 18 (100+60 EUR) as part of the measures set implemented during the COVID-19 pandemic	**(N=434)**				
	f	**%**	**X^2**	**df**	**p-value**
1 (Not effective)	138	31.8			
2	100	23.0			
3	76	17.5	50.194	4	.000
4	58	13.4			
5 (Highly effective)	62	14.3			

Large percentage of the respondents have rated the Direct payment of 160 EUR for all adult citizens as not efficient (54.8%), but we can not disregard a considerable percentage with a favourable stance in this regard (27.7%).

Table 6. Opinion on the Package for the poorest population

On a scale from 1 to 5 rate the effectiveness of the ONE-TIME FINANCIAL AID FOR THE MOST ENDANGERED- UNEMPLOYED, LOW-INCOME RETIREES, SOCIALLY IMPERILED as part of the measures set implemented during the COVID-19 pandemic	**(N=434)**				
	f	**%**	**X^2**	**df**	**p-value**
1 (Not efficient	84	19.4			
2	74	17.1			
3	78	18.0	28.442	4	.000
4	68	15.7			
5 (Highly efficient)	130	30.0			

Regarding the financial aid for the most endangered, we do not have such clear picture about the respondents' opinions. Majority have rated this package as efficient (45.7%), but there is no clear opinion on this topic. Possible cause for such an equal spread of grades may be rather confusing definition of the measures set, which cumulatively shows multiple measures directed towards the most vulnerable population.

Table 7. Opinion on the proposed focus switch towards the most vulnerable

Do you think that the government should focus on the most endangered citizens?	(N=434)		X^2	df	p-value
	f	%			
Yes	336	77.5			
No	22	5.1	386.167	2	.000
Not sure	76	17.5			

Table 8. Possibility to change opinion about the government and its actions

Would your attitude towards the Government' guidance through the pandemic change if the measures package was mostly focused on the vulnerable citizens??	(N=434)		X^2	df	p-value
	f	%			
Yes	256	59.0			
No	84	19.4	128.866	2	.000
Not sure	94	21.7			

Table 7 show that large portion of the general population (77.5%) think that the government should pay more attention to its poorest population. Considering the fact that nearly 70% (Table 1) of the respondents do not trust the government in general, a minor shift towards the poorest citizens would have a considerable impact on the general attitude, with a strong possibility for turning the 59% of the respondents shown in the Table 8 into the favourable ones. Despite being slightly suggestive, these two questions provide an important stance of the population about the direction of the existing measures.

Table 9. Relation of Education, Employment, Income, Sector with the Amount of trust in the government

Amount of trust you have into the Government's guidance and the set of measures during the COVID-19 pandemic (1-5 scale)		**1 (48.9%)**	**2 (20.7%)**	**3 (14.7%)**	**4 (6.5%)**	**5 (9.7%)**	**X^2**	**df**	**p-value**
Education	Elementary	26	4	2	2	0	29.221	8	.000
		76,5%	*11.8%*	*5,9%*	5.9%	0%			
	High school	66	16	14	6	6			
		61.1%	*14,8%*	*13.0%*	5,6%	5,6%			
	Higher education	*114*	*70*	*48*	20	36			
		39.6%	*24.3%*	*16.7%*	6.9%	12.5%			
Employment status	Employed full time	102	58	48	14	24	65.483	20	.000
		41.5%	*23.6%*	*19.5%*	5.7%	9.8%			
	Employed, short-term contract	54	22	14	8	10			
		50%	*20.4%*	*13.0%*	7.4%	9.3%			
	Unemployed	*12*	*2*	*0*	0	2			
		75%	*12.5%*	*0%*	0%	12.5%			
	Student	*6*	*2*	*2*	4	2			
		37.5%	*12.5%*	*12.5%*	25%	12.5%			
	Retired	*2*	*0*	*0*	2	4			
		25%	*0%*	*0%*	25%	50%			
	Informally employed	*30*	*6*	*0*	0	0			
		83.3%	*16.7%*	*0%*	*0%*	*0%*			
Monthly income per household	Less than 30.000 RSD	6	0	2	2	0	41.415	16	.000
		60%	*0%*	*20%*	20%	0%			
	30.001-60.000 RSD	68	16	12	2	4			
		66.7%	*15.7%*	*11.8%*	2%	3.9%			
	60.0001-100.000 RSD	60	28	22	12	16			
		43.5%	*20.3%*	*15.9%*	8.7%	11.6%			
	100.001-200.000 RSD	*52*	*40*	*26*	10	14			
		36.6%	*28.2%*	*18.3%*	7%	9.9%			
	Over 200.000 RSD	*20*	*6*	*2*	2	8			
		52.6%	*15.8%*	*5.3%*	5.3%	21.1			

Sector of employment	Food processing	16	0	8	0	4	119.195	44	.000
		57.1%	*0%*	*28.6%*	0%	14.3%			
	Construction	6	2	2	0	0			
		60%	*20%*	*20%*	0%	0%			
	Trade	*40*	*18*	*8*	4	2			
		55.6%	*25%*	*11.1%*	5.6%	2.8%			
	Passenger transportation and tourism	*12*	*6*	*2*	0	0			
		60%	*30%*	*10%*	0%	0%			
	Freight transport	*0*	*4*	*0*	0	2			
		0%	*66.7%*	*0%*	0%	33.3%			
	HoReCa	*20*	*2*	*2*	0	0			
		83.3%	*8.3%*	*8.3%*	0%	0%			
	Information technologies	6	12	4	0	2			
		25%	*50%*	*16.7%*	0%	8.3%			
	Education	40	22	10	8	12			
		43.5%	*23.9%*	*10.9%*	8.7%	13%			
	Personal services	*24*	*2*	*4*	2	0			
		75%	*6.2%*	*12.5%*	6.2%	0%			
	Professional services	*22*	*16*	*22*	10	14			
		26.2%	*19%*	*26.2%*	11.9%	16.7%			
	Agriculture	*6*	*4*	*0*	0	0			
		60%	*40%*	0%	0%	0%			
	Unemployed	*14*	*2*	*2*	4	6			
		50%	*7.1%*	*7.1%*	14.3%	21.4%			
Public or private sector	Public	62	46	32	18	26	54.479	12	.000
		33.7%	*25%*	*17.4%*	9.8%	14.1%			
	Private	110	34	30	6	6			
		59.1%	*18.3*	*16.1%*	3.2%	3.2%			
	Enter-preneur/ Self-employed	12	8	0	0	2			
		54.5%	*36.4%*	*0%*	0%	4.8%			
	Unemployed	22	2	2	4	8			
		57.9%	*5.3%*	*5.3%*	10.5%	21.1%			

Table 9 confirms statistically significant difference in attitudes towards the government guidance in regards with the education level, employment status, monthly income per household, and sector of employment.

Table 10. Relation of Education, Employment, Income, Sector with the Possibility to change opinion about the government

Would your opinion about the government-implemented measures change if the measures were focused on the most vulnerable population?		**1 (77.5%)**	**2 (5.1%)**	**3 (17.5%)**	**X^2**	**df**	**p-value**
Education	Elementary	34 *100%*	0 *0%*	0 0%			
	High school	94 *87%*	0 *0%*	14 13%	25.496	4	.000
	Higher education	*206* *71%*	*22* *7.6%*	62 21.4%			
Employ-ment status	Employed full time	188 *75.8%*	14 *5.6%*	46 18.5%	18.977	10	.041
	Employed, short-term contract	76 *70.4%*	8 *7.4%*	24 22.2%			
	Unemployed	*14* *87.5%*	*0* *0%*	2 12.5%			
	Student	*12* *75%*	*0* *0%*	4 25%			
	Retired	*8* *100%*	*0* *0%*	0 0%			
	Informally employed	*36* *100%*	*0* *0%*	0 0%			
Monthly income per household	Less than 30.000 RSD	6 *60%*	0 *0%*	4 40%	37.146	8	.000
	30.001-60.000 RSD	76 *74.5%*	2 *2%*	24 23.5%			
	60.0001-100.000 RSD	120 *87%*	6 *4.3%*	12 8.7%			
	100.001-200.000 RSD	*108* *75%*	*6* *4.2%*	30 20.8%			
	More than 200.000 RSD	*24* *63.2%*	*8* *21.1%*	6			

Industry sector	Food processing	18 *64.3%*	6 *21.4%*	4 14.3%	59.364	22	.000
	Construction	4 *40%*	0 *0%*	6 60%			
	Trade	*58* *78.4%*	*4* *5.4%*	12 16.2%			
	Passenger transportation and tourism	*16* *80%*	*2* *10%*	2 10%			
	Freight transportation	*6* *100%*	*0*	0			
	HoReCa	*22* *91.7%*	*0* *0%*	2 8.3%			
	Information technologies	14 *58.3%*	4 *16.7%*	6 25%			
	Education	70 *76.1%*	2 *2.2%*	20 21.7%			
	Personal services	*30* *93.8%*	*0* *0%*	2 6.2%			
	Profes-sional services	*66* *78.6%*	*2* *2.4%*	16 19%			
	Agriculture	*8* *80%*	*2* *20%*	0 0%			
	Unemployed	*22* *78.6%*	*0* *0%*	6 21.4%			
Public or private sector	Public	138 *74.2%*	10 *5.4%*	38 20.4%	5.926	6	.432
	Private	146 *78.5%*	12 *6.5%*	28 15.1%			
	Enterpreneur/ self-employed	18 *81.8%*	0 *0%*	4 18.2%			
	Unemployed	32 *84.2%*	0 *0%*	6 15.8%			

Table 10 provides information that help confirm the 1a hypothesis. All variables but public/private sector are considered statistically significant due to p-value lower than 0.05. Majority of respondents (77.5%) across all education and income levels, industry sectors, would change their opinion if the focus of the measures

would shift towards the most vulnerable, significantly contributing to confirming the 1a hypothesis.

Table 11. Effect of the variables on the Attitude towards measures dependent variable

Dependent variable: Attitude towards the measures					
Independent variable	**R^2**	**X^2**	**T**	**Significance (p)**	**Standard error**
Education	0.217	0.456	4.606	.000***	1.298
Employment status	0.125	-0.110	-2.607	.009***	1.319
Monthly income per household	0.155	0.210	3.257	.001***	1.313
Industry sector	0.178	0.073	3.741	.000***	1.308
Public or private	0.114	-0.170	-2.379	.018**	1.321

*** Value is significant at the 0.01 level, ** Value is significant at the 0.05 level
Source: Author's calculation based on the SPSS

Simple regression analysis was conducted to assess the respondents' characteristics such as: Education, Employment status, Monthly income, Industry sector, and Public or private sector tested individually, to understand how they affect Attitude towards the government-implemented measures, as well as their effect on the Most endangered citizens (Table 12).

Table 12. Effect of the variables on the Most endangered citizens dependent variable

Dependent variable: Most endangered citizens					
Independent variable	**R^2**	**X^2**	**T**	**Significance (p)**	**Standard error**
Education	0.204	0.249	4.324	.000***	.755
Employment status	0.146	-0.075	-3.070	.002***	.763
Monthly income per household	0.072	0.001	0.034	.973	.771
Industry sector	0.046	-0.011	-0.950	.343	.773
Public or private	0.063	-0.054	-1.303	.193	.770

*** Value is significant at the 0.01 level
Source: Author's calculation based on the SPSS

The results of the Table 12 show statistically significant connection between variables Education and Employment status with the Most endangered citizens as a dependent variable. Education has positive, while Employment status has negative effect on the dependent variable.

This research relies on the work of Nguyen at al. who assessed similar population in Vietnam in regards with the related measures. (Nguyen et al., 2020) The findings of that research are largely similar to this one, most likely due to similar development level and economic situations in Vietnam and Serbia.

4.1 Discussion

This study was performed during another peak of the COVID-19 pandemic in the early fall of 2021., which might influence the perception of the population about all COVID-related topics. The collected information show a considerable level of agreement among the respondents about the crucial topics- attitude towards the Government and necessity to help the most vulnerable citizens. In addition, the result indicated variations among different education levels, employment statuses, income levels, and most importantly among different sectors. The findings from this study can aid policymakers in adjusting the COVID-mitigation packages in the future.

Bearing in mind financial restraints and limitations of the developing countries, governments need to pay significantly more attention to the poorest part of the population for numerous reasons. Firstly, the most vulnerable workers are being hit the hardest by any crisis. Informal workers are the first to be laid off due to lack of legal repercussions. Secondly, it would have positive impact on the economy in general while combating poverty. Thirdly, most of the proposed measure adjustments do not cost as much as some of the measures already implemented. Serbia, for example, has spent almost 1b euros for largely populistic measure called “helicopter money”- 100 EUR for each adult citizen in spring and another 60 EUR in the fall of 2021. Other measures, such as: assistance on the labor market, workers activation, prequalification of the workers from the endangered sectors and transferring them into the deficient sectors, short-term

work support, utility bills assistance for the poorest 10% of the users, increased contribution for the most endangered, etc., would require significantly less financial resources, while benefiting a sizable portion of the Serbian population.

It is already concluded that majority of the Serbian population does not put much trust into the government and its COVID-related actions, which further causes numerous related problems. The results related to the opinion on the bank loans moratorium do not show a clear opinion, in contrast to the other measures-related questions. However, a significant percentage of the respondents have rated it as not efficient (grades 1 and 2 cumulatively around 40.5%), most likely due to the nature of the moratorium. It only delays peoples' obligations towards the banks for up to 90 days, primarily postponing the problem. With the economies recovering on significantly slower rates, this measure is efficient only on the short run. Intriguing results arise from the results related to the Direct payment for all adults in the total amount of 160 EUR. The opinion is largely negative, with nearly 55% of negative grades (Grades 1 or 2), despite the fact that majority of the people who graded it negative have actually received that money. Around 68% of the people who rated this measure negatively have completed higher education, which can be explained through broader economy-related knowledge and better understanding of such non-selective measure. Since around 25% of the respondents have less than 60.000 RSD, it roughly matches the 27.7% of the respondents who rated this measure with 4 or 5. It is likely that the respondents with the lowest average income appreciated this measure the most. Direct payment, as the key measure of the Serbian government, significantly contributes to the negative stance of the general population in that regard.

Observing the Table 9, it is noticeable that the level of trust in the government slightly increases with higher income. We can indirectly conclude that despite receiving a direct financial help equaling almost a half of their monthly income, poorer part of the population still do not trust the government and its actions. Further, the level of trust increases with education. Nearly 88.3% of the respondents who completed only elementary school do not trust the measures (grades 1 and 2), implying that they have been affected the most by the pandemic, likely struggling to support their households.

Regarding the information provided in the Table 9, it is clear that the most endangered groups trust the government the least. Regarding education level, people with elementary or high school education do not trust the government, with 87.3 % of the least educated and 75.9% of the high school diploma holders rating their trust as negative (Grades 1 or 2). Considering employment status, those groups include informally employed, Unemployed, and Employed on a short-term contract, who ranked their level of trust with 83.3%, 75%, and 50% of the lowest grades respectively. Further, the poorest citizens rated their trust level as negative in more than 82% of the responses. It confirms the findings of Udovički at al., who describe the most vulnerable workers as non-educated, involved in either informal or a short-term work, with below-average income. (Center for Advanced Economic Studies [CEVES], 2020). This indirectly contributes to confirming the hypothesis 1.

Regarding industry sectors, we can notice that the respondents from sectors labeled by Udovički et al. as endangered, such as Passenger transport and tourism, Freight transport, Personal services and especially HoReCa, have very negative attitude towards the government (Table 9), while remaining open for an attitude change if the measures shift towards them (Table 11). That provides space for the government to work on the general stance, to improve its disrupted image.

Due to the nature of both hypotheses, it cannot be proven or disproven through any specific analysis. Both 1 and 1a hypotheses have been proven through numerous findings throughout the research.

5. Conclusion and Policy Implication

The ongoing pandemic have significantly affected informal workers around the world. The goal of this research was to evaluate the current state of the labor market in Serbia, focusing on the informal workers as the most vulnerable group. The contribution to the human capital theory lies within the analysis of the current state of the labor market in Serbia, analysis of the measures set implemented in Serbia, followed by the assessment of the perception of the people about

those measures. Findings are applicable to most developing countries. Practical contribution could be significant if a research like this is considered by the policymakers from any developing country.

One of the key limitations of this research is the structure of the respondents. The research is focused on the lower strata of society, described as non-educated, low-income, informally employed workers, of which very few took part in the questionnaire conducted for the purposes of this research. Those workers most likely do not take part in researches and questionnaires due to limited access to electronic devices and internet, therefore being hard to reach and question.

Future research that target similar population should include more fieldwork and telephone questionnaires, to better reach the poorest citizens, and make the structure of respondents more diverse. Further, there is room for conducting a research on the measures from more economic perspective, to assess feasibility of the proposed measures.

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PARTICULAR CONTRIBUTIONS OF THE INDUSTRY 4.0 TO THE CIRCULAR ECONOMY[24*]

Abstract: Deterioration of the global environment, limited resources, and constant expansion of the population have caused many governments and corporations to discuss ways for ensuring sustainable economic development. During the last couple of decades, the Circular Economy emerged as the primary model for operationalisation of the sustainability concept on the macro, meso, and micro levels. Exceptionally, the emergence of Industry 4.0 and its technologies within the last decade brought additional potential and possibilities for speeding up the transformation from linear towards the Circular Economy. This paper aims to provide an understanding of the expected contributions of Industry 4.0 to the faster and more comprehensive implementation of the Circular Economy model. The analysis is based on the literature review and combined with available data examination. Data sets will be based on the indicators showing the leading technological drivers of Industry 4.0 and 4R's (Reduce, Reuse, Recycle, Renew) of the Circular Economy.

Keywords: Industry 4.0, Circular Economy, Economic Development, Sustainability, 4R's

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1. Introduction

Raising concerns about resource scarcity, increasing population, and the disturbances in the ecosystem have induced the debate about more sustainable economic development models. Initially, ecological economists brought concerns about sustainability into the academic and institutional focus in the 1970s (Boulding, 1966). Their research brought forth the elements of the Circular Economy (CE) into the focus for the first time. However, significant developments in the field were made only within the last ten years, when international institutions and national governments took the initiative to establish clear guidelines for environmental preservation (Popović, 2020).

In addition to governmental and institutional support towards implementing CE principles, new technological advancements represent some of the critical drivers of the sustainability paradigm. Industry 4.0, as the most recent industrial revolution, brings numerous technological advances which can potentially have many socio-economic benefits, including significant waste reduction, cleaner energy, lower energy consumption, and more sustainable production (Schwab, 2016; Popović, 2020). Thus, it is clear that Industry 4.0 can provide necessary tools to the companies, national governments, and international organisations to implement the CE model fully.

However, the lack of data on the Industry 4.0 technologies and even more vague framework for evaluating and implementing the CE model leave the question about the actual contributions that Industry 4.0 can have in terms of sustainability. Multiple companies and authors have focused on implementing the Industry 4.0 concept on the micro-level but ignored the sustainability aspects. Many authors have limited their research on the theoretical models and reviews of the implementation of Industry 4.0 technologies in the CE model (Pagoropoulos et al., 2017; Rajput & Singh, 2019b; Okorie et al., 2018, Awan et al., 2021). However, the current research base lacks the empirical perspective about the effects of Industry 4.0 on the CE model implementation. The papers focusing on the practical side of these relationships are either narrowly focused on the industry perspective (Daú et al., 2019) or the micro-level dynamics (Alcayaga et al., 2019).

This paper aims to fill the existing empirical gap and to show the significance of the Industry 4.0, represented by the Industry 4.0 Index (Atik & Ünlü, 2019) to the implementation of the Circular Economy model, measured by the Recycling Rate of Municipal Waste, Share of the Renewable Energy in Total Energy Consumption, and the Share of Environmental Taxes in Total Tax Revenue (Eurostat, 2021). The study will be geographically limited to the EU countries, with only Serbia included out of all external countries.

This paper aims to provide an understanding of the expected contributions of Industry 4.0 to the faster and more comprehensive implementation of the Circular Economy model. It will provide information about the relationship between CE variables determined by the European Union and Industry 4.0 implementation. This information will be relevant to academics by adding to the existing knowledge base. Additionally, this paper will give valuable data to the business community by indicating possible areas for further exploitation in terms of profit and environmental preservation. Finally, the governments and institutions can use the information presented in this paper as the possible basis for evaluation tools and future policy development.

2. Literature Review

The first notions of limited resources and concerns about environmental degradation surfaced as early as the 1970s in the works of the ecological economist Boulding (1966) and political economist Thomas Malthus (Popović, 2020). Building on the initial theory, some authors and international institutions proposed the introduction of social and environmental dimensions into the existing growth paradigm. Even though the notions of circularity were introduced early, the original formulation of the circular production system is attributed to Pearce & Turner (1989). The developments of the field were propelled by the increasing volume of resources and energy consumption with simultaneous environment degradation. The current view of the Circular Economy was shaped by the contributions and characteristics of the set of concepts that share the idea of the closed loops. However, due to the fast expansion and rising interest of both the academic and business community, there is no consensus on the CE definition.

In addition to the environmental focus, modern socio-economic development relies on unprecedented technological advancements framed as Industry 4.0. The main body of research regarding Industry 4.0 within the last decade comprises theoretical discussions and inquiries about the effects of the technological transformation on various socio-economic fields (Schwab, 2016; Popović, 2020). Over time, the potential impact of cyber-physical systems on the overall sustainability of the global value chain came into focus.

Considering that both research fields are relatively young, the research targeting the overlapping area of Industry 4.0 and CE is lacking. The current research base mainly relies on exploratory inquiries and theoretical discussions about the potential that cyber-physical systems have to transform and direct the evolution of the manufacturing practices, the drivers and limitations to this synergy and the effects it could have on society and the economy (Pagoropoulos et al., 2017; Rajput & Singh, 2019a, Rajput & Singh, 2019b, Sarc et al., 2019). Several authors tried to synthesise the current research in the form of a review providing strong fundamentals and directing future research in this overlapping area (Okorie et al., 2018; Awan et al., 2021; Romero et al., 2021). Some authors gave contributions to the field, on the national (Zhou et al., 2020; Cezarino et al., 2020), sectoral (Daú et al., 2019) and organisational level (Tseng et al., 2018).

Despite the rising number of papers on this topic, empirical data is still lacking. This paper aims to fill this gap in the empirical research regarding the connection between Industry 4.0 and CE through the correlation analysis between the Industry 4.0 Index and three significant indicators of the CE and the subsequent clustering of the European countries.

3. Methodology

This paper aims to provide an insight into the effects of Industry 4.0, measured by the Industry 4.0 Index (Atik & Ünlü, 2019), on the CE. For this purpose, the research relies on quantitative and qualitative approaches to analyse the secondary data collected from Eurostat (2021) and the research conducted by Atik & Ünlü (2019).

In order to analyse the effects of Industry 4.0 on the CE, we will consider the following indicators. Due to the lack of consistent statistical data on the underlying 10 indicators, we will rely on the derived Industry 4.0 Index provided by the aforementioned authors. To represent CE, we will take into three major CE indicators with consistent data (Eurostat, 2021): Renewable Energy Share in Total Energy Consumption, Environmental Tax Share in Total Tax Revenues, and Recycling Rate of Municipal Waste.

The central hypothesis we are testing in this paper is: *There is an existing and statistically significant correlation between Industry 4.0 and CE*

Based on the selected indicators, the research in this paper is structured as follows:

1. Correlation analysis between selected indicators
2. K-Means Cluster Analysis

The first step will provide information about potential correlation and the intensity of the correlation between Industry 4.0 integration with CE. The second phase of research will be performed through K-means clustering. Based on the results, countries will be divided into the most suitable number of clusters. Afterwards, descriptive statistics will be applied to each Cluster.

For the purposes of the analysis, we have used the statistical software R (version 4.1.0) and R Studio (version 1.4.1717).

4. **Results**

This section of the paper will provide an overview of the collected data and statistical analysis. The first part will show the correlation analysis between the Industry 4.0 Index and CE indicators, while the second segment will present the K-means clustering results.

The Pearson correlation analysis between Industry 4.0 Index and CE Indicators was performed and evaluated based on Cohen's standard to evaluate the correlation coefficient and determine the strength of the relationship. A weak association is represented by the absolute values of correlation coefficients between .10 and .29, coefficients between .30 and .49 represent a medium association, and a strong correlation is represented by the coefficients of .50 and above (Cohen et al., 2003).

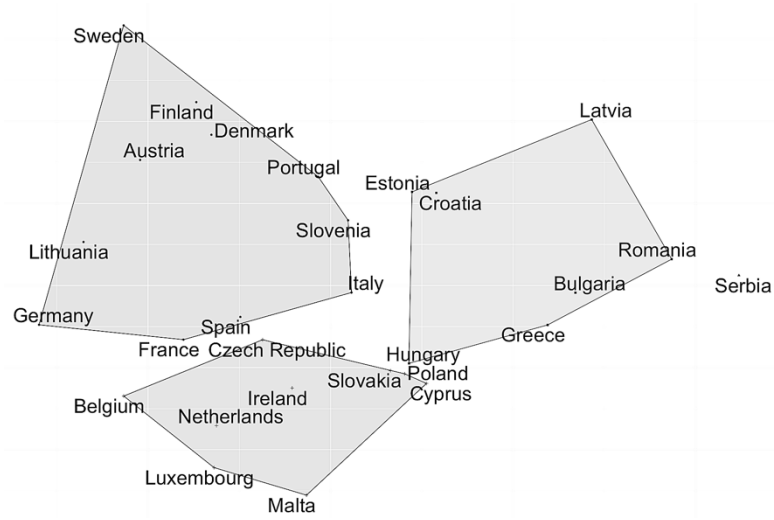
Table 1 – Correlation Analysis Results

Variable 1	Variable 2	*p*-value	Correlation Coefficient	Conf. Interval	
				Min	Max
Industry 4.0 Index	Renewable Energy Share in Total Energy Consumption	.5084	.1304	-0.255	.480
Industry 4.0 Index	Environmental Tax Share in Total Tax Revenues	.0060	-0.5061	-0.740	-0.164
Industry 4.0 Index	Recycling Rate of Municipal Waste	.0002	.6452	.358	.821

Reference – Author.

The correlation analysis (Table 2) shows that there is no correlation between Industry 4.0 Index and Renewable Energy Share in Total Energy Consumption, while the correlation between the other two variables shows a clear existing relationship. Both Environmental Tax Share and Recycling Rate of Municipal Waste significantly correlate with Industry 4.0 Index, but while the former shows a strong negative correlation, the latter shows a strong negative correlation. The correlation coefficients show that with the better and more comprehensive implementation of Industry 4.0, Environmental Taxes tend to go down, while the Recycling Rates go up. The correlation was examined based on the significance level of alpha (.05).

Figure 1 – Cluster Analysis



Reference - Author.

After running the K-Means algorithm through R, we identified four country groups:

Cluster 1. Austria, Denmark, Finland, France, Germany, Italy, Lithuania, Portugal, Slovenia, Spain, and Sweden.

Cluster 2. Bulgaria, Croatia, Estonia, Greece, Hungary, Latvia, and Romania

Cluster 3. Belgium, Cyprus, Czech Republic, Ireland, Luxembourg, Malta, Netherlands, Poland, and Slovakia

Cluster 4. Serbia

5. Discussion and Conclusion

This research aims to prove a correlation between implementing the I4.0 technologies measured by the Industry 4.0 Index and CE measured by Renewable Energy Share in Total Energy Consumption, Environmental Tax Share in Total Tax Revenues, and Recycling Rate Municipal Waste. Additionally, we have performed cluster analysis identifying four major country clusters.

Available data indicates that European countries differ in regard to the Industry 4.0 use for the purpose of CE model implementation. There is also a clear gap between the EU countries and the external countries in Europe (in this case, represented by Serbia). The data in this regard is slightly lacking and could include more external countries in the subsequent inquiries.

Correlation analysis of the 28 European countries shows that there is no correlation between Industry 4.0 and renewable energy consumption, while there is a connection between Industry 4.0 implementation and Environmental Tax and Recycling Rate of Municipal Waste.

The following K-means cluster analysis showed that it is possible to group countries into the four major clusters based on the Industry 4.0 Index and CE Indicators.

Briefly, we can conclude:

- Data and research on the Industry 4.0 implementation and its effects on CE is lacking.
- There is a strong correlation between the Industry 4.0 Index and Environmental Tax Share and Recycling Rate of Municipal Waste.
- Four major clusters of countries can be identified based on the Industry 4.0 Index and selected CE Indicators.

The results of this paper are relevant for academic and business communities, as well as policymakers. Scientifically, this paper contributes to an attractive but shallowly researched area. Contribution to the business community can be seen through the selection of areas for potential investments. Thus, business leaders can base their

decisions on reliable and scientific data. Finally, perhaps the most significant contribution is to policymakers. This research is an inquiry into the impact of technologies on the fundamental change of the linear manufacturing.

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ANALYSIS OF THE APPLICABILITY OF FINANCIAL MANAGEMENT AND CONTROL IN GOVERNMENT INSTITUTIONS AFTER A PANDEMIC

Abstract: Financial management and control (FMC) is an obligation of countries wishing to join the European Union. The Republic of Serbia has regulated its obligation through legislation, first the law on the budget system, and then the Rulebook on common criteria and standards for the establishment, functioning and reporting on the system of financial management and control in the public sector. This means that everyone who acts in accordance with the said law is required to implement internal controls in all work processes in the company and notify the Ministry of Finance once a year. To implement this project, there are certain methods and rules that need to be applied. How it is possible to build, implement and check the system of internal control in specific conditions in state institutions will be shown by the research conducted in this paper just after the pandemic.

Keywords: financial management and control (FMC), internal control system, public sector

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1. Introduction

The public sector (public property) is the state sector that is determined by the material and human resources on the basis of which the state management implements the policy and manages the state. It is determined by national, regional and local resources.

The size of the public sector mostley depends on the socio-economic system, in fact, the way the state is governed. That is why the public is very interested in the work of the public sector. Trust in public sector is crucial.

The work and results of the public sector is reflected in the financial statements. It is necessary for the public to believe in the truthfulness of the presented results of financial reporting. Financial statements should be characterized by truthfulness, objectivity, transparency and accountability of users of public funds. "The purpose of financial statements is to provide information about the financial position, performance and changes in the financial position of an enterprise that is useful to a wide range of users for making economic decisions."[28] Financial statementsrepresent the basis on which the public trust that is needed is built because it gives confirmation of good governance and strength to everything.

In the process of its candidacy for membership in the European Union, the Republic of Serbia has committed to implement reforms in order to improve the management of public finances. Republic of Serbia improves the management of public finances by developing and implementing a system of management and control over the use of public funds (Chapter 32 - Financial Supervision). The set of these measures was designed by the European Commission with the ultimate goal of managing public funds in an efficient and economical way through measures that bring under control:

- all income,
- all expenses,
- all assets and all obligations of the organization, and ensures compliance with relevant laws and principles of solid financial management, transparency, efficiency, effectiveness and

[28] Lynch, F.(2008). Финансијко извештавање. Превод Савеза рачуновођа и ревизора Србије од издавача Kaplan publishing Foulks Lynch, ACCA, стр.14.

economy of operations, and adequate use of resources and protection of assets.

The Law of the Budget System defines public funds as "funds available and under the control of the Republic of Serbia, local authorities and organizations for obligatory social insurance."[29] [Law of the Budget System]

"Internal control is defined as: a process, designed to provide reasonable assurance as to the achievement of objectives in the following categories: (a) reliability of financial reporting, (2) compliance with laws and regulations, (3) effectiveness and efficiency of operations, and (4) preservation property" [30]

Users of public funds are obliged to obey this law. In the Republic of Serbia, they are represented by:

- direct and indirect users of budget funds,
- beneficiaries of funds of organizations for obligatory social insurance,
- public companies established by the Republic of Serbia, by local authorities,
- legal entities established by public companies,
- legal entities over which the Republic of Serbia, or local government has direct or indirect control over more than 50% of the capital or more than 50% of the votes in the board of directors,
- other legal entities in which public funds have more than 50% of the total revenues generated in the previous business year, as well as public agencies and organizations to which the regulations on public agencies apply.

[29] Zakon o budžetskom sistemu "Sl. glasnik RS", br. 54/2009, 73/2010, 101/2010, 101/2011, 93/2012, 62/2013, 63/2013 - ispr., 108/2013, 142/2014, 68/2015 - dr. zakon, 103/2015, 99/2016, 113/2017, 95/2018, 31/2019, 72/2019 i 149/2020

[30] Schwinger, J.B. & Rittenberg, E.L. (2003). Auditing Concepts for a Channing Environment. University of Wisconsin-Madison and St. Cloud State University: Thomson South-Western, стр.171.

2. Steps of Practical Application of the Implementation of the System of Financial Management and Control in State Institutions

The institutional and legislative framework in Serbia for the implementation of the internal financial control system in the public sector (PIFC) is set out in the Law on Budget System, and is consisted of:

- Financial Management and Control System (FMC) and
- Internal audit (IA).

The CHU (Central Harmonization Unit) of the Ministry of Finance is responsible for coordinating the process of establishing and developing the internal financial control system in the public sector.

For the purpose of implementation of Financial Management and Control (FMC), the Republic of Serbia has adopted the **RULEBOOK** on common criteria and standards for the establishment, functioning and reporting on the system of financial management and control in the public sector - FMC Rulebook and FMC Manual.

State institutions, in accordance with the Rulebook, have the obligation to submit an Annual Report by the 31st of March every year on the system of financial management and control and the activities they have undertaken in their institution in that field.

Practical steps - set of activities undertaken in state institutions in order to implement the FMC system includes:

- forming a working group,
- analysis of the current situation,
- defining a list of business processes,
- defining activities in business processes,
- creating a process map,
- defining risks for each process,
- defining procedures,
- development of procedures,
- development of manuals for FMC,
- development of the Management Risk Strategy,
- creating a risk register.

3. Research and Analysis of the Application 0f FMC in State Institutions after a Pandemic

In the second half of 2021. in state institutions using the questionnaire method - anonymous survey based on interviews, the following research was conducted: in order to perform the analysis and consider the implementation of FMC in state institutions after the pandemic, we asked certain state institutions to respond to the questionnaire.

Table 1- Public companies

	2019.	2020.	2021.
Public companies	Score from 1 do 5, where 1 – insufficient, 2 – poorly, 3- medium, 4- satisying, 5 – more than enough		
To what extent are you trained to implement FMC in your institution?			
Assess the extent to which the FMC system in your institution is regulated?	4	3	3
After the internal control, evaluate the extent to which institution performes in accordance with the procedures in your work?	5	3	3
Assess the extent to which you perform the risk assessment that you have defined in the maps and the risk register?	4	3	3
How often do you hold joint meetings where you assess the strategic risks of the institution ?	5	2	2

Source – Authors

Table 2 - Local self-government

	2019.	2020.	2021.
Local self government	Score from 1 do 5, where 1 – insufficient, 2 – poorly, 3- medium, 4- satisying, 5 – more than enough		
To what extent are you trained to implement FMC in your institution?	3	3	3
Assess the extent to which the FMC system in your institution is regulated?	4	3	3
After the internal control, evaluate the extent to which institution performes in accordance with the procedures in your work?	5	3	3
Assess the extent to which you perform the risk assessment that you have defined in the maps and the risk register?	4		
How often do you hold joint meetings where you assess the strategic risks of the institution?	5		

Source - authors

Table 3 - Educational institutions

	2019.	2020.	2021.
Table 3: Educational institutions	Score from 1 do 5, where 1 – insufficient, 2 – poorly, 3- medium, 4- satisying, 5 – more than enough		
To what extent are you trained to implement FMC in your institution?	1	3	3
Assess the extent to which the FMC system in your institution is regulated?	2	3	3
After the internal control, evaluate the extent to which institution performes in accordance with the procedures in your work?	4	2	2
Assess the extent to which you perform the risk assessment that you have defined in the maps and the risk register?			
How often do you hold joint meetings where you assess the strategic risks of the institution ?			

Source - authors

The analysis of the research shows the following:
• During the pandemic, local self-governments were forced to work from home and with reducing workforce. This makes it significantly more difficultto meet the internal control requirements that define the division of responsibilities. In such a situation, it is really difficult to be consistent with the requirement that requires "precise definition of the powers and responsibilities of all employees in the business system." [31]To prouzrokuje sledeću konstataciju da „ there are certain situations in which the Management should intervene and for justified reasons require behavior contrary to the prescribed policies and procedures."[32]

• The responses we received from respondents in public enterprises indicate a similar situation and further recall the difficulty of working on joint meetings held through zoom. It is not possible to present all the necessary documentation that supports the assessment of strategic risks that are extremely important for making managerial decisions;
• Educational institutions express concern and low marks in following the procedures that take on a completely different dimension in distance learning. Especially when it comes to dialogue with students, which is missing in this situation.

4. Conclusion

When we talk about the period after a pandemic, we expect all these results to improve or to return to the period before the pandemic. In order to speed up recovery after a pandemic, the following Table 4 suggests some of the processes with activities in local government practice.

[31] Виторовић Б. (2004.) Интерне контроле и интерна ревизија. Београд: Савез рачуновођа и ревизора Србије. Професионална регулатива у рачуноводству. Савез рачуновођа и ревизора Србије, Београд, СРРС, стр.55-56.

[32] Stanišić, M. (2007). COSO стандарди интерне контроле. Институт за економику и финансије; часопис Ревизор, Београд: број 37., стр. 20.

Table 4. - Proposed part of the list of business processes for local self-government

Code of process	Process	Activity in the process
P1	Budgeting process	
P2	The process of monitoring the implementation of the budget	
P3	Revenue generation process	
P4	The process of transferring unspent budget funds to the budget execution account	

Date of adoption	Preparation	Control	Approves

Source - authors

Financial management and control are a legal obligation of state institutions that should be fulfilled on the way to joining the European Union. The basis of FMC, in addition to the elements that are based on the COSO model, in addition to risk, is characterized by the division of responsibilities as a significant argument of internal control. Considering that extraordinary circumstances caused by the COVID-19 pandemic occurred all over the world, the application of all legal provisions, including these obligations expressed in the Law on the Budget System, was respected, but in difficult conditions. The reasons for that are the restriction, ie reduction of the workforce, work from home, distance learning, training and meetings held with the online zoom, which gave certain results expressed after the research conducted by a questionnaire - an anonymous survey. The good side is that every institution in the country tried to provide its maximum contribution, which slowly, after the pandemic, returns the old results.

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6. Zakon o budžetskom sistemu "Sl. glasnik RS", br. 54/2009, 73/2010, 101/2010, 101/2011, 93/2012, 62/2013, 63/2013 - ispr., 108/2013, 142/2014, 68/2015 - dr. zakon, 103/2015, 99/2016, 113/2017, 95/2018, 31/2019, 72/2019 i 149/2020

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THE IMPORTANCE AND APPLICATION OF IT AUDIT IN GOVERNMENT INSTITUTIONS DURING AND AFTER THE PANDEMIC

Abstract: Nowadays, it is not possible to imagine any form of audit (audit of financial statements, internal audit, public sector audit) without considering the internal controls imbed into the information system that is the subject of the audit.

The aim of external audit is to confirm the truthfulness and objectivity of the financial statements of the company or client. The external auditor provides the service to external users. The external auditor applies control and essential tests for this service. Control tests are used for analysis of activities related to business transactions of the company and their processing by the accounting function (accounting system). Essential tests are used to determine the movement of cash flows , Accounts Receivable , saldo receipt and more.

What the legal obligation emphasizes is checking the application of internal controls.

This raises the following essential question for all of us who deal with internal controls: how far we can safely claim that we are convinced the implementation of internal controls has been performed satisfactorily if we have not checked the status of internal controls in IT applications used by employees in the company? Of course, this activity should be left to IT auditors and persons skilled in this type of verification.

While conducting this research, it is necessary to emphasize:

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the aim and process of external audit are not changed in the user information systems environment. Only audit procedures are changing, which is the topic of this report. Audit procedures of IT audit have their own way of application and it is fully expressed in specific conditions such as the conditions just formed after the pandemic.
KEYWORDS: internal controls, IT audit, information system, audit procedures

1. Introduction

The ultimate goal of this research is to develop and implement an audit procedure that will evaluate the existing internal control of the information system for calculating salaries and benefits of employees in three institutions that are marked in this paper: INST01, INST02 and INST03.Methodology used in this paper is the COBIT methodology. Its final goal is to help employees in the calculation of salaries and wages as well as to make their work efficient and accurate with minimal errors.It also provides management with a safer basis that they need to make business decisions.

In order to implement the basic goal in the mentioned institutions, it is necessary to take the following steps:

- define responsibilities in audit procedures of internal control of the information system in all three institutions,
- define the elements that measure the performance of the process,
- define control objectives based on COBIT (The Control Objectives for Information and Related Technology),
- coordinate the evaluation of internal control with ISACA (Information Systems Audit and Control Association) standards, guidelines and procedures for auditing information systems,
- design and suggest a methodology of audit procedures that would assess the existing internal controls in the information system,
- test the proposed methodology of the audit procedure after assessing the existing internal control of the information system on the example of all three institutions,
- notice and indicate the differences that represent risks important for making business decisions for managers.

Developing an internal audit methodology helps to see how robust the current control framework and its application are.It is performed through the information system that actually exists in these institutions.

If the economy is in extraordinary circumstances, such as pandemic, the methodology of internal controls and IT audit must be adapted to them, which usually include the audit of internal controls electronically, online, via zoom or other applications, at a distance.

This type of control is significantly more difficult, and the time required to conduct both control and substantive tests is extended. The reason for that is restricted movement, incomplete information, request for additional information, lack of personal insight on the spot, so the documentation is delivered by mail, e-mail or in other ways.

2. **Significance and Application of IT Audit in State Institutions**

Our already well-known COSO model presents internal control as: "The process performed by the board of directors, management and other employees designated to provide reasonable assurance regarding the objectives achieved in the following categories:

- business efficiency,
- reliability of financial reporting and
- compliance with applicable laws and regulations. "."[36]

[36] COSO(Committee of Sponsoring Organizations of the Treadway Commission), http://en.wikipedia.org/wiki/Committee_of_Sponsoring_of_the_Treadway_Commission, accessed on 09.01.2013.

[36] Information Systems Audit and Control Association - an international professional association that concentrates on IT management.

[36] *ITGI - IT Governance Institute - ITGI - IT Governance Institute (ITGI) is a branch of ISACA, an independent, non-profit, global association that develops, adopts and uses a globally accepted information system (IS) of knowledge and practice* (https://searchcompliance.techtarget.com/definition/ITGI-IT-Governance-Institute, used on 30.09.2021.).

[36] Stanišić, M., Radovanović, D. & Lučić, D. (2010). Analysis of the concept of information system audit according to COBIT methodology, VI scientific conference with international participation, University of Synergy, Bijeljina, p.2

The use of software support in the processing of accounting data in state institutions greatly affects the reporting of their internal control.

The processing of data, memorization and the way of their transfer are largely reflected in the existing internal control of each state institution, influencing the operations and activities that the person in charge of internal control in that institution actually performs. On the other hand, the legal obligation of the person in charge of internal control is to analyze the risks in the operations of state institutions. The reason for that is the need to perform its assessment. This is the only way to understand the role and significance of internal control in a state institution. In that way, its purpose is assessed and at the same time the role it has in terms of fulfilling the set goals.
Cobit is a world-renowned standard, widely accepted and developed by ISACA and ITGI.

"It combines business and IT goals, providing the ability to metrically track the maturity of an information system." Cobit consists of 34 key business processes. A maturity model is described for each. These basic business goals have the following domains:

- Domain of planning and organizing
- Domain of purchasing and implementation
- Domai of deliveries and support
- Domain of monitoring and evaluation

Well-known reasons why modern information technologies are used (increased labor productivity, reduced costs because business operations are executed in a much shorter period of time, etc.) show that an increasing number of business operations are supported by them. This imposes the need that the control of the execution of such business operations cannot be performed in the classical way because it is insufficient. This is the basis for the application of IT control and finally the implementation of IT audit.

When applying IT audit, the main task is to choose the information system that is the subject of the test and to understand it well. Its characteristics are extremely important. The reason for this is different information and telecommunication technologies that affect the level of risk of errors in financial statements. This includes a lack of clues about business events. Computer data processing continuously encourages the development of data and information and gradually reduces the volume of paper documents that directly enable the IT auditor to reconstruct the trace of internal control.

"The goal of internal controls over application systems is to ensure:

- that all input data is accurate, complete, authorized and exact;
- that all data are processed as provided;
- that all stored data is accurate and complete;
- that all outputs are accurate and complete;
- to keep a record of the processes of data flow from entry to storage and eventual exit."[37]

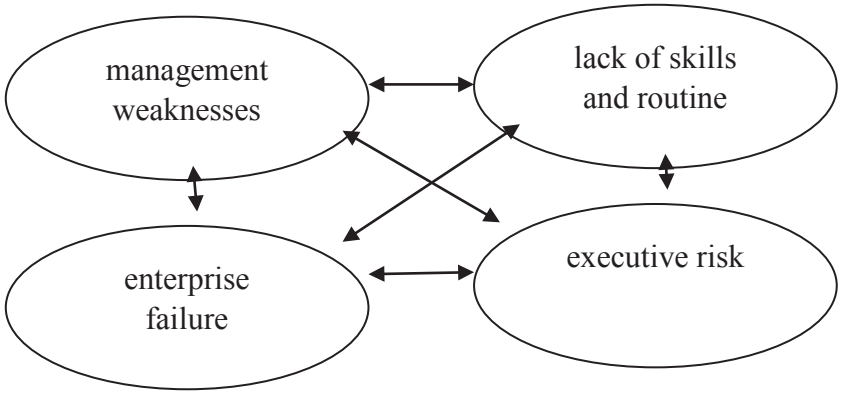
A major shortcoming in data testing is the limitation caused by the decentralized processing of accounting data in government institutions whose data is stored on computer HD. This shortcoming is especially seen in a pandemic.

In some state institutions, there is a situation where data is stored on disks for a shorter time, and sometimes a certain period of time is not stored at all. In such situations, direct data entry into the media used for storage is often performed so it causes the elimination of traces of business events. Since it is the most important tool for detecting errors in the records of accounting transactions, it creates space for manipulation and misuse of data. This can be prevented by certain IT controls so the problem can be solved.

[37] Eremić-Đođić, J., Novaković, M., Bošnjak, D., Bošnjak, J. (2013). Key areas of evaluation of internal controls of the information system in the company using the Cobit methodology, XL Symposium on operational research SYMOPIS, Zlatibor, 8-12. Septembar, Proceedings, 2013

3. Risk Management in State Institutions During and After the Pandemic

Risks are one of the categories that need to be managed continuously. The legal regulations remind us of that. Operational risks represent the actual situation in the operations of all institutions, especially state ones. They are numerous, independent of each other. However, there is a certain synergy between them, which helps to eliminate them one by one by or to bring them under control, or to manage them by reducing errors to minimum.



Picture 1: Impact of four major operational risks on each other[38] *(Chorafas, N.D.,2001)*

[38] Chorafas, N. D. (2001). Implementing and Auditing the Internal Control System. Great Britain by Antony Rowe Ltd, Chippenham, Wiltshire, стр.49.

3.1.Research results

	INST01												
	Activity evaluation						Assessment of current compliance						
	unimportant	Partly important	important	Very important	critical	Covered by other objectives	Management is not aware	Management is aware	Managemnt is working on a solution	Implementation is just beginning	The documentation is already in progress	Solution is reached	Solution is sustainable
Preparation and authorization of source data - documents are prepared by an authorized person following the procedures taking into account the distribution of duties				x								x	
Collection and entry of source data - correct and re-transmission of data entered incorrectly in the application is performed with respect to the granted rights				x								x	
Verification of accuracy, completeness and authenticity - correct data is verified, and incorrect data are sent for correction				x							x		
Integrity and validity of data processing-Integrity and validity of data are preserved during data processing					x							x	
Results verification and error management - results during data processing are delivered to the appropriate receipts and are protected during the data					x							x	
Authentication and integrity of transactions - ensures authenticity and integrity during transmission or transport					x							x	

Table 1.- Application controls performed on the application of calculation of salaries and compensation of salaries and other incomes in INST01
Source-authors

	INST02												
	Activity evaluation						Ocena trenutne usaglašenosti						
	unimportant	Donekle važno	važno	Veoma važno	kritično	Pokriveno drugim ciljevima	Menadžment nije svestan	Menadžment je svestan	Menadžment radi na rešavanju	Implementacija tek započinje	Dokuemntacija je već u toku	Rešenje je postignuto	Rešenje je održivo
Preparation and authorization of source data - documents are prepared by an authorized person following the procedures taking into account the distribution of duties				x								x	
Collection and entry of source data - correct and re-transmission of data entered incorrectly in the application is performed with respect to the granted rights				x								x	
Verification of accuracy, completeness and authenticity - correct data is verified, and incorrect data are sent for correction				x								x	
Integrity and validity of data processing-Integrity and validity of data are preserved during data processing				x								x	
Results verification and error management - results during data processing are delivered to the appropriate receipts and are protected during the data				x								x	
Authentication and integrity of transactions - ensures authenticity and integrity during transmission or transport				x								x	

Table 2.- Application controls performed on the application of calculation of salaries and compensation of salaries and other incomes in INST02
Source – authors

	INST02												
	Activity evaluation						Ocena trenutne usaglašenosti						
	unimportant	Donekle važno	važno	Veoma važno	kritično	Pokriveno drugim ciljevima	Menadžment nije svestan	Menadžment je svestan	Menadžment radi na rešavanju	Implementacija tek započinje	Dokuemntacija je već u toku	Rešenje je postignuto	Rešenje je održivo
Preparation and authorization of source data - documents are prepared by an authorized person following the procedures taking into account the distribution of duties				x									x
Collection and entry of source data - correct and re-transmission of data entered incorrectly in the application is performed with respect to the granted rights				x									x
Verification of accuracy, completeness and authenticity - correct data is verified, and incorrect data are sent for correction					x								x
Integrity and validity of data processing-Integrity and validity of data are preserved during data processing					x								x
Results verification and error management - results during data processing are delivered to the appropriate receipts and are protected during the data				x									x
Authentication and integrity of transactions - ensures authenticity and integrity during transmission or transport				x									x

Table 3. - Application controls performed on the application of calculation of salaries and compensation of salaries and other incomes in UST03

Source- authors

	Prosek INST01, INST02 i INST03												
	Ocena aktivnosti						Ocena trenutne usaglašenosti						
	nevažno	Donekle važno	važno	Veoma važno	kritično	Pokriveno drugim ciljevima	Menadžment nije svestan	Menadžment je svestan	Menadžment radi na rešavanju	Implementacija tek započinje	Dokuemntacija je već u toku	Rešenje je postignuto	Rešenje je održivo
Pripremu i autorizaciju izvornih podataka - dokumenti su pripremljeni od strane autorizovane osobe prateći procedure uzimajući u obzir raspodelu dužnosti			x	X X								X X	x
Sakupljanje i unos izvornih podataka – ispravno i ponovno slanje podataka koji su pogrešno uneti u aplikaciji se obavlja uz poštovanje dodeljenih prava			x	X X								X X	x
Proveru tačnosti, kompleknosti i autentičnosti - tačni podaci se verifikuju, a netačni salju na ispravku			x	x	x						x	x	x
Integritet i validnost obrade podataka - integritet i validnost podataka su očuvani tokom obrade podataka				x	X X							X X	x
Proveru rezultata i upravljanje greškama - rezultati tokom obrade podataka se dostavljaju odgovarajućim primaocima i zaštićeni su tokom podataka				X X X								X X	x
Proveru autentičnosti i integriteta transakcija - obezbeđuje se autentičnost i integritet tokom prenosa ili transporta				X X X								X X	x

Table 4. - Application controls performed on the application of calculation of salaries and compensation of salaries and other incomes – average
Source - authors

The following recommendations were made by interview method - anonymous survey of collected data, observed irregularities after the analysis of the research:

• design the source documentation in a way that is accurate in labeling business flow control data and enabling subsequent verification;
• create procedures for overcoming and correcting errors, as well as for monitoring, correcting, approving and re-submitting original documents on time;

• report the validation of failed transactions and send them for document suspension. Errors, individually, should be reported on time and valid transactions processed immediately;

• if interruptions occur, ensure that the validity of the data is preserved as well as after the failure of their processing;

• ensure the completeness and accuracy of processing in situations before the next use, in case of repeated electronic uses;

• Preserve and establish the authenticity of the origin and preserve the integrity of the content during the data transmission through prior analysis.

3. Conclusioin

Conducting any type of an audit, especially in a pandemic, is significantly difficult. In these circumstances, IT audit turned out best with good software tools, but it certainly cannot provide the best results it has always provided. The reason for this is difficult working conditions, reduced contact between employees and IT auditors, insufficient and slow data exchange. In this way, the reliability of financial statements can be staggered so the management decisions are based on an uncertain basis as well. Risks are harder to track, and weak points in the internal control framework are detected slowlier. And finally, all these irregularities are harder to identify and correct. We find the reasons for that both in the reduction of the labor force, and in the change and increase of business tasks that the situation

like a pandemic relentlessly imposes. There is one big remark in it: the purpose of internal control, among others, is based on the distribution of authorization and responsibilities. If in the conditions of a pandemic there is a problem of lack of manpower (and that is actually a fact), it remains to assess how this request can really be implemented. Therefore, we hope that these shortcomings will be corrected immediately in the period after the pandemic.

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THE ROLE OF INNOVATIVE TECHNOLOGIES IN CHANGING THE PARADIGM OF HIGHER EDUCATION DUE TO THE COVID-19 PANDEMIC

Abstract: The Covid-19 virus pandemic has significantly changed the current approach to higher education in many segments. The most important of them is, of course, the use of innovative technologies. The aim of this paper is to determine the extent to which professors and students have adapted to the new situation, what are the benefits, as well as whether they are able to use innovative technologies. For that purpose, an empirical research was conducted at the Faculty of Project and Innovation Management, PMC, in which 20 professors and 100 students participated. The research instrument is a survey questionnaire containing 15 questions, open and closed. The obtained results are presented in tables and graphs using the method of descriptive analysis. It was concluded that both professors and students are very satisfied with the change; that they needed time to adapt, but that they would like to further improve the use of innovative technologies.

Keywords: innovative technologies, higher education, Covid-19.

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1. Introduction

Social changes at the global level, changes in the economic system, changed structure of the need for professional staff, as well as the process of forming the European educational space, inevitably bring with them changes in the structure of our country's education system (Petrušić, Ostojić, 2020). This became especially clear when the Covid-19 virus pandemic hit the world. Due to the pandemic and the new situation in the world, which affects all spheres of life, a quick reorganization in the educational system was necessary. Crises are an inevitable part of the life cycle of any organization, regardless of its location, size, market and activity. At the beginning of 2020, all organizations, including higher education institutions, faced a new crisis caused by the Covid-19 pandemic. The sudden spread and the consequences that this disease leaves on people's health required a quick reaction of organizations and protection of the health and safety of employees through physical distancing. Organizations had to reorganize their way of functioning and find ways to continue their business in new circumstances (Lukić, Jaganjac and Lazarević, 2020). Higher education institutions were focused on the use of innovative technologies in order to continue the teaching process in changed conditions.

As higher education does not serve a basic human need, it is usually suspended in a crisis and not seen as an important phenomenon until things return to normal. In that sense, it seems evident that the COVID-19 pandemic, which has affected the whole world since the beginning of 2020, will prevent higher education from taking place normally. The global pandemic has negatively affected educational processes all over the world. The UNESCO report, published on March 13, 2020, shows that in 188 countries and in all educational cycles, the education of 91.3% of all students (which is a total of 1,576,021,818 students) was interrupted (UNESCO, 2020). Therefore, it is quite obvious that we need new adjustments in order to improve the sustainability and continuity of education in the world.

ICT competencies and the potential of internet technologies are becoming increasingly important. The new era, the power of digitalization and all its categories open the door to unimaginable limits of potential (Ostojić, Buha, Pećić, 2020). It is certain that during the pandemic, the spread of knowledge among countries, companies

and all parts of society gained importance. If innovative technologies and online learning can contribute, it is up to all of us to explore its full potential. In a very dynamic and uncertain environment in which organizations operate today, knowledge becomes a necessary resource for successful functioning, growth and development, but also a significant source of competitive advantage (Lukić Nikolić, 2021).

2. Innovative Technologies in Education

Studying the use and application of information and communication technologies (ICT) in education, with economic development, creates new opportunities by harmonizing technologies and applications aimed at useful and usable values for the community. This creates opportunities for significant access to and introduction of new information and communication technologies, goods and services in education and society. In order to realize this possibility, it is necessary to provide staff capable of developing and using information and communication technologies and to conduct appropriate research and innovation in the field of science, engineering and information technologies (Andersen, Nielsen, 2020).

Online education, services and processes basically require significant investments. In many ways, it should be the foreground for the development and implementation of innovation. The obligation to use information and communication technology includes: introduction of digital technology in the learning process and learning space, providing a wide range of connections within and between faculties and colleges, increased number of computer laboratories with longer use, creation of web-based educational environment, procurement and development of resources for education and teaching and support to teaching staff in the use of technologies and linking technology and learning processes (Onyema, 2019). The largest investments and their effective realization and return on investment are detected in the field of scientific research through the online communications. Significant resources must be devoted to teacher training, student support, and the management system. Significant efforts are needed to ensure and build an appropriate infrastructure for the successful implementation and application of online learning (Velichová, Orbánová, Kúbeková, 2020).

Like any organized educational activity, e-learning should be managed very systematically. First of all, it will include attention to the technology and infrastructure necessary to support it. It will include different approaches to designing and developing courses and strategies for generating and managing learning topics appropriate to conventional educational environments (Gajić et al., 2015). In a very dynamic and uncertain environment in which organizations operate today, knowledge becomes a necessary resource for successful functioning, growth and development, but also a significant source of competitive advantage (Lukić Nikolić, 2021).

Pedagogical changes due to the current situation of the Covid 19 virus pandemic are taking place in the domain of the possibility of using the Internet in teaching, as well as turning to online forms of knowledge transfer. Didactic-methodical reform and modernization of the process includes the use of new materials and the creation of different, more modern teaching strategies. The inclusion of multimedia in the teaching process not only changes the methods and forms of work, but also to a large extent the quality of the acquired knowledge. In that way, conditions are created for the acceptance of different, more dynamic and complex knowledge.

From all this, it can be concluded that e-learning is a learning paradigm based on didactic-information innovations in teaching. "E-learning means working at a distance through modern technologies that enable the delivery of electronic learning materials to users, which can lead to the creation of a community of users that encourages the development and improvement of teaching technology" (Švonja, 2018, p. 243).

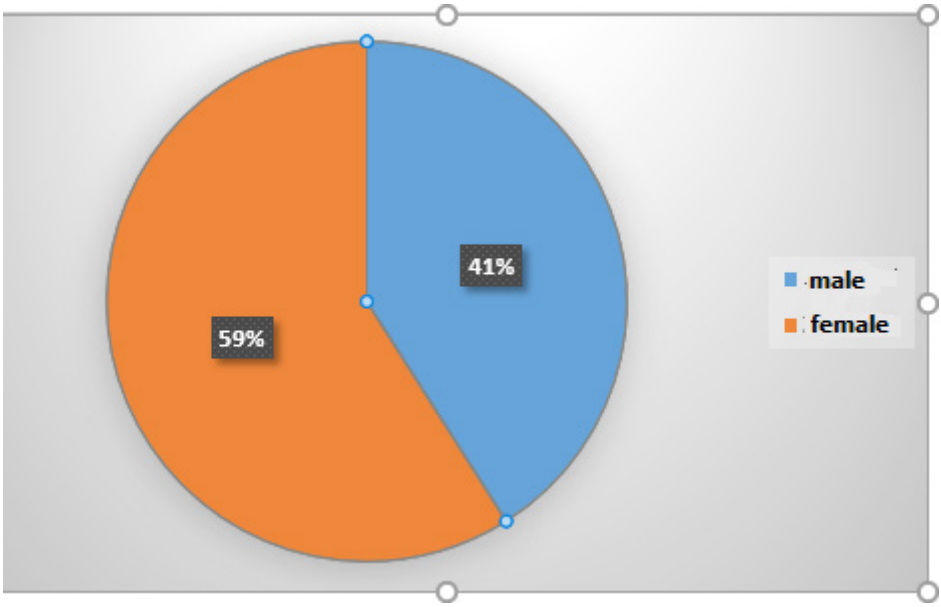
3. Research Methodology

The aim of the paper was to determine the extent to which professors and students have adapted to the new situation, what are the benefits, as well as whether they are able to use innovative technologies. For that purpose, an empirical research was conducted at the Faculty of Project and Innovation Management (PMC) in which 20 professors and 100 students participated. The research instrument is a survey questionnaire containing 15 questions, open and closed. The methods used on that occasion are the methods of analysis

and synthesis, induction and deduction, as well as the method of generalization. SPSS for Windows 20, which runs under the Microsoft Windows environment, was used for data processing. The results are presented in tables and graphs.

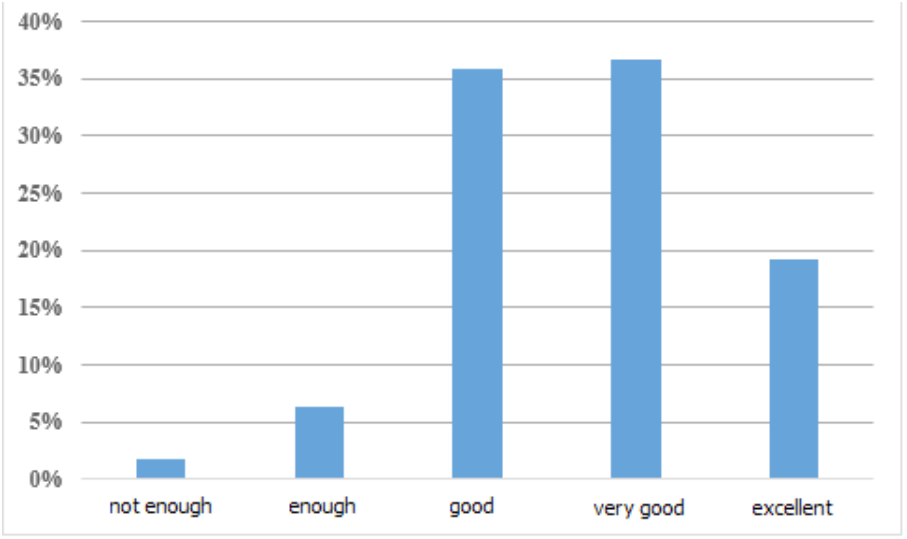
4. Research Results

The total sample of respondents consisted of 120 professors and students of the Faculty of Project and Innovation Management in Belgrade. The gender structure of the sample of respondents is given in Graph 1. Namely, 59% of females and 41% of males participated in the research.



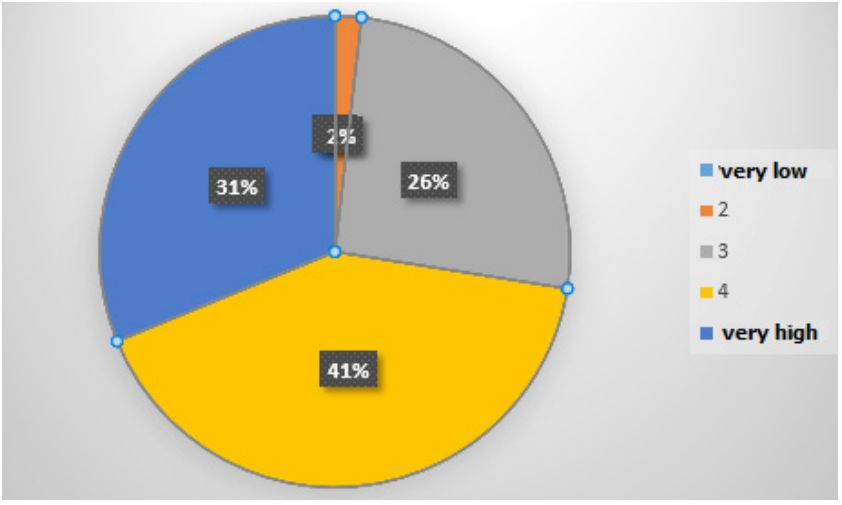
Graph 1. Gender structure of the sample of respondents

The following chart provides an insight into the percentage distribution of respondents' answers to the question: "Assess your own knowledge and use of innovative technologies."



Graph 2. Distribution of respondents' answers to the question "Assess your own knowledge and use of innovative technologies."

Respondents generally estimate that they know and use innovative technologies well (35.80%) and very well (36.70%), while 19.3% of respondents think that he/she is excellent in that. Only 1.8% of respondents rated their knowledge and use of innovative technologies as insufficient (Chart 2).



Graph 3. Distribution of respondents' answers to the question: "Assess your level of computer competencies."

The level of competencies for using computers of the respondents, according to their self-assessment, is on average 4.02 (SV = 0.80), while the level of competencies for using Web 2.0 tools in teaching is 3.65 (SD = 0.93). Namely, although the respondents have basic knowledge about web tools, they rate their competencies with average grades, and it is definitely necessary to pay much more attention to this problem (Graph 3).

Respondents were able to list the names of Web tools used in the teaching process (with the possibility of listing more tools) and their answers are presented in the following table.

Table 1. Web tools that were most often used in teaching during 2020

Tool	Percentage
Zoom	37%
Google meet	19%
Viber	18%
Moodle	14%
Prezi	9%
You Tube	3%

So, the most common is the Zoom application, which can be related to the availability of this application and its capabilities. As the most frequently used devices for these purposes, they pointed out:
- computer with additional devices (37%),
- laptops and PDAs (36%),
- tablets (5%) and
- mobile phones (22%).

Table 2. Percentage of respondents' answers to a group of questions about satisfaction with the achieved results of online lectures

Offered answers	Percentage of Respondents
Not at all satisfied	9%
I'm undecided	21%
I am generally satisfied	45%
I am completely satisfied at	25%

It can be concluded that the largest percentage of respondents are generally satisfied with the results achieved (45%). Although the outcome is positive, it is still necessary to examine why the respondents are not completely satisfied and how the situation can be further improved.

The following table shows the percentage distribution of respondents' answers to questions 7-15, as well as the calculated arithmetic mean and standard deviation.

Table 3. Distribution of respondents' answers in relation to questions 7-15

Claims	% of respondents					SV	SD
	I do not agree at all	I do not agree	neither agree nor disagree	I agree	comple-tely agree		
Using web 2.0 technology speeds up the teaching process.	1.8	6.4	17.4	36.7	37.6	4.02	0.99
The knowledge that is acquired with the application of innovative technologies is more efficient and long-lasting.	0.9	7.3	22.0	39.4	30.3	3.91	0.95
Using innovative technologies will increase my efficiency	0.0	4.6	20.2	35.8	39.4	4.10	0.88
Using innovative technologies will increase my productivity	0.9	5.5	22.0	34.9	36.7	4.01	0.95

Claims	% of respondents					SV	SD
	I do not agree at all	I do not agree	neither agree nor disagree	I agree	comple-tely agree		
I consider web 2.0 technologies a useful tool in my work	0.0	2.8	19.3	38.5	39.4	4.15	0.83
The use of innovative technologies makes the teaching process more interesting.	0.0	3.7	13.8	41.3	41.3	4.20	0.81
I think that it is necessary for teaching to "keep up" with digital trends	0.0	5.5	13.8	33.0	47.7	4.23	0.89
I think that it is necessary for teachers to be more intensively educated on the issue of using web 2.0 technologies in teaching	0.0	4.6	11.9	32.1	51.4	4.30	0.86
I want to further improve my use of ICT	0.0	5.5	22.0	38.5	33.9	4.01	0.89
I will use web 2.0 technologies in my teaching in the future.	0.0	4.6	16.5	35.8	43.1	4.17	0.87

Respondents generally have positive attitudes about the use of innovative technologies in teaching, taking into account that they predominantly express agreement with all statements (statements are positively connoted). Quite a large number of teachers (over 80%) agree (summarized categories I agree and completely agree) with the fact that the use of innovative technologies makes work more interesting and that working with technologies is fun, but also believes that teaching "goes to step "with digital trends and to educate professors in that field more intensively. Respondents have a less positive attitude towards the item that it is easy to use Web 2.0 technologies, because teachers generally agree with other statements to a greater extent, because about 70% of them place their answers in the category *I agree / I completely agree.*

5. Conclusion

The Covid-19 virus pandemic was one of the biggest challenges education systems have ever faced and is still ongoing. Distance education solutions have become a "mandatory choice" of countries for maintaining educational processes in this period. At the same time, the long-term impact of distance education on educational outcomes and suggestions to minimize negative effects began to be discussed. Predictions of a potential increase in educational inequalities after the COVID-19 pandemic became highlighted in these discussions (Özer, Suna, 2020). Education provides services to the majority of the population, including students, teachers, parents and other stakeholders.

In order to maintain the quality of higher education, higher education institutions should be able to function in crisis situations, and the education they provide should be considered acceptable to both lecturers and students. At the moment, the experience we have gained through the global pandemic is a valuable opportunity for higher education institutions to be prepared to continue their education in all types of crisis by planning appropriate education and setting up a substructure for professors and students to conduct education and research in a safe and healthy environment. In that sense, higher education institutions that learn lessons from the pandemic and make the necessary adjustments in a timely manner will shape the future of higher education in the world.

For a long time, we have not faced a global crisis that has affected all aspects of our lives, as was the case with the global COVID-19 pandemic. On that occasion, we could notice that higher education is based on a very fragile basis and functions properly only under normal circumstances. The pandemic has given us the opportunity to build a more sustainable higher education system by removing many vulnerabilities, shortcomings and problems that could not have been noticed under normal circumstances. The pandemic provided higher education institutions around the world with a vision of sustainable education and research, and led them to gain the experience they needed to pave the way for that vision, which is based on the use of innovative technologies.

From the presented data, it can be concluded that both professors and students are very satisfied with the change, but that they would like to further improve their skills in the use of innovative technologies and that they are satisfied with the teaching during the Covid-19 pandemic. In the future, it remains to improve even more, as well as to pay more attention to the detected problems in this period.

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LEARNING BY IMPORTING IN INDIA: INSIGHTS INTO FIRM LEVEL EXPORT PERFORMANCE SINCE 1991

Abstract: The recent wave of rising protectionism has consensually stressed the importance of strengthening a country's exports, while imports are generally frowned upon. This paper aims at revisiting the importance of imports at enhancing a country's exports and Total Factor Productivity (TFP), by addressing the interlinkages between imports and Foreign Direct Investment (FDI). The motivation is trivial since each country's imports represent another's exports, hence if all aim to reduce imports that will without a doubt have a negative impact on everyone's exports. Recent literature that has focused on the channels among exports and productivity gains are grouped broadly under two main hypotheses namely "Self-Selection (SS)" and "Learning by Exporting (LBE)". While the first strand of the literature highlights that more productive firms become exporters, the second one refers to productivity gains experienced by firms after they commence exporting i.e. the process of exporting thus makes domestic firms more productive. Our earlier working paper Das, Rishi, Jha and Mehmetaj (2020) contributes to the existing literature by allowing for the simultaneity of both hypotheses, which is only possible after integrating FDI to explain the virtuous circle between SS and LBE. In the exports - productivity / firm heterogeneity literature while the twin hypothe-

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ses (SS and LBE) have been looked at, the Learning by Imports (LBI) effects have been largely ignored, with the exception of Zheli and Dai (2017). Under the LBI hypothesis the very act of importing promotes productivity growth. There is a beneficial impact of importing on firm productivity ascribable to better complementarity of inputs, lower input prices, and/or access to inputs of higher quality. Moreover, importing from a country also augments the importing firm's ability to export to the same due to the already available trade networks, distribution channels, and local knowledge viz., consumer preferences, business practices and the institutional environment. The role of FDI to necessitate imports, where imports coupled with FDI raise productivity, which in turn increases exports has not been studied by the previous literature and accounts for the main contribution of this paper. Disentangling the channels through which imports and FDI can lead to export and productivity improvements, can have important policy implications for growth recovery, especially in the rising wave of trade protectionism across the globe at a time of the ongoing global pandemic. Objectives Against this background, the objectives of this paper are to probe into the following research questions: i. How do Imports and FDI together impact productivity? ii. What is the effect of Imports and FDI on total output and exports? iii. What is the economic rationale and evidence for the inter-linkage between LBI and LBE? Data and Methodology The paper would be using firm level data from Indian organized manufacturing since 1991 in conjunction with the HS 8 digit level trade data and ISIC 5 digit codes. Given that both the HS nomenclature and ISIC versions have undergone different rounds of refinement and modifications since 1991, they will have to be juxtaposed with relevant years to avoid any mismatch between the years taken and the versions of industry and trade databases used. To examine the combined effects and inter-linkages between SS, LBI and LBE hypotheses and the role of FDI as a bridge between Imports, Exports and TFP, we will utilize a Simultaneous Equations Model (SEM) with three-stage least squares (3SLS) to address any problems of endogeneity. Despite any criticism on using growth accounting to compute micro-level TFP measures, we argue in favor of this method within the SEM context, where our objective is to disentangle the interlinkages between trade, FDI and productivity instead of taking a stance on the details of TFP (mis)measurements.

Keywords: Learning by Importing, Exports, FDI, Productivity. JEL: F14, F21, D24

1. Introduction

The recent wave of rising protectionism has consensually stressed the importance of strengthening a country's exports, while imports are generally frowned upon. This paper aims at revisiting the importance of imports at enhancing a country's exports and Total Factor Productivity (TFP), by addressing the interlinkages between imports and Foreign Direct Investment (FDI). The motivation is trivial since each country's imports represent another's exports, hence if all aim to reduce imports that will without a doubt have a negative impact on everyone's exports.

Recent literature that has focused on the channels among exports and productivity gains are grouped broadly under two main hypotheses namely "Self-Selection (SS)" and "Learning by Exporting (LBE)". While the first strand of the literature highlights that more productive firms become exporters, the second one refers to productivity gains experienced by firms after they commence exporting i.e. the process of exporting thus makes domestic firms more productive. Our earlier working paper Das, Rishi, Jha and Mehmetaj (2020) contributes to the existing literature by allowing for the simultaneity of both hypotheses, which is only possible after integrating FDI to explain the virtuous circle between SS and LBE.

In the exports - productivity / firm heterogeneity literature while the twin hypotheses (SS and LBE) have been looked at, the Learning by Imports (LBI) effects have been largely ignored, with the exception of Zheli and Dai (2017). Under the LBI hypothesis the very act of importing promotes productivity growth. There is a beneficial impact of importing on firm productivity ascribable to better complementarity of inputs, lower input prices, and/or access to inputs of higher quality. Moreover, importing from a country also augments the importing firm's ability to export to the same due to the already available trade networks, distribution channels, and local knowledge viz., consumer preferences, business practices and the institutional environment.

The role of FDI to necessitate imports, where imports coupled with FDI raise productivity, which in turn increases exports has not

been studied by the previous literature and accounts for the main contribution of this paper. Disentangling the channels through which imports and FDI can lead to export and productivity improvements, can have important policy implications for growth recovery, especially in the rising wave of trade protectionism across the globe at a time of the ongoing global pandemic.

Objectives

Against this background, the objectives of this paper are to probe into the following research questions:

1) How do Imports and FDI together impact productivity?

2) What is the effect of Imports and FDI on total output and exports?

3) What is the economic rationale and evidence for the inter-linkage between LBI and LBE?

2. Data and Methodology

The paper would be using firm level data from Indian organized manufacturing since 1991 in conjunction with the HS 8 digit level trade data and ISIC 5 digit codes. Given that both the HS nomenclature and ISIC versions have undergone different rounds of refinement and modifications since 1991, they will have to be juxtaposed with relevant years to avoid any mismatch between the years taken and the versions of industry and trade databases used.

To examine the combined effects and inter-linkages between SS, LBI and LBE hypotheses and the role of FDI as a bridge between Imports, Exports and TFP, we will utilize a Simultaneous Equations Model (SEM) with three-stage least squares (3SLS) to address any problems of endogeneity. Despite any criticism on using growth accounting to compute micro-level TFP measures, we argue in favor of this method within the SEM context, where our objective is to disentangle the interlinkages between trade, FDI and productivity instead of taking a stance on the details of TFP (mis)measurements.

In the recent years of rising protectionism, the argument on strengthening exports and lowering imports has made a significant comeback. This paper aims to show that a country's imports are crucial to both the ability to export and to the productivity of all its firms. At the aggregate, since each country's imports represent another's exports, if all countries aim to reduce imports, that will in turn have a negative impact on everyone's exports. At the firm-level the direction is less trivial and might depend on the heterogeneous characteristics of each firm. To study the impact that imports have on both exports and productivity at the firm-level, we consider the circular framework shown in *Figure 1*, where Foreign Direct Investment (FDI) plays a crucial role linking the three together.

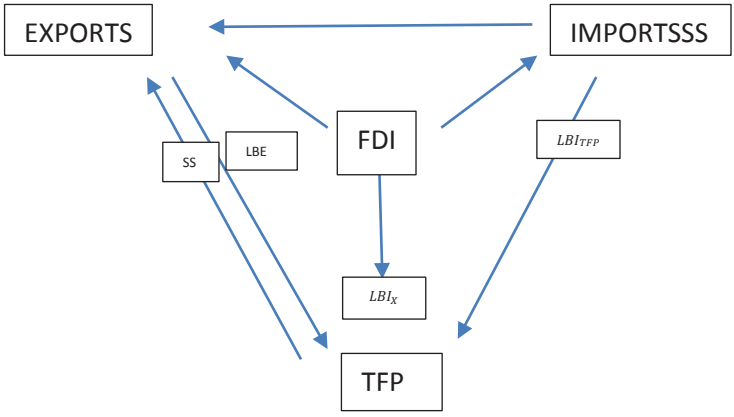

Figure 1: This figure shows the interlinkages between Imports, Exports, and productivity (TFP) in the presence of FDI. The channels, namely and represent the exports and productivity gains due to importing respectively. LBE and SS represent the simultaneous enhancement that Exports and TFP have on each other and FDI serves as a medium that connects all together.

The figure above shows the interlinkages between imports, exports and productivity in the presence of FDI. Our intuition is as follows. Imports can enhance exports (due to the already available distribution channels, trade networks and local knowledge.

Additionally, accessibility to import markets can make local firms more productive (due to their access to either better or cheaper inputs. The gains are even larger in the presence of foreign firms (FDI), since foreign firms could use imported inputs more effectively. Exports and productivity are also expected to influence each other positively. Based on the self-selection (SS) hypothesis, firms that make it to the exporting markets are usually the most productive ones and a firm's productivity is expected to increase after exporting due to knowledge spillovers from international buyers or higher competition due to its bigger market, as argued by the learning-by-exporting (LBE) hypothesis. Previous studies have focused on partial models to understand and find evidence in favor of either hypothesis described above. This paper is the first that we know of, to develop a complete framework that addresses the interlinkages between FDI, imports, exports and productivity simultaneously.

FDI plays an important role at enhancing the impact that an increase in either imports, exports or productivity can have on each other within an economy. This is especially true in developing economies. FDI has the potential to introduce foreign competition in the domestic economy. Usually if a multinational corporation with better human capital, technologies, and access to import-export markets opens in a developing economy, the spillover effects could make domestic firms more productive. The already available distribution channels can additionally enhance the domestic firms' abilities to either export in larger foreign markets or access imported inputs of higher quality or cheaper prices.

This paper uses Indian organized Manufacturing (CMIE Prowess) data since 1991 to present. The dataset contains financial information on approximately forty thousand Indian manufacturing firms, both listed and unlisted. It is built from the audited annual reports of these companies and information submitted to the Ministry of Company Affairs. The database contains additional information for the listed companies, such as company filings with stock exchanges and prices of securities on the major stock exchanges.

India is a particularly important developing country. In 1991, the Indian economy embarked on a series of economic reforms comprised of three main elements – Liberalization, Privatization and Globalization (LPG). The LPG economic reforms resulted in increased exports and

imports of goods and invisibles, remittances, and FDI inflows and outflows which have been considered responsible for elevating India's growth rates over the last two and half decades. Given this context, it seems important to study the Indian case for two reasons. First, India is a large developing country, so it is useful to understand its trade patterns. Second, India's growth in manufacturing and particularly in exporting has been slower than the growth of other similar developing economies, taking China as an example. Understanding the factors behind such differences can be important for policy targeted towards a country's trade and openness.

The econometric model that best allows us to study the combined effects of trade, productivity and FDI as shown in *Figure 1* is the Simultaneous Equations Model (SEM). The model consists of an equation for each endogenous variable and the main variables of interest are imports, exports, FDI and productivity. The CMIE Prowess dataset provides information for each firm over time on: exports, FDI, labor productivity, capital to labor ratios, import intensities, import incentives, export incentives, wages etc. Using this information, firm-level productivities (TFPs) are computed, from a Cobb-Douglas production function with Levinsohn and Petrin (2003) estimation techniques. Levinsohn and Petrin (2003) is preferred to other options, such as the standard growth accounting with OLS, fixed effects methods, or Olley-Pakes techniques. This is because it addresses the endogeneity issues of the standard OLS regressions, it allows for cross-sectional variation, which is an obvious restriction of the fixed effects methods, as well as solves the zero-investment issues of the Olley-Pakes estimation by augmenting intermediate inputs as instruments in the production function instead.

After obtaining a time-series for TFP at the firm level, we estimate the SEM model using a three-stage least squares (3SLS) regression to account for any endogeneity issues. At the current stage, we find evidence in favor of the SS and LBE hypotheses, in that productivity and exports simultaneously impact each other positively at all significance levels. The paper additionally finds that improvements in the productivities of the domestic firms result in higher inward FDI and vice versa, both results significant at all significance levels. The impact of imports on productivity at this early stage of estimation is captured by the effect of import intensities on firm-level TFPs. The

effect is positive and significant at all levels. The results are negative for the interlinkages between FDI and exports, which seems rather counterintuitive and an area that we plan to focus more in future work.

The rest of the paper is organized as follows. Section 2 is *Literature Review*, Section 3 is *Data and Methodology*, Section 4 is *Empirical Results* and Section 5 is *Conclusion and Future Extensions.*

4. Literature Review

Most papers that study the effect of imports on productivity, look at productivity gains as a result of lowering import tariffs. Amiti and Kronings (2007) studies gains in productivity in the cases of lowering imports tariffs for intermediate and final goods. Using Indonesian census data they find that the effect of the same reduction in tariffs is twice as large in the case of intermediate inputs as compared to final goods.

Topalova and Khandelwal (2011) establish a causal link between changes in import tariffs and productivity, specifically observing increases in productivity as a result of reductions in trade protection. Goldberg, Khandelwal, Pavcnik, and Topalova (2010) is another paper that looks at the consequences of lowering tariffs on imported intermediate inputs and finds that it increases the range of final products produced by domestic firms, aka domestic varieties. Although the paper does not analyze a direct measure for TFP, it argues that a higher range of final products is an indicator of higher productivity. Similar to our paper, they also use Indian firm level data (CMIE) from 1989 to 2003.

The literature that looks at the impact of imports on both productivity and exports simultaneously is limited. Two papers closest to ours are He and Dai (2017) and Kasahara and Lapham (2013). In line with the rest of the literature, He and Dai (2017) use tariff reduction data from China as a proxy for higher imports and find a positive causal effect of imports on exports and productivity. Similarly, Kasahara and Lapham (2013) use Chilean plant-level manufacturing data to test the effect of trade on productivity. They develop a theoretical model with heterogenous final-goods producers who simultaneously choose whether to export and import. Their structural empirical estimation

indicates that there are significant productivity and welfare gains due to trade openness. An important distinction of both He and Dai (2017) and Kasahara and Lapham (2013) with our paper is that they do not address the importance of FDI on the interlinkages between exports, imports and productivity.

The literature that talks about the importance of FDI for trade and productivity is vast. Halpern, Koren and Szeidl (2015) use Hungarian data to find that the gains from tariff cuts, which indicates access to a larger variety of foreign intermediate goods, is larger in the presence of more foreign firms. This result indicates that foreign firms use imports more effectively and hints to the importance of including FDI when looking at the impact of imports on either exports or TFP. Uttama and Peridy (2010) investigate the productivity spillover effects of FDI inflows in The Association of Southeast Asian Nations (ASEAN), to find strong evidence that FDI results in faster productivity growth. Liang (2017) explores how industrial linkages, firm capabilities, and the geographic location of domestic firms matter for the diffusion of technology brought by FDI in Chinese manufacturing. The paper finds positive productivity spillovers between foreign suppliers and their domestic producers that use their inputs. Castellani and Zanfei (2003) and Damijan et al. (2013) present evidence that the closer the domestic firm is to the foreign firm, the higher are the spillovers from the foreign firm to the domestic one.

The literature analyzing the mutual relationship between exports and productivity is also substantial. Melitz (2003) argues in favor of the SS hypothesis, showing that only the most productive firms enter the export market, while some less productive firms continue to produce only for the domestic market, which will simultaneously force the least productive firms to exit altogether. Haidar (2012) additionally finds that self-selection in Indian manufacturing has resulted in more productive firms entering the export markets, but that there are no gains to productivity from exporting. This in turn contradicts the findings of several other studies, such as Thomas and Narayanan (2012) and Tse et. al (2017) to name a few.

Tse et. al (2017) argue in favor of the LBE hypothesis in that exporters utilize strategic decisions pertinent to innovativeness, production capability, and human capital so as to leverage knowledge and resources obtained from exporting in order to achieve productivity

gains. Similarly, Thomas and Narayanan (2012) have found that learning by exporting results in productivity gains at the firm level, using data from Indian manufacturing.

Our previous working paper Das, Jha, Mehmetaj and Rishi (2020) contributes to the existing literature by allowing for the simultaneity of both the SS and the LBE hypotheses in the presence of FDI. Our current paper builds on its methodology and extends it, by additionally incorporating imports to analyze their role on exports and productivity simultaneously, in the presence of FDI. The data is also extended to account for the most recently published version of the CMIE Prowess dataset.

5. Data and Methodology

i) Model Specification

A Simultaneous Equations Model (SEM) and Indian firm-level manufacturing data are used to investigate the relationship between exports, imports, FDI and productivity.
The model is specified as follows:

$$fdi_{it} = \gamma_0 + \gamma_1 tfp_{it} + \gamma_2 exp_{it} + \gamma_3 im_{it} + \gamma_4 gni_{it} + \gamma_5 w_{it} + \gamma_6 R_t + u_{it} \quad (1)$$

$$exp_{it} = \alpha_0 + \alpha_1 tfp_{it} + \alpha_2 fdi_{it} + \alpha_3 im_{it} + \alpha_4 gni_{it} + \alpha_5 xi_{it} + \phi_{it} \quad (2)$$

$$im_{it} = \alpha_0 + \alpha_1 tfp_{it} + \alpha_2 fdi_{it} + \alpha_3 exp_{it} + \alpha_4 gni_{it} + \alpha_5 mi_{it} + \phi_{it} \quad (3)$$

$$tfp_{it} = \beta_0 + \beta_1 exp_{it} + \beta_2 fdi_{it} + \beta_3 im_{it} + \beta_4 kl_{it} + \beta_5 size_{it} + \beta_6 R\&D_{it} + \epsilon_{it} \quad (4)$$

For each firm i at time t, the model consists of four equations, one for each endogenous variable in our model namely: FDI(fdi), exports(exp), imports(im) and total factor productivity(tfp). In the first equation, inward FDI is modelled as a function of TFP, exports, imports, gross national income(gni), wages (w) and royalty payments (R) made abroad. Trade liberalization is captured by *Eq. (2)* and *(3).* In *Eq. (2)* exports are a function of TFP, FDI, imports, gni and export incentives

(xi) and *Eq. (3)* expresses imports similarly as a linear combination of TFP, FDI, exports, gni and import incentives (mi). Lastly, TFP in *Eq. (4)* is formulated loosely following the growth accounting framework first introduced by Solow (1957), but is extended to include variables inspired by the endogenous growth theory. While the traditional capital and labor inputs are accounted for by the capital-to-labor ratio (kl), *Eq. (4)* also includes trade liberalization measures such as exports, fdi, imports, firm size (size) and research and development expenditures (R&D).

ii) Estimation Techniques

The empirical estimation is performed using the three-stage least squares (3SLS) regression techniques for evaluating Simultaneous Equations Models (SEM), similar to the approach adopted by Turnbull et. al (2016). Once the estimation of SEMs is completed, autocorrelation plots for each predicted residual are generated and presence of serial correlation is identified. The presence of serial correlation implies that the point estimates of the coefficients become non-efficient, even though they still remain consistent. To account for the efficiency problem, we use the block bootstrap technique which helps us evaluate standard errors for the point estimates. Unlike the standard bootstrapping techniques, the block bootstrap accounts for the dependence among time series by stratifying the data into sequential blocks. One shortcoming of this technique is that the resulting estimates are sensitive to the selected block length. As suggested by Inoue and Shintani (2006), we choose a block length (ℓ) to be approximately $\ell = T^{1/3}$, where T is the number of observations of each series.

iii) Data

The data used to carry out the estimation of the Simultaneous Equations Model as shown by equations (1)-(4) come from the Indian manufacturing (CMIE Prowess) datasets, containing time-series with financial information on approximately forty-thousand Indian manufacturing firms since 1990.

To compute a TFP time-series for each firm, we assume production at the firm level is Cobb-Douglas. The Cobb-Douglas production function is preferred instead of other less-restrictive functional forms, because of the ease at using it to compute TFP from growth accounting as suggested by Solow (1957). An alternative to the Cobb–Douglas function would be a more flexible trans log function, which, in theory, is more attractive because it is less restrictive. In practice, the restriction of the functional form (as in Cobb–Douglas) does not tend to make a significant difference quantitatively. Additionally, the advantage of employing the Cobb–Douglas function, is that it is relatively easy to assess whether the estimated coefficients and the resulting returns to scale are broadly in line with common sense.

A Cobb–Douglas production function with labor, capital and materials taken as inputs can be captured as follows:

$$y_{it} = b_0 + b_l l_{it} + b_k k_{it} + b_m m_{it} + w_{it} + u_{it} \quad (5)$$

where y is the logarithm of the firm's output, l and m are the logarithms of labor and materials and k is the logarithm of capital stock available to the firm for production at a given time period. The error is composed of two parts: the transmitted productivity component given by *w* and the error term that is uncorrelated with input choices represented by *u*.

The issue with using *eq. (5)* to compute productivity, is that at least a part of the TFP will be observed by the firm at a point in time early enough, so as to allow it to change the factor input decision. If that is the case, then the firm's profit maximization implies that the realization of the error term of the production function is expected to influence the choice of factor inputs. This means that the regressors and the error term can be correlated, which makes OLS estimates biased.

A relatively simple solution to this problem can be found if one has sufficient reason to believe that the part of the TFP that influences firms' behavior *w,* is a plant-specific attribute and invariant over time. If this condition is satisfied, including plant dummies in the regression,

i.e., running a fixed-effect panel regression, will solve the problem and deliver consistent estimates of the parameters. There are two drawbacks to this method. First, a substantial part of the information in the data is being left unused. A fixed-effect estimator only uses the across-time variation, which tends to be much lower than the cross-sectional one. This means that the coefficients will be weakly identified. Second, the assumption that *w* is fixed over time may not always be correct, thus invalidating the entire procedure. As an alternative to fixed-effect regressions, a consistent semi-parametric estimator has been developed by Olley and Pakes (1996), resulting from solving for the firm's investment decision.

Their method is able to generate consistent estimates for the production function, provided a number of conditions are met. One of the conditions is that there must be a strictly monotonous relationship between investment and output. This means that any observation with zero investment must be dropped from the data in order for the correction to be valid. Depending on the data, this may imply a considerable drop in the number of observations because it may be the case that not all firms will make a strictly positive annual investment.

Levinsohn and Petrin (2003) offer an estimation technique that is very close in spirit to the Olley and Pakes (1996) approach. Instead of investment, they suggest using intermediate inputs as instruments. Typically, many datasets will contain significantly less zero-observations in materials than in firm-level investment. We prefer the Levinsohn and Petrin (2003) procedure in our model for various reasons. The Levinsohn-Petrin procedure takes into account the time variation as well as the cross-sectional variation of the data. It also addresses the zero-investment issue in the Olley-Pakes methodology, by using intermediate inputs as instruments instead of investment.

Using intermediate inputs as a proxy, the estimation takes place in two stages using OLS. First *eq. (6)* below is estimated:

$$y_{it} = b_l l_{it} + f(k_{it}, m_{it}) + u_{it}, \qquad (6)$$

where

$$f(k_{it}, m_{it}) = b_0 + b_k k_{it} + b_m m_{it} + w_{it}\,. \qquad (7)$$

This results in consistent estimates for the coefficient on labor and the function for capital and intermediates f(.), which once available can be used to estimate the error term *w using*:

$$w_{it} = f(k_{it}, m_{it}) - b_k k_{it} - b_m m_{it} \qquad (8)$$

Having *w*, the TFP series is then estimated from the following regression:

$$w_{it} = a_0 + a_1 w_{t-1} + a_2 w_{t-2} + a_3 w_{t-3} + e_t \quad (9)$$

The intermediate input variable that is chosen as an instrument in our model is energy, specifically power and fuel, which is available in the CMIE Prowess dataset at the firm-level.

Due to the lack of firm-level FDI data on the CMIE Prowess dataset, foreign equity ownership of manufacturing companies in India is used as a proxy for inward FDI. The exogenous variables included in the study are: firm size (size) — measured as the number of employees of a company and accounts for the impact of economies of scale; capital to labor ratio (kl) — measured as capital per unit of labor as productivity is impacted by both physical capital and labor inputs; import intensities (mi); export intensities (xi); R&D — research and development expenses, royalty and technical fee (R) payments made abroad; and wage rate (w) — reflecting the domestic cost of production, which is one of the necessary factors to determine FDI flows.

Summary statistic of the key variables used in the estimation are shown below, in *Table 1.*

Table 1: Summary Statistics of Selected Data Series from CMIE Prowess

	Variable		Unit	Mean	Standard Deviation	Min	Max	Observations
1	tfp	Total factor productivity	rs million	148.039	208.787	0.0295	1285.90	210
2	exp	Exports	rs million	982.320	2102.663	0.1000	15403.60	210
3	fdi	Foreign Direct Investment	(%)	34.418	30.481	0.0100	90.00	210
4	lp	Labor Productivity	rs million/ labor hour	5.597	5.596	0.0016	32.63	210
5	kl	Capital to labor ratio	rs million/ labor hour	3.184	3.734	0.0182	21.82	210
6	impfg	Import of final goods	rs million	25.793	84.763	0.1000	794.20	210
7	impcg	Import of capital goods	rs million	118.068	422.611	0.1000	2938.20	210
8	mi	Import Intensity	(%)	25.906	30.554	0.1100	100.00	210
9	R&D	Research & Development expenses	rs million	120.156	503.565	0.0100	3631.00	210
10	R	Royalties & technical fees	rs million	17.832	69.093	0.1000	561.00	210
11	size	Size of workforce	number	1709	3926	3	25441	210
12	w	Wages	rs million	445.130	1188.304	0.1000	8266.10	210
13	xi	Export Incentives	rs million	22.000	99.361	0.0100	894.50	210

6. Empirical Results

To estimate the Simultaneous Equations Model presented above we use a 3SLS regression developed by Zellner and Theil (1962), where all reduced-form coefficients are estimated applying the least square estimator and all structural coefficients are computed using 2SLS to each of the structural equations. Third, all of the structural coefficients of the system are computed from the Generalized Least Squares (GLS) estimators, using a covariance matrix for the stochastic disturbance terms of the structural equations, which in turn comes from the second-stage residuals. Using this covariance matrix improves efficiency as shown by Intriligator (1978).

Upon assessment of initial estimation results we find evidence supporting the theory that trade liberalization leads to productivity spillovers in Indian manufacturing and the competitive pressures through trade and FDI openness thus exerted, force domestic producers to become more efficient and productive. We find that a one hundred percent increase in exports contributes to about over thirty five percent increase in manufacturing TFP, which is significant at the 1%, 5% and 10% levels. Additionally, a 100 percent increase in the FDI contributes to over forty percent increase in manufacturing TFP, again significant at the 1%, 5% and 10% level. This validates the underlying learning by exporting (LBE) phenomenon/hypothesis, whereby firms participating in international markets are exposed to more intense competition and exporting thus makes firms more productive.

Furthermore, our results suggest that productivity improvements for these industries are partially explained by economies of large-scale production. Also, we find empirical evidence to suggest that capital intensity, import penetration and size have directly impacted productivity of domestic manufacturing industries.

As expected, an increase in capital intensity impacts firms' productivity positively. A 10% increase in capital intensity increases TFP by 2%, which is significant at 1%, 5% and 10% levels. Also, imported intermediate inputs and raw materials can impact productivity by offering domestic producers' insight into best foreign practices. To capture this spillover effect, import intensity/penetration is included in the model and we find empirical evidence that indicates that the presence of such skill or knowledge spillovers are indeed arising from imported intermediate inputs. In particular, a 100% increase

in import intensity leads to about 3% increase in manufacturing TFP. The downside is that this result is only significant at 10%.

Additionally, a 10% increase in size is linked with over 2.3 percent increase in manufacturing TFP, which is significant at 1%, 5% and 10% levels. Again, this result is expected and could be explained by economies of scale. Coefficients for R&D, imports of capital goods and imports of final goods are also statistically insignificant.

In the estimated Eq. (2) presented in Table 2, we find that the coefficients for TFP, exports and R are statistically significant, whereas the impact of the wage rate on FDI is statistically insignificant. We find empirical evidence to suggest that inward FDI is significantly impacted by domestic manufacturing productivity (TFP). Specifically, results indicate that a 100% increase in TFP results in about a 95 % increase in inward FDI. This result is significant at the 1%, 5% and 10% levels. This could possibly corroborate the expectation that increased levels of productivity will attract a higher amount of inward FDI, other things remaining constant. It is expected that a firm with higher productivity will be more efficient in terms of adoption of new technologies and innovations, which is one of the important determinants of foreign investors' decisions regarding location thereby attracting higher FDI.

At 10% significance level, we find that a 100% increase in royalties and technical fees (R) leads to only 2% rise in inward FDI. In contrast, we find that FDI is negatively impacted by exports. A 10% increase in exports is linked with about 6% decrease in FDI, the result being significant at 1%, 5% and 10% levels.

In the case of Eq. (3) where the dependent variable is exports, we find that all estimated coefficients are statistically significant at 1%, 5% and 10% levels. As expected, we find that increases in manufacturing TFP result in statistically significant increases in exports, validating the self-selection hypothesis, whereby more productive firms enter exports markets. In particular, a 100% increase in manufacturing TFP results in about 122% increase in the EXP; a result which is significant at the 1%, 5% and 10% percent levels. Also, a 10% increase in export incentives increases manufacturing exports by around 2%. In contrast, our results indicate that exports are also negatively impacted by inward FDI. A 10% increase in FDI is linked with about 6% decrease in exports, the result being significant at 1%, 5% and 10% levels.

Table 2: 3SLS Estimates of the Initial SEM

Equation	Variables	Estimated Coefficients	Standard Error	Bootstrapped Standard Errors
Eq 1 (tfp)	exp	0.3579***	0.0548	0.1695
	fdi	0.4021***	0.0864	0.2017
	kl	0.2027***	0.0528	0.0811
	mi	0.0330*	0.0177	0.0233
	size	0.2342***	0.0557	0.0938
	R&D	0.0243	0.0289	0.0234
	const.	-1.959***	0.3571	0.4929
Eq (2) fdi	tfp	0.9404***	0.1846	0.2649
	exp	-0.6109***	0.1255	0.2584
	w	0.1475	0.1015	0.1160
	R	0.1145**	0.0528	0.0838
	const.	4.6150***	0.7207	0.7612
Eq (3) exp	tfp	1.2223***	0.1532	0.1913
	fdi	-0.6930***	0.1364	0.2822
	xi	0.1812***	0.0562	0.1021
	const.	3.403***	0.4934	0.6442

Note:

* Represents significance at the 10% level.

** Represents significance at the 5% level.

*** Represents significance at the 1% level.

7. Conclusion

This paper looks at the interconnectedness between trade liberalization, captured by access to more import and export markets, productivity and foreign direct investment. To study how imports, exports, productivity and foreign investment affect one another, we propose using the Simultaneous Equations Framework, where each equation represents any of the four endogenous variables of interest as functions of each other and other exogenous variables. Firm-level productivity series, defined as total factor productivity, are computed using a Cobb-Douglass production function and the Levinsohn-Petrin

procedure to address any endogeneity issues. The rest of the variables come straight from the CMIE Prowess database. The 3SLS regression results suggest that exports and productivity positively impact each-other, in line with both SS and LBE hypothesis. The paper also finds preliminary evidence in favor of the theory that imports enhance productivity, as well as a positive impact of inward FDI on TFP and vice versa. The relation between exports and FDI at these early stages is counterintuitively negative and will be addressed more in detail in future work.

Other future extensions will involve running the 3SLS regression on the entire SEM specification, including imports as an endogenous variable, together with performing robustness checks to test whether the results hold if TFP measures are replaced by labor productivity measures, since labor productivities at the firm level are already included in the CMIE Prowess datasets.

The empirical findings of this study have significant policy implications. Our results provide empirical support for trade liberalization. One suggestion for policymakers is to re-think trade reform policy with orientation towards trade-FDI linkages, if they hope to achieve domestic productivity gains in manufacturing. Additionally, governments should continue to pursue new free trade agreements (FTAs), improve the terms of existing FTAs and reduce levels of non-border assistance to domestic industries where practical.

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BARRIERS OF IMPLEMENTING ECO-INNOVATION POLICIES IN WESTERN BALKAN COUNTRIES

Abstract: Just as there is a global trend to move to more sustainable products with less harmful impact on the environment, also in the Balkan region there is great pressure to switch to green energy and eco-innovation in various industries. Numerous world class scientific researches strive to detect the relationship between investment and results in the application of green technologies and eco-innovation at the level of individuals, companies, local communities and the state. All efforts are directed towards the formation of sustainable eco-friendly and less harmful products for the urban and rural environment, in order to be cleverly designed, administrative state bodies allocate funds on the one hand, and on the other hand create policies, that should motivate and direct individuals, companies, society and local community to make their efforts towards that common goal. The main aim of this paper is to detect, analyze and dissect barriers to the adoption of policies to encourage eco-innovation in the Western Balkans region, following the example of EU member states.

Keywords: Eco-innovations, European Union, Sustainable Development, Green Economy, Sustainable Development Goals.

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1. Introduction

The Green Agenda for the Western Balkans is a new growth strategy for the region, moving from a traditional model to a sustainable economy, in line with the European Green Plan. By signing the Declaration on the Green Agenda, the countries of the Western Balkans committed themselves at the Summit in Sofia on November 10, 2020 to implement measures in the field of climate change prevention and pollution, energy development, transport and circular economy, as well as biodiversity development, sustainable agriculture and production. food. In particular, there are a number of recommendations:[50] 1. *Renewable energy sources, climate protection* - The Western Balkans is a region heavily affected by climate change, which requires reducing greenhouse gas emissions and increasing resilience to the effects of climate change. Partners from this region will be supported in accordance with the new European legislation in the direction of reducing CO2 emissions through quotas and carbon pricing mechanisms. Due to the extremely high dependence on coal, the transition to clean and renewable energy sources is necessary. The EU will particularly encourage transport models that pollute the environment to a lesser extent, as is the case with rail transport. 2. *Transition to the circular economy* - The transition to a circular economy is the key that guarantees the EU and the Western Balkans a green transition. The EU will support the Western Balkans in developing strategies to improve the sustainability of raw material production, prevention, reduction, recycling and waste management, taking into account the entire product life cycle. The development of a regional agreement on the prevention of plastic pollution, especially marine litter, will also be financially supported. 3. *Reduction of air, water and land pollution* - Air pollution in the Western Balkans is at the highest level in Europe and has a direct impact on the health of the population. The EU will help the region comply with EU standards when it comes to air and water quality, as well as wastewater management. This includes more modern monitoring and further investments in these fields. 4. *Sustainable agricultural and food production* - Agriculture and related activities account for about 10% of the GDP of the Western Balkans.

[50] https://ec.europa.eu/neighbourhood-enlargement/sites/default/files/factsheet_wb_green_agenda_en.pdf

The EU will step up its support for sustainable rural development, helping agri-food to increase food quality and safety, reduce waste, improve compliance with EU food safety and animal welfare standards and promote environmentally friendly and organic production. 5. *Biodiversity and ecosystem protection* - The Western Balkans is rich in habitats and species that need to be protected and preserved for future generations. The EU will support the region in developing and implementing the Western Balkans Biodiversity Action Plan as well as the Forest Potential Restoration Plan.

At the mentioned Summit in Sofia, which gathered the highest state representatives, in addition to the Declaration on the Green Agenda, the Declaration of the Leaders of the Western Balkans on the Common Regional Market was signed, which should contribute to economic growth and ecological development of the region.

2. Eco-innovation Policies in EU Member States

European innovation policy is primarily focused on the promotion of international cooperation in R&D. The Framework Programmes (FP) are the main instrument for this. Environment and sustainable development are explicitly part of all FPs. In the Sixth Framework Programme, 2.1 billion EUR is labelled for the priority theme sustainable energy, environment and transport (Faber et al., 2008, p.190). The 7th framework programme is said to support environmental technologies up to a sum of 10 billion EUR.

Although innovation has always been seen as part of the solution in environmental problems, prior to 2005 few programmes at the EU-level specifically addressed the stimulation of environmental innovations. There are two notable exceptions: first, the fairly small ACE-Programme (Action Communautaire pour l'Environnement), which ran from 1984-1991 with a total budget of 41 million euro; second, its successor, the LIFE-Programme (L'Instrument Financiel pour l'Environnement), which has been running since 1992, with a cumulative budget of well over 1.3 billion EUR (Faber et al., 2008, p.191). The LIFE-Programme is a broad tool for the implementation of the Union's environmental policy. It subsidizes the demonstration of new technologies with positive effects on the environment, but it is not exclusive-

ly focussed on technologies or innovations, since, for example, nature conservation projects can apply for subsidy. Overall, almost 2500 projects were supported until 2004 (Faber et al., 2008, p.191).

Over the past six years, eco-innovation has received growing attention. An important EU initiative in the field of environmental innovations is ETAP: the Environmental Technologies Action Plan. This strategic programme was adopted in January 2004. It is a joint initiative of DG Environment and DG Research (European Commission, 2004). ETAP seeks to exploit the potential of environmental technologies to improve both the environment as well as European competitiveness, thus contributing to growth and job creation. The actions in ETAP are mainly aimed at getting results from research more readily into the market. Following ETAP, some programmes of FP6 have been redrafted, funds have been made available by the European Investment Bank, and Technology Platforms on environmental domains have been established and stimulated. Furthermore, mutual learning between Member States in the area of financial instruments for the introduction of new environmental technologies into the market has been promoted (European Commission, 2004).

A new initiative is the Eco-Innovation Action Plan. The action plan kept the priority areas of ETAP but sought to expand focus from green technologies to all aspects of eco-innovation, bringing existing ETAP tools to "the next level", to leverage private funding through new financial instruments, to increase SME focus by better linking with existing initiatives, to reinforce the global dimension and to improve cooperation and coordination with global efforts.

All Member States have policies for eco-innovation. An overview of measures for all Member States is given in Figure 3 showing that there is a mix of policies. The measures fall into four areas. Within the area *Getting research to the market*, most of the support actions are in R&D support. For *Improving market conditions*, Member States also use a range of policies, the majority of which relate to regulation and raising environmental awareness. The relatively even distribution of policy instruments (measures) to improve market conditions suggests that there are few gaps in the policy portfolio, but a deeper analysis is required to really determine whether this is true. For *Acting globally* and *Moving forward*, there are far fewer policies. *Acting globally* is not a MS responsibility but an EU one. *Moving forward* is about

improving ETAP and the Open Method of Coordination (for a discussion of internationalisation of research and the OMC, see Kaiser and Prange, 2005). There is no document discussing the theoretical basis for the policies, so we can only speculate about the link with market failure and system failure. R&D support fits with the view that the public good nature of knowledge and uncertainty led companies to underinvest in R&D (market failure issue about inappropriate incentives). Establishing innovation platforms is based on innovation system thinking. The policies under improving market conditions and acting globally aim to foster learning and encourage the uptake of innovations. They fit with proposals of evolutionary economists that the uptake of innovation is suboptimal, having to do with capabilities and inappropriate institutions. *Moving forward* is about coordination and thus about correcting system failure.

For example, environmental taxes are an economic instrument that entirely supports the principles of sustainable development and has impact on balanced improvement of all its four pillars (economic, ecological, social, and 385 institutional). Environmental taxes provide a flexible and cost-effective means for reinforcing the polluter-pays principle and for reaching environmental policy objectives. Enforcement of environmental taxes (and penalties) simultaneously generates multiple values—it stimulates ecologically acceptable production, generates budget revenue, and stimulates socially responsible behavior (Golušin et al., 2013).

3. Barriers of Implementing Eco-innovation Policies

Despite the many benefits of eco-innovation, the key reasons why it has not received much wider application are barriers of the market and overall system. These barriers and gaps include lack of incentives and weak support systems. Presented below is a list of some barriers to eco-innovation frequently encountered in previous studies.[51] This list is not exhaustive as barriers depend on the dynamics and complexity of a specific national context. Their effects are also often interlinked and cannot be addressed in isolation and by a single

[51] http://unep.ecoinnovation.org/wp-content/uploads/2018/03/UNEP_157-Mainstreaming-ecoInnovation_web.pdf

solution. It is therefore important for policymakers to understand the nature of these barriers, the reasons why they occur and how they limit eco-innovation. This understanding, as well as communication and coordination among policy frameworks and related stakeholders, can help to design flexible and relevant combinations of policy interventions. Policy recommendations to overcome barriers and gaps are given in Chapter 4.

Table 3.1: Barriers to eco-innovation

Barriers to eco-innovation	
Insufficient economic incentives	The market fails to capture the benefits of eco-innovation and does not offer sufficient economic return to companies that are ahead. Namely, the costs of negative externalities (e.g. external costs to society) are not sufficiently reflected in actual costs of production. This can be due to the lack of appropriate regulatory frameworks, civil society pressures or perverse subsidies.
Perverse incentives	Subsidies for the use of natural resources such as fossil fuels or water distort the market and further encouraging their depletion.
Insufficient consumer demand	As global demand for sustainable products (goods or services) increases, consumer awareness about sustainability imperatives in many countries is still low. There is a lack of information and guidance for consumers to help them select more sustainable products and modes of consumption. Additionally, in developing countries, sustainable products are often considered an expensive luxury. This may result in general cultural and institutional norms in the market that do not encourage corporate transparency and environmental and social responsibility. In the end, this may lead to insufficient consumer demand for sustainable products.

Limited investment and access to finance	The cost of implementing eco-innovation can involve up-front investment with a pay-back period. This may be an inhibiting factor for many companies, especially SMEs, which often have limited financial resources to invest into developing and adopting eco-innovative solutions and have difficulty of attracting both public and private investment. Ineffective protection of intellectual property (IP) can hamper investment for innovation. For instance, the IP context needs to be clear to ensure that upfront investment can be recovered and yet not too restrictive in order not to limit collaboration, knowledge spill-over and cross learning.
Limited absorptive capacity	Developing countries tend to have weaker absorptive capacity, that is, capacity to assimilate and apply new knowledge. This is especially true for SMEs, which in addition to limited technical and organizational capacity, SMEs often have a basic lack of information about existing market opportunities or insufficient contact with experts and larger networks, which are needed to diffuse eco-innovation skills and competencies. Local universities, as well as technical institutes, may be lacking the right expertise to successfully provide the necessary skills at the national level.
Weak systems for innovation	Innovation requires a supportive system to enable interaction between companies, universities and technical research institutions. Collaboration and cooperation lead to interactive learning, flow of research and technology into industry for successful commercialisation and diffusion of eco-innovative solutions. These interactions and diffusion do not take place in weak systems. The effectiveness of systems depends on efficient coordination and facilitation, a role that can be played by government with the help of service providers.

Source:http://unep.ecoinnovation.org/wp-content/uploads/2018/03/UNEP_157-Mainstreaming-ecoInnovation_web.pdf

4. Potential Impact of Eco-Innovation Policies on the Development of the Western Balkans Region

The system innovation approach responds well to the ambition and scope of change set in the 2030 Agenda for Sustainable Development (2030 Agenda). The 2030 Agenda is composed of SDGs and builds on a number of high level political commitments on sustainable development including the Paris Agreement on Climate Change. Its adoption represents an important universal recognition of the notion that the achievement of sustainable development is the responsibility of all countries and stakeholders. The key idea underlying the SDGs, targets and indicators, is the need for a major paradigm shift in a currently inefficient system. The goals in the 2030 Agenda structure are deliberately connected, implying a collective and coordinated effort and holistic perspective in approaching the challenges. It envisions a particularly important role for the business sector as without their involvement, the achievement of a range of goals is not feasible. Eco-innovation responds directly to Goal 8 ('Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all'10) and Goal 12 ('Ensure sustainable Consumption and Production Patterns'11). Eco-innovation is a tool to respond to the 2030 Agenda in a practical way by building competitive, sustainable and viable businesses. The task of system innovation is complex and demands innovation from policymakers to try new approaches and to address issues holistically on both supply and demand sides.

He deserves special attention when it comes to the green economy in the Western Balkans an energy sector facing a single double transition, as a challenge unprecedented in history: the transition from centralized systems to state control to open and competitive markets, as well as the transition to decarbonisation. You could say yes energy systems play a key role in constituting an economy of prosperity and could be a driver of greater cooperation and security in the region (Djorić, 2021).

The use of renewable energy generates a wide range of economic benefits. Job creation is an important attribute of a healthy economy and a significant part of economic development activities. When there are more people working, the utility exceeds the income of the all working positions. Additional benefits occur when earned

money and part of their income have been invested in local economies, creating an effect called spin-off benefit, known as the multiplier effect. This increased spending, also, results in economic activity (jobs and income) in other sectors, such as retail, restaurants, and providing quality leisure and entertainment area. Renewable energy systems have the ability to create more jobs per unit of cash invested projects based on conventional energy systems. The number of jobs also depends on how the stages of production take place in the observed region (Duran, 2011). Research shows that work on green economy, green management, circular economy and sustainable development is needed. More funding is needed to invest in scientific research and better cross-sectoral cooperation in public policy making. (Ješić, J., Vukadinović, S., 2019)

5. Conclusion

In addition to numerous aspects and issues arising from the implementation of eco-innovation, in this paper we focused and extracted the issue of overcoming barriers to the introduction of policies that will encourage the implementation of eco-innovation in the Western Balkans. Open questions for all levels of government and decision-making remain whether incentives or penalties in the form of higher taxes are a better solution. Available data confirm the thesis that incentive policies in developed countries have achieved results in terms of eco-innovation. The big gap between developed and developing countries (which mostly includes the countries of the Western Balkans) is a long tradition of investing in research and development in the field of green technologies, widespread culture and awareness of the importance of the environment, education at all educational levels about importance of renewable energy sources. Of course, first and foremost, the availability of funds for investment in projects that require significant funds. The potential direction for solving the unenviable situation in the countries of the Western Balkans in overcoming barriers to incentive policies in the field of eco-innovation is the engagement of all factors of society (government, business sector, all educational institutions, civil sector, NGOs) with one ultimate goal - preserving the environment for future generations.

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SUSTAINABLE PRODUCTION AND SUPPLY CHAINS IN POSTPANDEMIC PERIOD

Abstract: Over the last two decades, we have seen the hyper-globalization of supply chains, made possible by advances in information technology, communication systems, outsourcing, and lean manufacturing. The appearance of a pandemic caused by the COVID-19 virus in just a few months revealed how vulnerable this model is. The sharp increase in demand on the one hand and disruptions in supply chains caused by lockouts and the closure of borders on the other have led to complete disruptions in the market for essential goods in particular. The aim of this paper is to point out the vulnerability of supply chains conceived in this way and to present therecovery strategies proposed so far.

Keywords: supply chains, production, disruptions, strategies

1. Introduction

The acceleration of the globalization process, at the end of the past and the beginning of the 21st century, driven by various economic and political factors, market forces and efforts to reduce costs has led to the creation of geographically distributed supply chains that have become longer and more complex. Strategies such

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as consolidating production in regions where skilled labor is cheap resulting in concentrated procurement and production centers, then minimizing working capital by keeping inventories lower, and so on. unfortunately, the necessary risk assessments have been neglected. With specialization and concentration in manufacturing industry, disruptions at one or a few entities can affect almost all ones in supply chain. Once such disruptions occur, the whole supply chain has to face a lot of problems, such as supply disruption, production disturbance or demand change. Therefore, it is very important to design resilient supply chains so as to cope with different disruptive events effectively.

The global pandemic caused by the COVID-19 virus, in just a few months, revealed how vulnerable many global supply chains actually are and how important an efficient way of managing business operations and supply chains is

The National Association of Manufacturers conducted a survey of its member companies on the impact of the COVID-19 outbreak to manufacturers. The survey was in the field from Feb. 28 to March 9, 2020. The 558 respondents were asked about effects to their supply chain and operations, their financial expectations and their emergency response plans (National Association of Manufacturers, 2020):

78.3% Anticipate a Financial Impact

53.1% Anticipate a Change in Operations

35.5% Facing Supply Chain Disruptions

Even then, it was clear that the spread of disruptions in the supply chain, the so-called ripple effect, would cause a strong impact on the entire world economy. In a pandemic situation, the demand for essential products is growing rapidly, meanwhile, supply, transportation, and manufacturing face numerous challenges that reduce their capacities. These include border closures, lockdown in the supply market, interruption in vehicle movements and international trade, labor shortage, and the maintaining of physical distance in manufacturing facilities (Paul and Chowdhury, 2020; Amankwah-Amoah, 2020)

This double disruption suddenly affects the production process and the process can collapse without immediate and necessary actions. To mitigate the impacts of these dual disruptions, our goal is to develop a recovery model for making a decision on a revised production plan.

2. Sustainable Production and Recovery Strategies

As mentioned earlier, many companies have applied the principles of lean manufacturing, as well as outsourcing their production to low-cost regions. These two trends exposed many supply chains to a much higher overall risk, which was realized with the disruption caused by COVID-19.

The interruption caused by the pandemic revealed all the problems in this way of production, both upstream (supplier relations, procurement of raw materials, transport, stocks), and downstream (storage, distribution, transport, sales). In addition, the organization of the production process itself faced problems due to the physical distance of the workforce. In addition to the standard costs in supply chain disruption situations, manufacturers face additional costs

- **Fixed order cost (FOC)** cost of raw materials ordered by the manufacturer from suppliers in advance of the production schedule, regardless of the number of orders and the ordered quantity
- **Raw material inventory cost (RIC)** A manufacturer's raw material inventory includes a certain amount of safety stock held before a supply disruption occurs, which will be consumed after the disruption, and production to order, which may result in a backlog of raw materials
- **Original supplier procurement cost (OPC)** contain the three potential sub-costs, i.e. normal procurement costs from those suppliers who did not experience the disruption, emergency procurement costs for additional quantities ordered after the disruption, and procurement costs for suppliers who experience short-term disruptions and are able to restore supply after production cycles.
- **Suppliers change costs (SCC)** includes the costs of procuring from the alternative supplier
- **Product change cost (PCC)** Product design changes require consideration of product change time and change costs. Also include costs of lost sales resulting from price differences between changed products and original products
- **Backorder cost (BC)** Lack of supply can lead to orders not being delivered on time due to further spread of supply disruptions. Delayed delivery requires compensation to the customer and will incur the cost of the backlog of the order.
- **Lost sales cost (LSC)** When the delivery time of the order according to the order exceeds the last waiting time of the customer, the customer will cancel the order, which will lead to a lost sales cost.

By analyzing the various difficulties in which the producers and the complete supply chains found themselves, different opinions and suggestions have emerged in the literature on how to overcome the current situation but also to draw lessons for the future.

Due to the drastically increased demand for certain products, there are opinions that it is necessary to increase production capacity. On the other hand, assuming that the sharp jump in demand caused by the pandemic is short-term, researchers have proposed building temporary capacities by removing non-essential operations, rather than increasing the permanent capacities (Leite et al., 2020). At the same time, acknowledging the need to increase production capacities, a number of the studies have suggested strategies for modifying product features, such as their basic quality and size, to serve more customers with existing resources (Paul and Chowdhury, 2020b) To improve the responsiveness and diversified needs of the supply chain, some studies proposed redesigning and improving logistics, such as redesigning production facilities and diversifying their locations to accommodate emergency items (Rowan and Laffey, 2020) For example, Ivanov & Dolgui (2020) proposed enhancing visibility by mapping supply networks, to predict potential disruptions and their consequences. This mapping can be useful for formulating node/ supplier-specific strategies. Another recommendation is for supply chains to diversify suppliers across different locations, to avoid production breakdowns while a given location is under lockdown (van Hoek, 2020). Considering tehnologies development such as 3-D printing, artificial intelligence (AI), cloud computing researchers have suggested automating the production system such that it can function with less human intervention (Ivanov and Das, 2020) Moreover, the use of emergency sourcing at times of crisis has been suggested as a strategy for responding to and recovering from the impacts of the COVID- 19 outbreak (Paul and Chowdhury, 2020)

The strategies proposed and their implementation will certainly depend on whether the situation caused by the pandemic will have a longer term. The solutions that will be applied will have an individual character and will be within the iron triangle of costs, time, quality. Depending on how complex the supply chain is, each organization will need to assess its dependence and associated risk for each of its suppliers, manufacturers, warehouses, distribution centers, carriers, and workforce.

While companies are struggling to recover from this crisis, their success largely depends on the strength of government support, their own financial reserves, and efforts and strategies to manage their workforce, supply chain, and operations during this slowdown.

3. Supply Chains and Recovery Strategies

In the modern globalized world, companies are sourcing materials from all parts of the globe. Even if the direct suppliers of a company are from the domestic market, its tier 2 or tier 3 suppliers are likely to be located overseas. As a result, the sudden closure of international suppliers' operations, in line with local restrictions created by lockdowns, have caused supply disruptions. In the area of supply management, governments have imposed full or partial lockdowns around the world, restricting vehicle movements to control the spread of the virus, such measures have substantially affected suppliers' ability to deliver products on time to customers

Different modes of transportation, including ocean shipping, air freight, trucking, and rail, have all been disrupted because of the restriction in vehicle movement (Gray, 2020). These transportation disruptions have created delays and negatively affected the smooth flow of products (Chiaramonti and Maniatis, 2020), while also disrupting international trade (Deaton and Deaton, 2020). Distribution and logistics patterns are shifting rapidly. While for many years physical channels were the main distribution mode, the pandemic has forced many companies to shift their business fully online, or to undertake a blended online-offline model. Moreover, physical distribution channels are either closed or have limited operations due to the restrictions (Dente and Hashimoto, 2020). Despite the efforts of companies to increase their capacity in the area of online sales, the loss or limited operations of physical channels has caused huge negative impacts on the flow of supply chains. Moreover, the sudden surge in online sales also outstripping the ability of the supply chains to cope.

The development of a recovery plan should include the entire network, end-to-end supply chain. It is necessary to map all participants in the supply chain in order to create transparency on multitier supply chains, establishing a list of critical components,

determining the origin of supply, and identifying alternative sources. Several studies (Cappelli & Cini, 2020; Deaton & Deaton, 2020; van Hoek, 2020) have suggested strategies of nearshoring or back shoring production facilities to increase domestic capabilities for dealing with the COVID-19 pandemic. Strategies of short supply chains by reducing the number of partners can also be effective in accelerating recovery and preparing for the next disruption (Farias and Araújo, 2020) Hence, firms should now use home delivery, online sales, and mobile services; and by the same token, digitalization and the use of information technology are required to monitor the supply chain and to reduce the impacts of disruption (Ibn-Mohammed et al., 2021; van Hoek, 2020)

However, a single strategy may not be able to safeguard supply chains from all impacts of a pandemic and ensure a quick recovery. (Chowdhury et al 2021). Hence, selecting an optimal combination of strategies that can ensure better resilience is important and should be explored. In this regard, future studies should map impacts using the strategies, i.e., outline which strategy can deal most effectively with which impact.

4. Conclusion

The current uncertainty in the world is forcing companies to adopt a new approach to supply chain management. they must build more flexible and resilient networks that can respond effectively to global shocks and disruptions - whether caused by nature or a competitor.

Risk management in the supply chain must be included in regular decision-making and planning processes. Incorporating risk management capabilities as a regular component of business decisions in operations is the first step towards creating a true risk culture and a resilient company that continuously and reliably monitors vulnerabilities in the supply chain.

When overcoming the crisis, companies should fully consider the supply chain end-to-end and examine all critical points, ie their resistance to shocks. An analysis of the main sources of supply chain vulnerabilities that were exposed during the crisis would provide

answers and increase resilience. Detailed answers can reveal great possibilities.

The paper presents disturbances in the supply chain and production, as well as proposals for recovery strategies, which certainly does not reflect complete knowledge of the topic. For a more comprehensive analysis, other factors influencing such as Demand planning, Product complexity, Organizational maturity, Financial resilience should be taken into account. With all the limitations, the conclusions presented in this paper can serve as a basis for further research.

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