The Central and Eastern European Economies in the Era of Industry 4.0 and Chinese Digital Silk Road

Extended abstract

Over the recent decades, the changes in the paradigm of international trade have been observed. As the result of decreasing of trade barriers as well as the reduction in trade costs allowed companies to divide their production into stages and to locate it in different countries according to their competitive advantage. Eventually, the production process has become more fragmented, both geographically and vertically. It means that intermediate products are shipped across boarders many times and every exporting economy provides some value added according to its competitive advantage. As a result, global value chains have become one of the most important feature of international trade. Following (Gereffi & Fernandez-Stark, 2011), in this study global value chains are defined as "the full range of activities that firms and workers do to bring a product from its conception to its end use". Humphrey and Schmitz (2002) pointed out four types of upgrading in global value chains: product, process, functional and chain. Product and process upgrading involve companies retaining their positions in global value chains by enhancing productivity gains through adopting new product processes or "new configurations of product mix". Thus, functional upgrading involves a slicing up the global value chains into new activity which generates higher value added, e.g. own brand manufacturing. In turn, chain upgrading involves a going up to new activity, which needs higher skills and capital and value added. Milberg and Winkler (2013) offered similar classifications of upgrading.

Production fragmentation has caused a rapid increase in trade in intermediate goods as often companies offshore an intermediate stage of production process. Offshoring production has been typical to manufacturing (Timmer, et al., 2012), however, services have been often overlooked, but play a major role, especially in supporting global value chains (Kommerskollegium 2013).

In turn, Digital Silk Road, announced in 2015, has become a significant part of Chinese Belt and Road Initiative strategy. China has implemented this strategy as a part of its long-term technological plan, under which China provides support to its exporters, including many well-known technology companies and builds a network of cooperation with selected countries in the field of technology, including ICT infrastructure, services, 5G networks, e-commerce, etc. China's rapid technological changes must not go unnoticed by trading partners, including analysed European countries, which, to maintain international competitiveness, are increasing the technological advancement and enhancing market protection against Chinese technology. Until recently, the value added from China to European countries was concentrated mainly on medium technology industries and value added from Europe to China focused more on advanced goods and services. Nowadays, there is a redirection of Chinese value added to high-tech activities (including service activities), which reflects China's ambition to build an economy that leads to innovation and industry 4.0.

The CEE economies and their relations with China and Germany in the light of Digital Silk Road are particularly interesting subject of the production networks studies. The CEE

countries (being also the post-socialist economies) between the end of World War II and the late 1980s were under the central command system largely immune to the impacts of globalization. The collapse of the communist system and the disintegration of the USSR were followed by transitional recession in the CEE economies. Its main sources lay in wide-ranging reforms to the economic system such as the transition toward a consumers' market and the multidimensional transformation of the economy (Kornai 1994). The transition of the CEE states' economic and political systems initiated in the early 1990s, earned them the EU membership in 2004. The accession to the EU's structures meant that these countries achieved the free-market economy status and they should be treated as the full member of the global business networks. Moreover, the decline in trade costs (transport and transaction), greater openness of their market and the removal of trade barriers have all helped the CEE states to join global value chains.

Hence, the CEE economies are going to be more heavily involved in global production linkages. Many empirical studies have presented the close and dynamic integration of these countries with the EU market (especially the EU-15) and in a more limited scope with the whole global economy as well (Behar and Freund 2011). Generally, democratisation, the strengthening of political and economic relations (particularly with the EU), and the modernisation of many sectors (including financial sector, more advanced industries), were common elements of the CEE countries long-term development policies. One of their priorities was the redirection of foreign trade towards the EU and joining the global production linkages where China has become the core producer.

Recently, the role of the economy in global value chains is more determined by the advancement of value added that it offers. Companies move toward services and innovations in the business model (Nenenen & Storbacka, 2010) and introduce industry 4.0 (Bundesministerium fur Bildung und Forschung, 2016). A symptom of these novelty is a concept of servicification of manufacturing (Neely et al. 2011), which has reconstructed traditional global value chains (Naude et al. 2019) and, together with Industry 4.0, is expected to change the landscape of global manufacturing. As a result of facilitation of manufacturing, economies placed in the downstream market can improve their role in global value chains. In Europe, this can be an opportunity for most Central and Eastern European countries.

Analyzing changes in CEE's role in global value chains, we should take into account its two most important value-added suppliers: China and Germany. These three economies established a sort of value added flows triangle. The regional supply chains built by Germany in the CEE allowed it to maintain a comparative advantage in sectors important for the economy, while helping the CEE countries join global value chains, positively influencing economic growth, but also reducing them to entities operating in less advanced stages of production (Jacoby, 2010; Fortwengel, 2011). Today, Germany also cooperates strongly with China, and the CEE economies (especially V4) are increasingly dependent on Chinese value added, still linked to German value added. The most visible connections can be found in automotive and electronics. Hence, the question is: How strong are these links in servicification of manufacturing and whether there are visible trends in value-added flows in between this triangle in the era of industry 4.0 and Chinese Digital Silk Road.

The research question seems to be relevant, thus in the subject literature, little is known about the mentioned relations (Roland Berger, 2021). Moreover, in the light of possible

establishment of the EU-China Comprehensive Agreement on Investment (European Commission, 2020, 2021), these relations might be crucial for Europe.

The paper consists of three parts. The first one briefly presents the method applied in the paper. The second part discuss the results of the estimations. The third section are conclusions.

Keywords: information and communication technologies, servicification of manufacturing, China, Germany, CEE

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