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DANUBE REGION UNIVERSITIES IN TRANSITION: ISSUES AND CHALLENGES

Alojz KRALJ*

Abstract. – The main issues and challenges with possible opportunities and threats for universities in transition are presented. In the beginning, some essential facts are provided. Introduced next are some transition driving forces and their consequences. Selected impacts are explained and listed. The influence of information communication technology and ICT developments, with the examples in the robotization and utilization of artificial intelligence, is discussed. All of these advances are supporting the emerging industry 4.0 (4th industrial revolution, 4th IR). Additionally, the arising social disparities and large socio-economic changes are logically elaborated and described. Evidence is presented that fundamental change with restructuring are unavoidable at all levels of society and in particular in educational system and universities. The current situation and development trends are shown by selected facts and supported by world competitiveness and universities ranking data of the Danube region countries, DRC. Additionally, not only the possible benefits, but also rising challenges are highlighted, discussing the increase of unfavorable socio-economic disparities, rising perturbations, and possible threats, induced by the technological advances. Underpinned by these facts, the need for transition of universities and unavoidable fundamental socio-economic changes is briefly presented. No detailed conclusions are made for predicting the outcomes, or for coping with the rapid changes and how to select and start the needed transition activities.

Keywords: Transition, driving forces, consequences, Danube region countries, situation and challenges

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INTRODUCTION

When discussing needs and advances for transition, it is helpful to review some facts which are mostly known and accepted, but seldom in the forefront when discussing changes. Here we are shortly presenting some facts which do not need much explanation. For instance, the Danube region countries can be divided into older democracies, Germany and Austria, and the post-socialist countries. Many of the latter have not yet fully finished the transition from a socialist to a democratic state. It is evident that the society or country functions and operates according to the ability and qualifications of its managing professionals, but not better. We may accept as self-evident that the majority of managing and governing professionals, particularly in the Danube post-socialist countries, were predominantly educated in their own countries. Accordingly, the areas of problematic performance in these countries are by large the result of inadequate education, competences and skills provided in the past. University rankings provide one aspect of quality, but the country's economic competitiveness and social disparities, living standard and associated political and governing practices present many additional important facets. Therefore, the understanding and need for university transition are indispensable, if the transition driving forces are observed and discussed in the wider context. The universities educate for professions and jobs which are emerging with the progression of global technology. They have to take into account consequent changes of society functioning and organization. The professional higher education, HE schools and programs are educating for current jobs and employment needs. Therefore, it is evidently beneficial for the wider context of university transition, if the discussion is based not only on data of universities' ranking and quality, but also by utilizing and comparing other data, like the socio-economic and competitiveness performance of the examined country. Globalization has blurred the borders and is continuing to remove trade, economic, mobility, technology, capital, educational and many other barriers, inherited from the past. Very important measures of performance are the economic competitiveness and associated social disparities in a country. We understand the latter as a result of political, governmental and social attitude with mentality and other inherited issues. Do we need to study and compare in detail all Danube region countries, DRC to distill the general findings? Probably not. We prefer to keep the examination and discussion of findings concentrated on the main and important issues and challenges, to keep the procedure acceptably short and simple. We have decided not to include countries which do not appear in the professionally important international databases and

countries which do not perform in a challenging way. Including these countries would probably not yield much additional knowledge. When speaking of data sources and bases, we have in mind the well-known OECD [1], EU [2], UN [3], and data of universities' performance [4, 5, 6,], and data about economic competitiveness of countries [7]. The IMD World Competitiveness Yearbook, which provides the overall ranking and competitiveness performance of sixty countries, is an outstanding source for our approach. The data and facts in this publication are based on more than 300 data sets and criteria, gathered by 55 partner institutions in the important main areas: the economic performance, government efficiency, business efficiency and infrastructure. In regard to the above discussion, the relevant question is whether the findings and results will be useful for the DRC which were not included in the detailed analyses? The answer is yes. The DRC which are included in the analysis are the more prosperous, faster accommodating to changes and advancing in comparison to the countries not included. These countries have more of the severe and mostly similar main problems in common with the countries which were included. It should be noted, that all DRC have to be compared and are competing in nearly all main aspects with the 60 listed [7] better performing countries. The goal of this presentation aims to explain and provide the reasons and needs for transition of society operation and consequently associated transition of educational system, universities' functioning, efficiency and improvement of quality. By understanding the driving forces of transition, the expected consequences can be foreseen and discussed in brief. We have to be aware of the possible changes and also how to cope with the emerging problems. In this regard we are trying to answer the questions "Why" and "wWhat", but not "hHow". We are intentionally not discussing the steps to proceed, deal and accommodate the transition induced issues and problems. The challenges section is based on and utilizes the findings presented in part 4.0, where the situation and performance of DRC is discussed.

TRANSITION DRIVING FORCES

There are numerous technological and social developments which are present and were already accepted in the past. But we do not recognize enough, how our lives, work and society have and are going to change because of them. The accelerated developments emerging from science and technology, their influences and consequently needed adaptations are hard to foresee. Many of the changes do not need to be introduced or explained in detail, since they

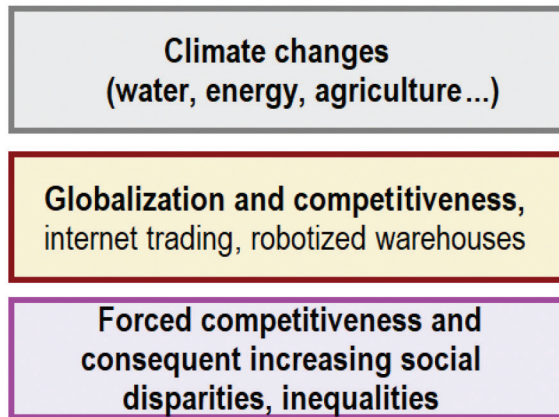


Fig. 1. Transition driving forces

are considered facts, like the climate change, globalization, internet trading, cryptocurrencies and others. All these should be considered and addressed as potential transition driving forces. In Figure 1 some essential transition driving forces are displayed.

For instance, climate change is causing immigration problems, in some areas even armed clashes for the water supplies. The climate change and water shortages are causing not only the gradual agricultural shifts, but also other shortages. The globalization is present together with the digitalization almost everywhere, at trade, work, and homes and in our lives. Mobile banking, cryptocurrency payments, internet trading, wireless communications are some examples. All of this is supporting the rise of competitiveness, but also the consequent increase of social disparities and inequalities, particularly in the countries which are not responding properly, or fail to utilize the technological opportunities and widening possibilities for the benefit of the entire society. The emerging driving forces are going to fundamentally change our lives, the society and our work. To list the important ones: the digitalization, artificial intelligence and ICT advances, robotization, with the resulting 4.0 changes (4th IR) [8, 9]). Reusman et al. [8] cite nine technologies which are transforming the industrial production, and general managing for optimized performance (cyber physical systems). Figure 2 is showing the list of by ICT enabled driving forces, partly with subdivisions.

We are not describing in detail or elaborating on the influences of the listed transition driving forces. Rather, we are presenting some performance facts, trends and achievements. The SAM [10] bricklaying robot replaces 6

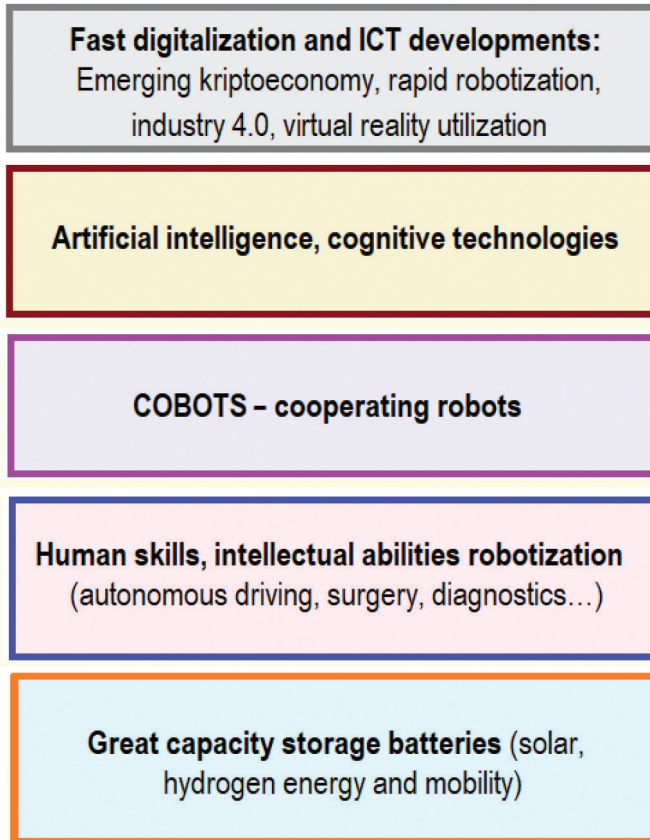


Fig. 2. Transition driving forces (continuation)

workers. Similarly, the Hadrian [11] robot can build a typical house in two days. The AlphaGo [12] computer algorithm beat the world champion in Go in 2016. This is proof that digitalization and artificial intelligence are rapidly entering and spreading in the intellectual ability fields of employment. Robots and computer software, like the IBM WATSON [13], the questions answering computer, can provide legal advice in seconds and deliver diagnosis of cancer four times more accurate than humans. There are forecasts that the medical robot sale will double in 2020 [14, 15]. In some fields of surgery robots are very reliable, capable and precise [31], since they have excellent computer memory of the magnetic resonance images of the size, curvature, angles, the patients' anatomy and tissue to be removed. The annual world increase of robot sale is 12 %. The achievements in digitalization, artificial intelligence advances and systems like the IBM WATSON have in 2016 influenced the closure of

thousands of banking sites in USA [16]. There are estimations that disruptive changes, caused by rapid technological progress, are going to significantly change the employment landscape. The World Economic Forum, WEF Global Challenge Insight Report [17], scrutinizing the future of jobs, provides very useful and interesting data regarding the changes of jobs landscape for the years until 2020. It discusses the employment, skills and workforce strategy for the 4th IR. The report concludes that many jobs could possibly be at risk in the next 10-20 years. The development and application of autonomous, self-driving cars and probably trucks and buses is still a question of time. The Tesla Car Company [18] is already advertising electrically powered cars which will be similar in performance to the currently used cars, but surpass the vast majority of them in terms of pollution, handling, and ease of use. The breakthroughs in automobile industry and shift to the electric and hydrogen power may fundamentally change many areas, but certainly the petro-chemical economy. All of these changes may create employment needs, change the landscape of employment, but they may also create serious unemployment problems. Similarly, the container handling in sea ports utilizing robotic cranes [19] may change the entire sea ports scene. Already today in some container port areas, like in Los Angeles TraPac automatized terminal, people are not permitted in the area [20]. It is realistic to expect, that similar sea port container handling terminals will be introduced and applied in numerous larger world ports.

The briefly introduced and presented transition driving forces with examples are exposing the need for discussing the consequences of these developments. If possible, we would also like to make some forecasts and raise the awareness of these problems. This is necessary for triggering of adaptation activities and preparations for the fast approaching »new times«. It is important to note and stress that these adaptations cannot be postponed and are unavoidable. The above presented examples are indicative of the accelerating developments in numerous areas of technology and ICT. The changes are substantially large and fast-coming. Furthermore, the socio-economic systems, particularly the education, are not keeping up, and it is in fact safe to say, that they are by large being left far behind. If we view the accelerating technological development as an evolutionary process, then the necessary societal accommodations and changes in education can be said to be evolution triggered/induced. The advances in ICT, AI, robotization, manufacturing and managing are boosting efficiency, quality and value of all processes (new approaches for increasing the added value) and result in lower cost, employment and increased competitiveness. In similar way these changes are influencing and requesting changes of knowledge needed for different jobs and we recognize the need for reeducating

the current employees and the introduction of changed curricula at all levels of education. Where they are upgrading the human capabilities, the new technologies also create new job opportunities. This can be positively exploited only if the professionals are educated about these opportunities. These findings partly support the claim that robotization and new technologies are also creating new jobs, but in many aspects these new jobs differ quite a bit from the current employment requirements. All of the above introduced, interlaced problems indicate the need for faster adaptation processes, the transition of the entire education system, along with supporting society rearrangements and changed operations.

CONSEQUENCES AND FORECAST

The awareness of needs for reform and renovation or some kind of transition of universities was discussed and presented already a decade ago [21, 22]. The Bruegel policy – brief of 2007/04 reports a country performance index based on the Shanghai ranking data [5]. It displays the EU-USA performance gap for Shanghai top one hundred ranked universities. The comparison was made to the measure in which USA universities performance was considered as 100%. The EU 15 countries reached only 27% and the EU 25 only 20,8%, or about 1/3 of the performance of the USA universities. A policy [21] for challenging the US quality of universities by the faster improvement of EU universities was proposed. In this regard, there are necessary activities which should take place in Europe if EU intends to be a leader in the global knowledge economy. For this to happen, universities have to improve quality and produce very much needed top level research results. Accordingly, a comprehensive reform of higher education is essential. In the USA the discussions regarding university transition started early [22, 32], and the Emerging Global Model of Research Universities, EGM was proposed. The ICT advances and robotization with utilization of artificial intelligence achievements have been increasingly widening and boosting the transition driving forces for the last 10 years. The world economy leaders, gathered at the annual meeting of World Economic Forum, WEF in January 2016 [23, 24], have invited leaders from top 26 universities to present views regarding the needs, approaches and impacts of socio-economic transition. They have also discussed the future of jobs, due to the impacts of the 4th IR. In 2016 at the Asia university Summit [25], 11 university presidents discussed issues of the 4th IR and needs with approaches for restructuring of universities. In October 2017, the 6th Asia-Europe Foundation, ASEF, Con-

ference and Students Forum took place in Singapore [25]. Leaders from 110 universities, rectors, student leaders, business and government representatives from 51 Asian and European countries have participated. A set of policies and recommendations was elaborated and agreed upon, with the aim to be conveyed to the up-coming Asia-Europe Meeting, ASEM, of Education Ministers, taking place in Seoul, South Korea in November 2017 [26]. At the 6th ASEF Rector's Conference & Students Forum, ARC6 some of the topics discussed were the future-ready universities and graduates, with challenges for ensuring top quality. In the discussions, the topics of industry 4.0 (4th IR) or university efficiency and transition were not in the forefront, but inherently present. Better represented were the issues of quality assurance, massification and diversification of student's body, and how to respond to demographic changes and fast evolving new social demands. There were discussions on how to support the needs for lifelong learning, how to deploy and apply digital technology for the advancement of education and research, and how to prepare graduates for these challenging and changing environments. On the agenda there were also the methods with organization models of knowledge production and dissemination. The outcome of the ARC6 are recommendations in four areas: 1. Forward-looking institutional missions, 2. Connecting, learning and teaching, research and services to society in response to local and global challenges, 3. Lifelong learning as a key mission of future-ready universities and 4. Towards a quality education for all. The in-detail elaborated four areas of recommendations have been conveyed to the ministers at the 6th Education Ministers Meeting, ASEM, ME6, [26]. Interestingly, both the top meeting of rectors from numerous countries, and of the ministers of education devoted hardly any attention to the issues and associated needs for fast changes caused by accelerated development of ICT, robotization and Artificial Intelligence. There were no discussions regarding time scales of changes, the evolving consequences, like the socio-economic issues of competitiveness, and there was no mention of the problems of rising social disparities and inequalities. To illustrate the consequences of the rapid ICT developments, we are challenging the International Federation of Robotics, IFR, claim, that »Robots create jobs« [27, 28]. In this regard the IFR is not sufficiently answering the questions like: What kind and how many jobs? How to re-educate and reactivate the work force laid off because of new technologies like the robotization? This issue is very sensitive indeed. The »new class of unemployable people« may create social instabilities [29,30], if not adequately approached and helped. Hence, the ICT- and robotization-driven social disparities and inequalities could be at rise along with the associated socio-economical problems. We recognize the »big unknowns«,

areas of missing data and knowledge on these issues, for example how the authorities, educational and social systems, taxation and universities shall transform timely and efficiently in regard to the 4th IR, to the benefit and prosperity of the entire society? There are no suggestions on how to make use of and create wealth for all from the ICT, robotization and industry 4.0 changes, in particular how to ensure the reduction of social disparities, and also boost and support the national economic competitiveness (increase of the added value). The consequences of the above described developments are supporting our statement, that the ability of governments, authorities and universities to adapt will determine the national and regional progress, socio-economic prosperity, but also indirectly ascertain their standing or even survival. In this regard, not only will proper timing with exceptional creativity be paramount, but we also have to accept that fundamental changes with restructuring cannot be postponed and are unavoidable. With this in mind, two issues should be emphasized in regard to university transition: 1. The ultimate mission of universities is to create progress, prosperity, justice for mankind, society and each individual and 2. The Aristotelian logic: »The function is rudimentary and the form subordinate«. The ultimate message of the above explained changes with needs shall be considered as a forecast for progress. The advances of ICT, robotization and 4th IR together with the utilization of artificial intelligence developments are posing increasing and fast rising challenges for renewal of operations. We strongly believe that the adaptations will require innovative new ways of cooperation, behavior, new forms for institutions including creative and very effective ways of functioning. All the latter are fundamental and very important.

SITUATION IN DANUBE REGION COUNTRIES

In the beginning, it would be interesting to display and critically discuss the progress the universities in Europe have made in the last 10 years. The data already provided in 3.0 (The Bruegel policy brief published in 2007 [21]) describes the performance of EU universities a decade ago and will be used as the starting position for our discussion. The quality and ranking of EU universities in 2007 was compared to the USA universities. The performance of EU universities in 2007 was not remarkable, particularly if we consider the EU population of 510 million against the USA population of 325 million. Today, in 2017, a comparison and review of how many EU universities are ranked within the first 100 ones (Shanghai ranking) displays a favorable result and

improvement. Universities from the 27 EU countries ranked in the best top 100 universities 33 times, while the USA universities ranked 48 times. Comparison of these results shows an unbelievable improvement of EU universities over the past ten years. Such dramatic improvement warrants additional verification of the results. The 33 ranked EU universities confirm that the EU universities have reached 33% of the top places. To additionally verify the shown result, we are making a similar comparison for the year 2017, utilizing the Ranking Web of Universities [4]. The ranking displays 58 best USA universities within the first one hundred ranked universities, while in Europe there are only 19 such universities. This is leading to the result of EU compared to the USA performance of 33%. According to data in the year 2017 [21] we observe an improvement of about 5%. The obtained findings are interesting, but not converging well. To additionally illustrate our findings, we have to take into account that the methodologies of ranking have evolved and changed substantially during the last 10 years.

The above provided data, regardless of weak convergence, in general show essential lagging of EU universities, when compared to the best ones. In this regard it is justified and important to accept, that the HE and universities in Europe need to improve a lot, if we would like to compete or achieve comparable results with the best socio-economies in the world.

Most of the DRC are not contributing to the European competitiveness in a sufficient way. The DRC can be divided into the older democratic countries Germany and Austria and the post-socialist countries, some of which are already members of the EU. In the 1.0 Introduction it was explained why the countries' economic competitiveness, social disparities, living standard and similar issues are important for grading the performance of universities and higher education systems in quality discussions. This understanding and knowledge is important for the planning and implementation of changes in universities' structures, improved performance and the process of transition as a whole.

In the following we are going to select and present important national performance data. This data is useful for grasping the extent of problems and to highlight our discussions and steps for university transition. In order to establish a sound starting position we are comparing the economic competitiveness of the world leading countries to the DRC economic competitiveness displayed in Table 5. The data is obtained from the 2016 IMD World Competitiveness Yearbook [7], while data in brackets represent scores for the year 2015.

Table 1 lists the DRC which we are going to compare in detail. Comment: the non-listed DRC were not considered due to different reasons, such as ques-

Table 1. DUNAVIA REGION COUNTRIES, from the Ranking Web of Universities, Data for 2017

	Universities and HE institutions/ One Million Population	Institutions ranked below average (13.000) in %
Germany	5.5	45
Romania	5.0	30
Hungary	7.2	48
Bulgaria	79	36
Austria	8.7	20
Serbia	10.0	77
Croatia	12.0	71
Slovenia	17.5	69

tionable performance, political instability and similar issues. We are first comparing the data of the Ranking Web of Universities [4] for the DRC in two categories: the number of universities and HE institutions per million of citizens, and the percentage of universities with HE institutions ranked below the average. Out of about 27.000 ranked institutions the rank of 13.000 was selected as the average or dividing line. On Table 1 we observe large discrepancies, like some small countries which have twice the number of universities and HE institutions per capita compared to an advanced country, for instance Germany. This fact points to the obvious problem of a very low critical mass (difficulties in staff mobility, interdisciplinarity, investments...) of some institutions but also low quality. This finding is confirmed with the fact that about 70% of the institutions in some countries are ranked below the average. It would be interesting to obtain the answer to the question: What are these institutions and their graduates contributing to the national progress, innovativeness and economy? We have to pose the question, whether and how the operation and contributions, financing of these (low or below average ranked) institutions is justified in terms of the utilization of national resources. How are these institutions contributing to the national economy and progress. It is open, how to remedy the problem of low or below the average performing institutions for the benefit of all involved. Table 1 also displays some countries with very large proportion of HE institutions ranked below the average. Associated with this is an additional problem, that some of these institutions are ranked near the end in about the last 30 % margin.

Table 2. University education//Educational System Does (not) Meet the Needs of Competitive Economy

UNIVERSITY EDUCATION	EDUCATIONAL SYSTEM
8 Germany	10 Germany
20 Austria	27 Austria
42 Romania	37 Slovenia
44 Hungary	45 Slovak Republic
45 Slovenia	48 Romania
56 Slovak Republic	53 Hungary
59 Croatia	57 Croatia
61 Bulgaria	58 Bulgaria

Table 2 is displaying ranking data on how the national university educational system and entire educational system meets the needs of a competitive economy [7]. From the same source [7] the Table 3 is compiled, displaying patent applications per 100.000 inhabitants and for comparison additionally the innovative capacity of companies.

Table 3. Patent Applications (per 100.000 inhabitants) and Innovative Capacity of Companies

PATENT APPLICATION	INNOVATIVE CAPACITY
10 Germany	6 Germany
12 Austria	9 Austria
27 Slovenia	19 Romania
33 Hungary	30 Slovenia
40 Slovak Republic	45 Romania
44 Bulgaria	52 Slovak Republic
45 Romania	54 Hungary
46 Croatia	58 Croatia

We are also providing ranking data in Table 4 [7], of the overall productivity, the GDP per person employed in US \$ and the labor productivity, GDP (PPP) (per person employed, per hour) in US \$. From the Table 4 we can see a rather similar performance of countries as displayed on previous figures.

Table 4. The overall productivity

GDP PER PERSON EMPLOYED IN US \$	LABOR PRODUCTIVITY GDP (PPP), PER PERSON EMPLOYED PER HOUR IN US \$
15 Austria	15 Austria
21 Germany	18 Germany
31 Slovenia	28 Slovenia
36 Slovak Republic	32 Slovak Republic
38 Croatia	37 Hungary
42 Hungary	43 Croatia
48 Romania	47 Romania
52 Bulgaria	49 Bulgaria

From data in Table 1 it is easy to recognize that some of the post-socialist DRC have roughly doubled the number of HE institutions, but about 70 % of these institutions are performing below the average. This is similarly repeated in the ranking of how the university education and educational systems are supporting the needs of competitive economy, shown in Table 2. The IMD World Competitiveness Yearbook [7] as mentioned, ranks 60 leading countries deeming the scores under 30 as below average, while scores below 40 are displaying a performance of the lowest 1/3 ranked countries. Again, it is obvious that the majority of considered post-socialist DRC countries scored in the range of about 40 to 60. Rather similar and convincing are the scores provided in Table 3. In it, ranking of the innovative capacity and performance in patent application is provided. The scores below average indicate also inadequate research performance of universities, research institutes with institutions in general and companies. The reasons are various, but also related to insufficient quality, low investments in education, research, development and patent application. The grading of innovative capacity is also repeating the mostly below average scores of the post-socialist DRC. The comparison of the ranking data displayed in Table 3 and Table 4 shows similar result as obtained and displayed in Table 2. Unsatisfactory performance of university education and in general educational system in a country does not only reflect the low innovativeness, patent application capacity and creation of new knowledge, but also unsatisfactory results in many other segments in a country. We point out that there is some kind of correlation between HE system, university education, their quality and country's socio-economic performance, economic competitiveness, social disparities and quality of life.

Table 5. Economic competitiveness

WORLD LEADING COUNTRIES	DANUBE REGION COUNTRIES
1 (2) China Hong Kong	12 (10) Germany
2 (4) Switzerland	24 (26) Austria
3 (1) USA	40 (46) Slovak Republic
4 (3) Singapore	43 (49) Slovenia
5 (9) Sweden	46 (48) Hungary
6 (8) Denmark	49 (47) Romania
9 (16) Ireland	50 (55) Bulgaria
8 (15) Netherlands	58 (58) Croatia

Indeed, after we observe again the ranking of economic competitiveness displayed in Table 5 we are quite convinced, that the performances are interrelated and complex, but supporting the understanding of why the post-socialist DRC are scoring in the lowest 1/3 of the list, in the interval between 40 and 58.

The ranking data provided on Tables 3, 4 and 5 are rather similar to the ranking of the university education and educational system ranking shown in Table 2. The comparison of performance in other areas examined and scored in the 2016 IMD World Competitiveness Yearbook [7] is also interesting, as it provides rather similar results and findings. Regardless if we are comparing the overall productivity, labor productivity, government efficiency, bribery and corruption, corporate values, ethical practices, adaptability of companies, expenditure on research and particular total public expenditure on education per capita, the findings and results are quite similar to the described. These results and findings are essential for supporting two of the exposed claims; first, that a country cannot operate better than the leading professionals had been and are educated, and the second claim, that for starting the activities for socio-economic restructuring, improvement or reduction of the social disparities, the educational system has to be advanced and improved. In particular the quality of universities, with knowledge competence and skills of graduates needs to be improved. By accepting these findings, we recognize the needs for timely and fundamental universities' restructuring, improvement and transition. This is particularly needed in post-socialist DRC. All the possible upgrading of universities' functioning and quality will require innovative new organizational forms.

The post-socialist DRC are also struggling with additional problems which will not only influence and determine the pace of needed universities' and educational system transition, but also expose other needed changes. Here we are listing some of these problems. Starting with political tensions, demographic problems, some countries experience tensions because of unsettled borders, some are dealing with the past too much and not focusing on progress. In some countries the transition from the socialist to democratic system was not completed in a satisfactory way. The south-east DRC countries have serious problems with emigration of their best professionals, and the high unemployment, in particular of young citizens. In many countries there are large financial debts. A great problem in post-socialist DRC is the inherited slow and inefficient decision-making at nearly all levels. There are claims of corruption in politics, among government officials in the economy, but sometimes also at the universities. We are not elaborating these issues but rather pointing to the situation. Owing to it, many countries will be faced with difficulties in performing university transition. Regardless of all these findings, the countries are forced to face the transition because of the rapid ICT, internet economy and robotization progress. These developments are requesting timely activities, entirely new forms and changes in the functioning of socio-economic, government, political, financing and other systems. In this regard, fast and innovative transition of the entire educational system and, in particular, of universities is very much needed. The universities are considered as »lighthouses« of progress and hence have to be timely and first to start the transition changes in a country. Universities have to start predominantly educating for the jobs to come. The new jobs and required functioning associated to the fast technology developments are entering our economy, production, society and homes. To benefit and ensure positive developments of all segments of the society, highly knowledgeable, competent and skilled professionals will be very much needed.

CHALLENGES

In part 4, topics and problems were presented which are posing great challenges for the decision making regarding transition of universities and society. In particular, the decision-making for implementing possible corrective approaches and activities is very demanding and difficult. The challenges are great, especially because of the fact that most of the DRC post-socialist countries have not yet completed the socialist to democratic state transition. Regardless of this, the countries are facing and entering fast rising

developments induced by the rapidly emerging ICT developments and 4th IR. All of these technology-driven fast changes with globalization pressure are unavoidable and cannot be postponed. Hence, they are calling for proper and timely accommodation and changes at all segments of society. Therefore, we are using the term transition. The inherited inefficient and slow decision making with associated problems, listed in part 4.0, together with the inherited post-socialist mentality are quite persistently present, opposing faster development and adaptations to the emerging and already present global challenges. The scope and pace of the listed rapid developments, in particular the outcomes of transition changes are difficult to predict. There are numerous open questions and challenges regarding how to benefit from these changes and make use of the unique opportunities offered by these developments. Particularly because all segments of the society, including the socio-economic functioning and the education and innovation with research system will have to be changed to better forms of organization, improved efficiency and functioning. The grasping and dealing with these serious changes has to be appropriate and include solutions for prevention of dangerous socio-economic developments. This presentation is not aiming to deliver any recipes or suggestions on how to initiate and realize the necessary transition. We are not providing suggestions on how to start and select approaches and activities. Our intention was to highlight the problems of transition and emphasize the need for a timely university transition. The aim of this presentation is also to provide some background for better and correct understanding of the historical and unique developments. We would like to stress that for most countries the necessary changes are larger and are happening faster than they might be able to cope with them, recognize and grasp them. : In our opinion, the time is right for accommodation and fundamental restructuring, but for many countries, time is not on their side.

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УНИВЕРЗИТЕТИ ДУНАВСКЕ РЕГИЈЕ У ТРАНЗИЦИЈИ: ПРОБЛЕМИ И ИЗАЗОВИ

Алојз КРАЉ

Резиме

Представљени су најважнији проблеми и изазови, заједно са могућим приликама и претњама, за универзитете у транзицији. На почетку су приказане неке кључне чињенице. Затим су представљене неке покретачке снаге транзиције и њихове последице. Изабрани утицаји су наведени и објашњени. Расправља се о утицају информационо-комуникационе технологије и развоју ICT, са примерима из роботизације и употребе вештачке интелигенције. Сви ови напреси подржавају надолазећу Индустрију 4.0 (4. индустријску револуцију, 4. ИР). Поред тога, логично су елаборирани и описани настајући социјални диспаритети и велике социо-економске промене. Представљени су докази да су корените промене са реструктурирањем неизбежне у свим друштвеним сферама, а нарочито у образовном систему и универзитетима. Тренутна ситуација и трендови развоја су приказани помоћу одабраних чињеница, које су додатно подржане подацима о глобалној конкурентности и ранговима универзитета земаља дунавског региона. Уз то, наглашени су не само могући бенефити, већ и растући изазови, и дискутује се о повећању неповољних социо-економских диспаритета, растућим разлозима за забринутост и могућим претњама, које су последица технолошког напретка. На основу ових чињеница, кратко су приказане потреба за транзицијом универзитета и за неизбежним коренитим социо-економским променама. Нису изведени детаљни закључци за предвиђање исхода нити за начине хватања у коштац са брзим променама, као ни за начин бирања и започињања потребних транзиционих активности.

Кључне речи: транзиција, покретачке снаге, последице, земље дунавског региона, ситуација и изазови