Anna Masłoń-Oracz[*]
Aleksandra Balkiewicz-Żerek[**]
Ayo Eso[***]

Global Value Chain of Clusters Enhancing EU Competitiveness

Abstract

For many years European Union has been putting more and more effort toward boosting innovation and becoming the most competitive global economy. The aim of the article is to explore the concept of the global value chain of clusters and the role clusters might play in enhancing the EU competitiveness. The authors develop the concept of integration between clusters and present the examples of clusters cooperation within the global value chain (GVC), both in terms of horizontal and vertical integration. Cooperation of clusters within the global value chains gets more and more intense with the processes of globalisation and, paradoxically, is boosting the significance of regions. Regions with strong cluster structures are becoming platforms for creating knowledge and innovation and enhancing cooperation on the regional, national and even global scale. The idea of cluster cooperation networks in the EU is developed in light of smart specialisation strategy: a tool for enhancing regional innovation-based growth, facilitating the role played by the SME sector and aimed to reduce imbalances in development, both spatial and social. Well-defined and well-managed clusters, operating in line with the economic specialisations of regions, provide opportunities to strengthen the competitive position of local and regional companies and enhance the innovation and technology transfer within the GVC.

Key words: Clusters, Global Value Chain, Internationalisation, Smart Specialisation

[*] **Anna Masłoń-Oracz** – SGH Warsaw School of Economics, e-mail: a_maslon@yahoo.com, ORCID: 0000-0002-4639-6317

[**] **Aleksandra Balkiewicz-Żerek** – SGH Warsaw School of Economics, e-mail: aleksandra.balkiewicz-zerek@doktorant.sgh.waw.pl, ORCID: 0000-0001-9152-400X.

[***] **Ayo Eso** – Lead City University, Ibadan, Nigeria, e-mail: aeso@3consult-ng.com, ORCID: 0000-0002-1376-7716.

Introduction

Global value chains (GVCs) and the innovation performance

The concept of the value chain (VC) is used to analyse the complex process of delivering goods and services to the market – from the product conceptualisation/design, through its production, distribution, marketing and its delivery to final consumer. In the model environment, the product gets added value at each stage of its VC, however the contributions to the total value added for the product at different stages of the VC are not necessarily equal. In the great majority of cases, the first stages of a VC generate the low share of value (e.g. raw materials processing), while the high value-added activities are limited to the final stages of the product.

With the increasing globalisation of economies, the value chains become global as well. The concept of global value chains (GVCs) developed mainly under the international trade theories and development theories, provides the framework for analyzing the global flow of goods and services. The term "global value chain" was proposed by Gereffi *et al*. in a comprehensive study on the value distribution among countries.[1] They proposed a theory of value chain governance that is based on three factors: complexity of transactions, ability to codify transactions and capabilities in the supply base. The combinations of these factors determine the value chain type.

Nowadays researchers and policy makers focus on the role the GVCs play in terms of: industrialisation strategy, labour issues, regional development, innovation and technological spillovers, economic crisis, supply chain resilience, environmental protection, consumer protection, poverty alleviation, trade regimes or national accounts.[2]

As companies locate their production processes in different countries or regions trying to optimise their costs, the fragmentation of GVCs increases and so does the polarisation of countries in terms of value they add in the GVCs. It raises concerns of policy makers towards countries or groups of countries engaged in the low value-added activities in the GVCs, especially in terms of their limited participation in innovation and technology transfer. The recent OECD policy paper "The links between global value chains and global innovation networks" highlights this issue, trying to ask questions on how to foster innovation performance of

[1] G. Gereffi, J. Humphrey, T. Sturgeon, *The Governance of Global Value Chains,* "Review of International Political Economy", no. 12(1)/2005, pp. 78–104.

[2] S. Inomata, *Analytical Frameworks for Global Value Chains: An Overview*, Global Value Chain Development Report 2017.

countries involved in trade and production networks within the GVCs and increase international co-operation in innovation.[3]

The role of clusters in the smart specialisation approach to innovation policy

The idea to increase the contribution of regions in the co-invention of innovations is reflected in the smart specialisation approach adapted in the innovation policy of the European Union and is relevant to the Europe 2020 strategy for smart, sustainable and inclusive growth.[4] The smart specialisation is a place-based approach, meaning that the competitive advantage of countries/regions should be based the specific strengths and assets of the country/region, that is, their specialisations. The smart specialisation approach towards innovation policy assumes then that the national/regional efforts and investments towards innovation development should be allocated within the economic areas of smart specialisations. The national/regional priorities of EU Member States are listed in the research and innovation strategies for smart specialisation (RIS3). The process that reveals the national/regional specialisations is described as an *entrepreneurial discovery process* – a long-term, bottom-up, participatory process with multiple actors involved (companies, scientific units, business environment institutions).

The European Commission highlights an important role of economic clusters in smart specialisation strategies.[5] The concept of clusters was introduced to management science by M.E. Porter, who defined clusters as "geographic concentrations of interconnected companies and institutions in a particular field".[6] Clustering is defined by OECD as "the tendency of vertically and/or horizontally integrated firms in related lines of business to concentrate geographically" and clusters as "geographic concentrations of inter-connected firms and related actors (specialised service providers, universities, etc.)". Clusters do reflect, then, the specialisations of regional economies. They foster inter- and cross-sectoral cooperation within the geographic area and offer resources for implementing smart specialisation strategies. Clusters are to provide a fertile ground for fostering industry

[3] *The links between global value chains and global innovation networks: An exploration*, "OECD Science, Technology and Industry Policy Papers", no. 37/2017.

[4] *EUROPE 2020: A strategy for smart, sustainable and inclusive growth*, European Commission 2010.

[5] *The role of clusters in smart specialisation strategies*, European Commission 2013.

[6] M.E. Porter, *Clusters and New Economics of Competition*, "Harvard Business Review", no. 76(6)/1998, pp. 77–90.

transformation and the development of emerging industries.[7] Well-defined and well-managed clusters contribute extensively to the development of regional competitiveness.

A number of studies indicate the important role of clusters in fostering the international and innovation performance of companies.[8] Clusters belong to the group of institutional entities important in the internationalisation process of SME.[9] Individual cluster members may use a cluster's resources and knowledge sharing possibilities in various stages of internationalisation.

In terms of clusters development policy, the smart specialisation strategies provide tools to:

1. increase international capabilities of individual companies operating in clusters;
2. establish international cluster cooperation in the fields of strategic interest, fostering clusters' role in the GVCs.

This article presents the possible cluster cooperation models in the global value chains.

Cooperation of Clusters in the GVCs

The approach to analyse the role of clusters in the GVCs is based on the approach to mapping global value chains by UNIDO: it highlights the importance of relations between value chain actors and partners involved in various roles within the process value creation.[10] The value chain mapping provides also the characteristics of the final product and target markets. Figure 1 presents six group of questions to be answered while mapping the global value chain: *roles*, *actors, partners, relations, final product* and *target markets*.

[7] Ch. Ketels, S. Protsiv, *European Cluster Panorama*, European Commission 2016.

[8] E.g. B. Jankowska, C. Główka, *Clusters on the road to internationalization – evidence from a CEE economy*, "Competitiveness Review", vol. 26, is. 4/2016, pp. 395–414; A. Colovic, O. Lamotte, *The role of formal industry clusters in the internationalization of new ventures*, "European Business Review", vol. 26, is. 5/2014, pp. 449–470; D. Libaers, M. Meyer, *Highly innovative small technology firms, industrial clusters and firm internationalization*, "Research Policy", vol. 40, no. 10/2011, pp. 1426–1437; S. Andersson, N. Evers, C. Griot, *Local and international networks in small firm internationalization: cases from the Rhône-Alpes medical technology regional cluster*, "Entrepreneurship and Regional Development", 25:9-10, pp. 867–888.

[9] E. Costa, A.L. Soares, J. Pinho de Sousa, *Institutional networks for supporting the internationalisation of SMEs: the case of industrial business associations*, "Journal of Business & Industrial Marketing", vol. 32, is. 8/2017, pp. 1182–1202.

[10] *Agro-Value Chain Analysis and Development, The UNIDO Approach, A staff working paper*, UNIDO 2009.

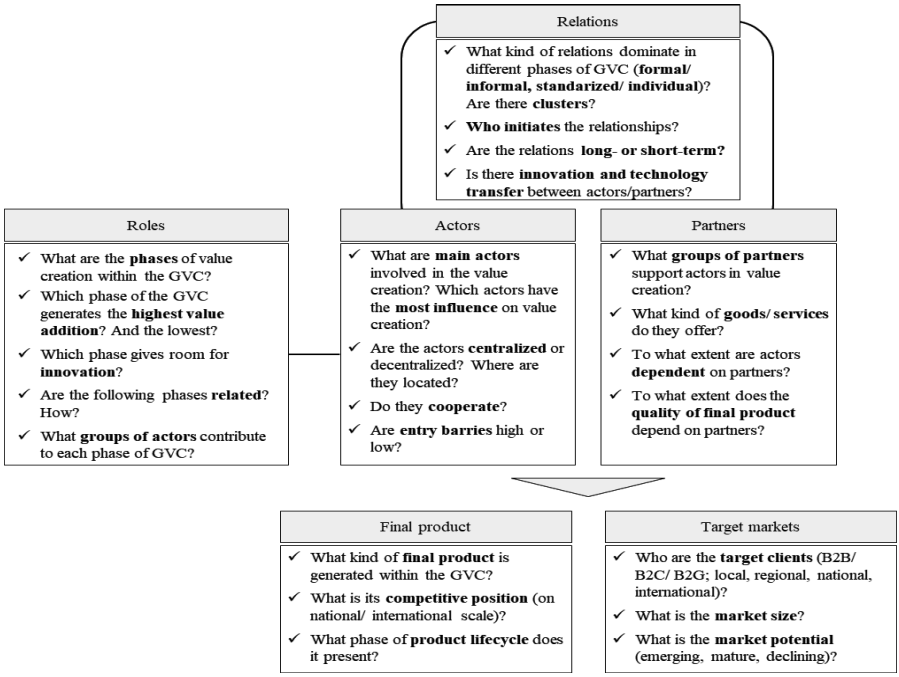

Figure 1. The approach to map the GVC

Source: own elaboration based on UNIDO.

Strengthening the relations between actors representing the same geographical area within the global value chain may lead to cluster integration: horizontal (with actors involved in the same role within the value chain) or vertical (with actors involved in different roles within the value chain). The competitive position of individual companies cooperating within a clustered structures gets stronger in terms of their relationships with both other actors involved in the value chain (involved in different stages of the value chain) and partners (operating inside and outside of the cluster).

The next step in the process of company integration within a value chain is the cooperation between clusters. Similarly, as in the case of company integration within the cluster, the cluster cooperation may be horizontal (with clusters from different geographic areas involved in the same role within the value chain) or vertical (with clusters from the same or different geographic areas involved in the different roles within the value chain). In both cases the importance of clusters among GVC actors increases.

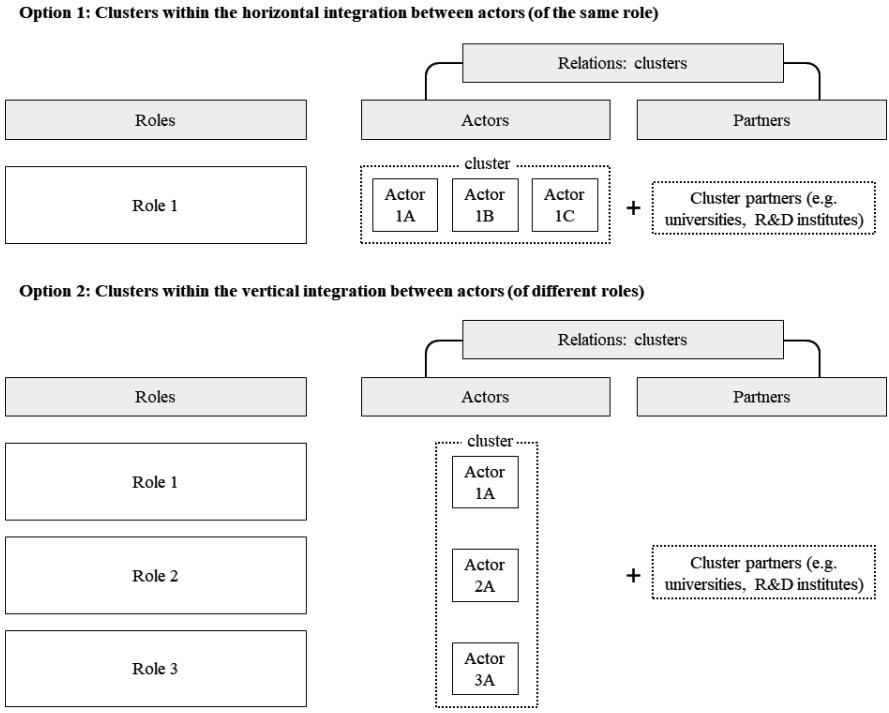

Figure 2. Clusters within the GVC

Source: own elaboration.

The idea of cluster cooperation along value chains in light of the smart specialisation approach is implemented within the European Cluster Collaboration Platform.[11] The initiative provides tools for: 1. Cluster cooperation mapping (with hundreds of cluster organisation profiles to be filtered within the European Cluster Observatory), 2. Matchmaking events (*C2C – cluster to cluster* and *C2B – cluster to business* meeting), 3. International cooperation (key information sources helping clusters and SMEs cooperate with strategic countries beyond Europe), 4. Partner search (a virtual "marketplace" to trigger direct dialogue with other clusters), 5. EU cluster partnerships (presentation of ECPS – European Strategic Cluster Partnerships).[12] Silicon Europe Worldwide is an example of cluster coop-

[11] www.clustercollaboration.eu (15.20.2018).

[12] C. Schierenbeck, *Support actions for cluster cooperation along value chains towards industrial modernization*, Industry 4.0: opportunities, challenges and strategies for the industry of the future Toscana Tech, Florence, 28.02.2017.

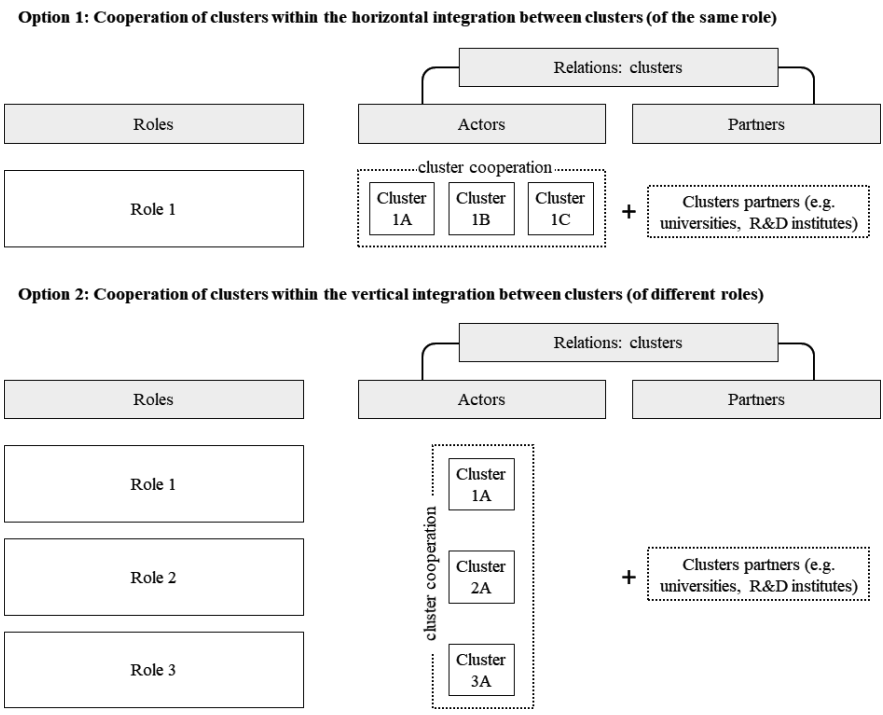

Figure 3. Cooperations of clusters within the GVC

Source: own elaboration.

eration established within the European Strategic Cluster Partnerships for Going International (ECPS-4i). The partnership was built in 2016 by 6 clusters: mi-Cluster, Minalogic, High Tech NL, Fondazione Distretto Green & High Tech Monza-Brianza, Silicon Saxony and DSP Valley. The aim of the initiative was to strengthen the global position of cluster members on non-European markets by establishing relationships on an intermediary level with selected regions: Taiwan, The Northeastern region of the USA and South East Asia.[13]

The individual members of clusters may benefit from clusters integration on many ways. Apart from benefits related directly to internationalisation support, the integration between clusters provides better access to domestic target markets, increases bargaining power (towards clients, suppliers or policy makers), provides greater access to capital, human or

[13] *European Semiconductor Cluster internationalisation Project – Silicon Europe Worldwide* – the project description.

technical resources and strengthens the umbrella brand of regional actors. The vertical integration of clusters provides additionally great opportunities for cross-sectoral cooperation and development of emerging industries, both with actors playing the same or different roles within the global value chain.

The cooperation of clusters within the horizontal integration models are common in the agricultural industries. The joint activity of agricultural producers, in form of capital or functional integration, allows for many advantages for individual farmers – it brings the possibility to obtain higher prices for products, provides greater access to financial resources and information.[14] The further integration within the value chain, in form of agriculture clusters integration, brings for advantages for the whole industry – it strengthens the position of the country/region in the global scale and consequently increases the position of individual farmers in the global value chain. A good example here is the ASEMESA, the Spanish Association of Exporters and Industry of Table Olives that is the peak industry body representing the interests of the whole table olives sector in Spain and promoting the Spanish table olives worldwide, thus strengthening the competitiveness of individual produces on the global scale.[15]

The Aviation Valley Association – an industrial cluster created in 2003 in the Podkarpackie region in Poland, is a good example of the vertical integration of regional actors operating in different roles within the aviation industry. One of the main goals of the association is to enhance the cooperation between companies, scientific units and R&D aviation-related base in order to create favorable conditions for the development of the aviation industry of the region. The Aviation Valley cooperates with other regional clusters operating in related (e.g. space technologies) and distant industries (e.g. life quality) to create a genuine platform and to revive the ecosystem of the region as a whole.[16] The regional cluster cooperation is developed in line with the regional smart specialisation strategy, with focus on the cross-sectoral innovations.[17]

Another example of vertically integrated cluster is the Mazovian Chemical Cluster that aims to improve the competitiveness of companies from the chemical sector by developing innovative technologies and en-

[14] A. Nowak, *Rural producers horizontal integration as innovation symptom as well as its opportunities*, "Contemporary Management Quarterly", no. 4/2011, pp. 163–171.

[15] www.asemesa.es (15.02.2018).

[16] L. Suwała, G. Micek, *Beyond clusters? Field configuration and regional platforming: the Aviation Valley initiative in the Polish Podkarpackie region*, "Cambridge Journal of Regions, Economy and Society", vol. 11, is. 2, 7 June 2018, pp. 353–372.

[17] www.dolinalotnicza.pl (15.02.2018).

vironmentally friendly products, together with the science sector in the Mazovia region of Poland. The members of the cluster cover all roles within the value chain of chemical production. Thanks to integrating the cluster within the European Chemical Regions Network (ECRN), the members of the cluster have the opportunity to cooperate and run research projects with partners of 20 member regions with a well-developed chemical industry throughout Europe, e.g. Bavaria (Germany), Brandenburg (Germany), Cheshire West and Chester (UK), Flanders (Belgium), Hesse (Germany) or Ida Virumaa (Estonia).[18]

Finally it is worth mentioning an advanced form of the cooperation between clusters that can be observed in the state of Baden-Württemberg in Germany, with medical technology industry predominantly organised in clusters represented by SMEs located in different parts of the state, e.g. the Black Forest-Baar-Heuberg area with surgical and endoscopic instruments, the Rhine-Neckar and Stuttgart/Tübingen areas with personalised medicine and diagnostics, and the northern Black Forest focused on dental supplies and instruments. The close cooperation of clusters has made the state one of the largest markets for medical device in the world, with about 47 thousand people working in 818 companies generating turnover of approx. 12 billion euros in 2014.[19]

Conclusion

Particular attention should be paid to the growth of the cluster system and the collaboration of networks of clusters within the global value chains as companies become more and more open for cooperation. Clusters may increase the competitive position of companies involved in global value chains by strengthening their relationships with other actors and partners involved in the process of value creation. Clusters are to provide access to specialist knowledge, skills and other resources typically not available for SMEs. By concentrating enterprises and research institutions in a small geographic area, they provide room for developing rapidly-implemented innovations.

The idea of collaboration network of European clusters representing different geographic areas within the global value chain might be execut-

[18] A. Masłoń-Oracz, M. Proczek, *Klastry a zrównoważony rozwój Unii Europejskiej w świetle inteligentnej specjalizacji na przykładzie Mazowieckiego Klastra Chemicznego (Clusters and the sustainable development of the European Union in terms of the smart specialisation – the case of Mazovian Chemical Cluster)*, „Przemysł Chemiczny" 2017.

[19] *Medical Technology 2016 Facts and Figures for Baden-Württemberg*, BIOPRO Baden-Württemberg GmbH 2016.

ed in light of the smart specialisation strategy: by establishing partnerships between business and scientific communities and undertaking joint research and development projects with many clusters involved. Clusters might then play an important role in fostering innovation and technology transfer within the global value chain, which is especially important for countries/regions that are involved in low value-added activities with the value chain. Cluster partnerships might also facilitate the internationalisation process of SME towards non-European markets and thus enhance the competitiveness of the European Union on the global scale. A significant role is also to be played by public administration that provides resources that might be transferred directly and indirectly to clusters.

The development of clusters cooperation should be accompanied by further empirical research and recommendations for policy makers on how to support the process most effectively, with special focus on the role of clusters in fostering innovation within the smart specialisation framework.

References

Agro-Value Chain Analysis and Development, The UNIDO Approach, A staff working paper, UNIDO 2009.

Andersson S., Evers N., Griot C., *Local and international networks in small firm internationalization: cases from the Rhône-Alpes medical technology regional cluster*, "Entrepreneurship and Regional Development", vol. 25, no. 9/10/2013.

Colovic A., Lamotte O., *The role of formal industry clusters in the internationalization of new ventures*, "European Business Review" 2014, vol. 26, is. 5, https://doi.org/10.1108/EBR-02-2013-0027.

EUROPE 2020: A strategy for smart, sustainable and inclusive growth, European Commission 2010.

European Semiconductor Cluster internationalisation Project – Silicon Europe Worldwide – the project description on www.clustercollaboration.eu.

Ketels Ch., Protsiv S., *European Cluster Panorama*, European Commission 2016.

Gereffi G., Humphrey J., Sturgeon T., *The Governance of Global Value Chains,* "Review of International Political Economy", no. 12(1)/2005, https://doi.org/10.1080/09692290500049805.

Costa E., Soares A.L., Pinho de Sousa J., *Institutional networks for supporting the internationalisation of SMEs: the case of industrial business associations*, "Journal of Business & Industrial Marketing", vol. 32, is. 8/2017, https://doi.org/10.1108/JBIM-03-2017-0067.

Inomata S., *Analytical Frameworks for Global Value Chains: An Overview*, Global Value Chain Development Report 2017.

Jankowska B., Główka C., *Clusters on the road to internationalization – evidence from a CEE economy*, "Competitiveness Review", vol. 26, is. 4/2016, https://doi.org/10.1108/CR-02-2015-0010.

Libaers D., Meyer M., *Highly innovative small technology firms, industrial clusters and firm internationalization*, "Research Policy", vol. 40, no. 10/2011, https://doi.org/10.1016/j.respol.2011.06.005.

Masłoń-Oracz A., Proczek M., *Klastry a zrównoważony rozwój Unii Europejskiej w świetle inteligentnej specjalizacji na przykładzie Mazowieckiego Klastra Chemicznego (Clusters and the sustainable development of the European Union in terms of the smart specialisation – the case of Mazovian Chemical Cluster)*, "Przemysł Chemiczny" 2017.

Medical Technology 2016 Facts and Figures for Baden-Württemberg, BIOPRO Baden-Württemberg GmbH 2016, https://doi.org/10.15199/62.2017.8.1.

Nowak A., *Rural producers horizontal integration as innovation symptom as well as its opportunities*, "Contemporary Management Quarterly", no. 4/2011.

OECD, Interconnected Economies: Benefting from Global Value Chains, OECD 2013.

Porter M.E., *Clusters and New Economics of Competition*, "Harvard Business Review", no. 76(6)/1998.

Schierenbeck C., *Support actions for cluster cooperation along value chains towards industrial modernization*, Industry 4.0: opportunities, challenges and strategies for the industry of the future Toscana Tech, Florence, 28.02.2017.

Suwała L., Micek G., *Beyond clusters? Field configuration and regional platforming: the Aviation Valley initiative in the Polish Podkarpackie region*, "Cambridge Journal of Regions, Economy and Society", vol. 11, is. 2, 7 June 2018.

The links between global value chains and global innovation networks: An exploration, OECD Science, Technology and Industry Policy Papers, no. 37, OECD Publishing 2017.

The role of clusters in smart specialisation strategies, European Commission 2013.