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RESTORATION OF UKRAINE: THE CURRENT STATE AND OPTIONS FOR TECHNICAL UNIVERSITIES

The full-scale military invasion of the Russian Federation on the territory of Ukraine has created a real disaster. The current economic and socio-political situation in Ukraine is unprecedented in the recent history, marked by significant losses in all sectors of the economy and will be accompanied by no less serious consequences.

Ukraine has the potential to transform into a new, technological and green economy [1]. It is critical to the country's recovery from the Russian aggression, and people recovery from the trauma of the war. Ukraine's movement towards full-fledged economic integration with the EU [2] creates the need to determine the trends of post-war development in order to obtain a synergistic effect in view of the large-scale economic, financial, and human losses of the country.

As the world becomes more interconnected and interdependent than ever imagined, technology has generated enormous amounts of wealth, higher incomes, rapid urbanisation and reduced poverty. But it has also sharpened and intensified social inequalities and created political disruptions that threaten to tear societies apart.

Technological acceleration and economic globalisation have done little to address global issues such as climate change and to impact the greater common good as represented by the United Nations' Sustainable Development Goals [3].

The movement towards effective integration into the global economic environment for Ukraine should be accompanied by creation of a new successful state with a growing economy, sustainable energy and inclusive infrastructure [1, 4, 5].

A recovery plan for Ukraine must include:

- focus on the European integration, fit the United Nations' Sustainable Development Goals;
- create friendly business environment, financial infrastructure and effective supervision for reconstruction finance;
- the need for production in technological industries and its integration into EU value chains, export of more technologically advanced products with greater added value, such as electronics, vehicles and machinery;
- create workplaces and incentives for refugees to come back for the reconstruction of the country;
- liberalizing energy market, investments in renewable energy sources and hydrogen, which will allow Ukraine to turn into a green energy centre;
- reforms on institutional strengthening of Ukrainian society, including continuing the liberalization of the land market.

The cornerstone of Ukraine's success in the long run lies in attracting foreign capital and modern technology to radically modernise the country. Poland (ranking 5th in the world in terms of greenfield FDI) offers a playbook for Ukraine. Access to the EU market and institutional alignment with the EU made Poland a desirable destination for FDI. Although Ukraine and Poland started with similar initial levels of development in 1990, Poland's GDP (PPP) per capita was three times larger than Ukraine's in 2021 [6].

As a result of hostilities, the number of damaged and destroyed infrastructure objects continues to grow. As of September 2022, the amount of damage to education infrastructure is \$8.2 billion. In a figure 1 the percentage of damaged or destroyed buildings by regions are presented. We can conclude that the most affected educational institutions by 2022 were in Kharkiv, Donetsk, Zaporizhzhia and Kyiv regions. In addition, higher education institutions were relatively more affected - obviously, because they were in the cities that were and still mostly directed by the enemy [7].

In our opinion, the role of technical universities in sustainable post-war development of Ukraine will include the following aspects:

- quality education;

- industry, innovation and infrastructure;
- sustainable cities and communities;
- climate action;
- partnership for the goals.

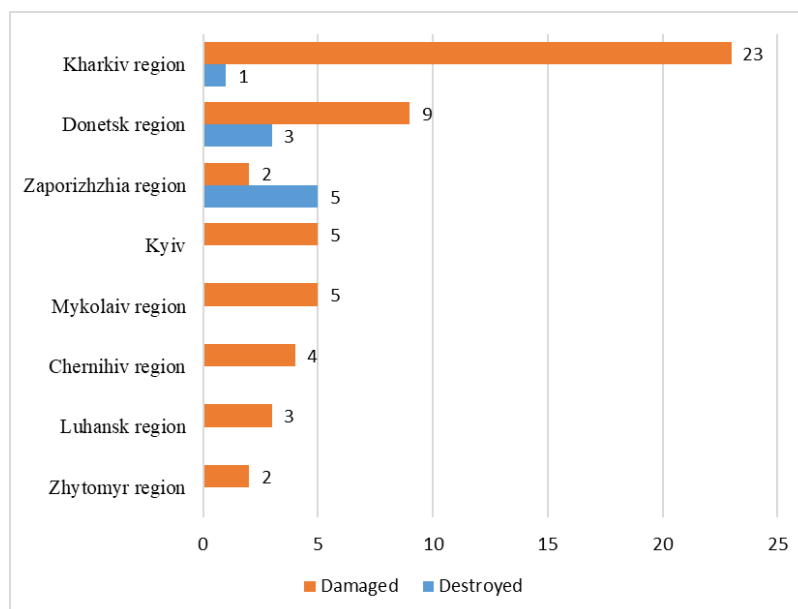


Fig. 1 – Number of damaged/destroyed higher education institutions, January 2023

The massive refugee flow of students, researchers, and other high human capital workers from Ukraine to the EU, and the need for the reconstruction and restoration plan create unique opportunities for Ukraine to forge long-lasting relationships in research and development. European educational programmes, such as Erasmus +, European Research Council and many others, have already expanded participation of Ukraine and offered funding opportunities for Ukrainians to study abroad and return home thereafter. There are many more programmes still to come. Relations with foreign universities developed during the war will likely remain in place. These should be used for (1) to increase professional level of academicians in Ukraine, (2) global education for Ukrainian students, and (3) "inflow of knowledge" - the use of experience gained abroad for the implementation of projects in Ukraine, even in the remote format of cooperation. The Ukrainian higher education can be further consolidated to concentrate resources on leading institutions that can deliver higher research

productivity and better services to students [6].

Human capital was always a core of the future well-being of any country and Ukraine will need it extremely to restore destroyed facilities keeping in mind and following the goals of sustainability. Strengthening the digital competences of the Ukrainian High Educational Institutions (HEIs) is the essential investment in sustainability of the project results as the infrastructure of the universities is partially or fully destroyed due to the war activities. Digital learning is already the central element of teaching and learning and it will remain such during the first years of the post-war period.

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