

Research-in-progress

THE CENTRAL AND EASTERN EUROPEAN ECONOMIES IN THE ERA OF INDUSTRY 4.0 AND CHINESE DIGITAL SILK ROAD

Ewa Cieřlik

Associate Professor at Poznan University of Economics and Business, Poland

ewa.cieslik@ue.poznan.pl

EXTENDED ABSTRACT OF RESEARCH IN PROGRESS

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 borders 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 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

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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 für Bildung und Forschung, 2016). A symptom of these novelty is a concept of servicification of manufacturing (Neely et al. 2011) and cross-sectoral connections, which have 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 technological global value chains, we should take into account its two most important value-added suppliers: China and Germany, as well as their most important value-added buyer - 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 (as a result of Digital Silk Road), and the CEE economies (especially the Visegrad Group) 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).

The research method based on the analysis of data from the OECD Trade in Value Added databases, containing the world input-output tables for the period 2005–2018. The system of balance equations in the input-output model for one economy has been adopted to a multi-economy model. The model is described in more detail in (Koopman et al. 2013 or Hummels et al, 2001) and is based on the decomposition of gross exports. The method includes not only estimates of total value added in global value chains, but also calculations at both the mezo-economic level and cross-sectoral flows of value added (including servicification of manufacturing).

The results of analysis showed that most relations between economies continued to deepen the imbalance in flows of value added. The CEE economies are making their manufacturing increasingly dependent on advanced services (both from Germany and China). On the other hand, the share of CEE services to Chinese and German manufacturing is decreasing or remains steady. However, some trends could be observed in the last years, especially between

Germany and China. German manufacturing is starting to rely more on Chinese value added (information and communication technologies services and the subgroup computer programming, consultancy and information services activities in manufacturing, information and communication technologies services' value added in transport equipment), although previously Germany provided more of these services to China. In telecommunications in manufacturing between CEE and Germany, the trend has turned against CEE. However, there was no direct compensation between pairs of economies, but the decrease in German value-added flows to China resulted in a much larger increase in value-added from China in German manufacturing.

If the presented changes in flows were to reflect the effectiveness of Chinese industry 4.0 and Digital Silk Road. These strategies serve their purposes and increases not only the advancement of Chinese value-added exports, but also makes important economies dependent on this added value. On the contrary, the industry 4.0 strategy in CEE has not improved its position in the triad. Germany has still a strong position as a provider of value added, but its dependence on foreign value added is high, which derives from the links with CEE.

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

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