



European
Commission



SMART SPECIALISATION IN THE EU ENLARGEMENT REGION (WESTERN BALKANS AND TURKEY)

Analysis of Value Chains in the Western Balkan Economies - Enriching the Potential for Regional Cooperation in Priority Areas

This publication is a Technical report by the Joint Research Centre (JRC), the European Commission's science and knowledge service. It aims to provide evidence-based scientific support to the European policymaking process. The scientific output expressed does not imply a policy position of the European Commission. Neither the European Commission nor any person acting on behalf of the Commission is responsible for the use that might be made of this publication. For information on the methodology and quality underlying the data used in this publication for which the source is neither Eurostat nor other Commission services, users should contact the referenced source. The designations employed and the presentation of material on the maps do not imply the expression of any opinion whatsoever on the part of the European Union concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

Contact information

Monika Matusiak, Team Leader, European Commission - Joint Research Centre, Seville, Spain

e-mail: monika.matusiak@ec.europa.eu

EU Science Hub

<https://ec.europa.eu/jrc>

JRC126816

EUR 31024 EN

PDF ISBN 978-92-76-49489-8 ISSN 1831-9424 doi:10.2760/47718

Print ISBN 978-92-76-49490-4 ISSN 1018-5593 doi:10.2760/060677

Luxembourg: Publications Office of the European Union, 2022

© European Union, 2022



All content © European Union, 2022

The reuse policy of the European Commission is implemented by the Commission Decision 2011/833/EU of 12 December 2011 on the reuse of Commission documents (OJ L 330, 14.12.2011, p. 39). Except otherwise noted, the reuse of this document is authorised under the Creative Commons Attribution 4.0 International (CC BY 4.0) licence (<https://creativecommons.org/licenses/by/4.0/>). This means that reuse is allowed provided appropriate credit is given and any changes are indicated. For any use or reproduction of photos or other material that is not owned by the EU, permission must be sought directly from the copyright holders.

How to cite this report: Matusiak, M., Radovanovic, N., Rakhmatullin, R., Stehrer, R., Beraha, I., Berrer, H., Boch, M., Djuricin, S., Graser, G., Jovanovic, B., Korpar, N., Ljumovic, I. and Marjanovic, D., *Analysis of Value Chains in the Western Balkan Economies - Enriching the Potential for Regional Cooperation in Priority Areas*, Matusiak, M., Radovanovic, N. and Rakhmatullin, R. editor(s), EUR 31024 EN, Publications Office of the European Union, Luxembourg, 2022, ISBN 978-92-76-49489-8, doi:10.2760/47718, JRC126816.

JRC TECHNICAL REPORT

Analysis of Value Chains in the Western Balkan Economies - Enriching the Potential for Regional Cooperation in Priority Areas

EDITORS

*Matusiak, M., Radovanovic, N.,
Rakhmatullin, R.*

AUTHORS

*Matusiak, M., Radovanovic, N.,
Rakhmatullin, R., Stehrer R., Beraha I.,
Berrer H., Boch M., Djuricin S., Graser G.,
Jovanovic B., Korpar N.,
Ljumovic I., Marjanovic D.*

2022

CONTENTS

ABSTRACT	2
EXECUTIVE SUMMARY	3
Chapter 1. Introduction	6
1.1 Selection of value chains for a detailed analysis	6
1.2 Detailed review of selected value chains	9
1.3 Assessment of megatrends	10
1.4 Assess policy responses to foster integration of Western Balkan economies into value chains and increase their competitiveness	10
Chapter 2. Agri-food value chain	12
2.1 Overview	12
2.1.1 Overall patterns and trends	12
2.1.2 Detailed patterns.....	12
2.2 Review of the agri-food chain.....	20
2.2.1 Digging	20
2.2.1.1 Firm-level data analysis	20
2.2.1.2 Patent data analysis.....	24
2.2.1.3 Scientific and research publications.....	24
2.2.2 Determining	27
2.2.3 Decomposing	29
2.2.3.1 Overview.....	29
2.2.3.2 Value-added dynamics in the GVC, identifying types of linkages and relationships between different actors in the GVC	32
2.2.3.3 Labour issues	35
Chapter 3. Textile value chain.....	39
3.1 Overview	39
3.1.1 Overall patterns and trends	39
3.1.1 Detailed patterns.....	43
3.2 Review of the textile value chain.....	48
3.2.1 Digging	48
3.2.1.1 Firm-level data analysis	48
3.2.1.2 Patent data analysis.....	52
3.2.1.3 Scientific and research publications.....	52
3.2.1.4 Trademarks	55

3.2.2 Determining	57
3.2.3 Decomposing	57
3.2.3.1 Overview.....	57
3.2.3.2 Value-added dynamics in the GVC, identifying types of linkages and relationships between different actors in the GVC	59
3.2.3.3 Labour issues	60
Chapter 4. Automotive value chain	63
4.1 Overview	63
4.1.1 Overall patterns and trends	63
4.1.1 Detailed patterns.....	67
4.2 Review of the automotive value chain	71
4.2.1 Digging	71
4.2.1.1 Firm-level data analysis	71
4.2.1.2 Patent data analysis.....	75
4.2.1.3 Scientific and research publications.....	75
4.2.1 Determining	80
4.2.2 Decomposing	80
4.2.2.1 Overview.....	80
4.2.2.2 Value-added dynamics in the GVC, identifying types of linkages and relationships between different actors in the GVC	81
4.2.2.3 Labour issues	83
Chapter 5. Energy value chain	87
5.1 Overview	87
5.1.1 Overall trends and patterns	87
5.1.1 Detailed patterns.....	91
5.2 Review of the energy value chains.....	93
5.2.1 Digging	93
5.2.1.1 Firm-level data analysis	93
5.2.1.2 Patent data analysis.....	97
5.2.1.3 Scientific and research publications.....	97
5.2.1 Determining	100
5.2.2 Decomposing	100
5.2.2.1 Overview.....	100
5.2.2.2 Value-added dynamics in the GVC, identifying types of linkages and relationships between different actors in the GVC	101
5.2.2.3 Labour issues	105

Chapter 6. Tourism value chain	107
6.1 Overview	107
6.1.1 Overall trends and patterns	107
6.1.1 Detailed patterns.....	109
6.2 Review of the tourism value chain	112
6.2.1 Digging	112
6.2.1.1 Firm-level data analysis	112
6.2.1.2 Patent data analysis.....	112
6.2.1.3 Scientific and research publications.....	112
6.2.1 Determining	117
6.2.2 Decomposing	119
6.2.2.1 Overview.....	119
6.2.2.2 Value-added dynamics in the GVC, identifying types of linkages and relationships between different actors in the GVC	121
6.2.2.3 Labour issues	123
Chapter 7. IT value chain	125
7.1 Overview of the IT value chain.....	125
7.1.1 Overall trends and patterns	125
7.1.2 Detailed patterns.....	127
7.2 Review of the IT value chain.....	131
7.2.1 Digging	131
7.2.1.1 Firm-level data analysis	131
7.2.1.2 Patent data analysis.....	131
7.2.1.3 Scientific and research publications.....	135
7.2.1 Determining	139
7.2.1 Decomposing	139
7.2.1.1 Overview.....	139
7.2.1.2 Value-added dynamics in the GVC, identifying types of linkages and relationships between different actors in the GVC	140
7.2.1.3 Labour issues	145
Chapter 8. Impact of megatrends on selected GVCs	149
8.1 Digitalisation and automation	150
8.2 Climate change and greening.....	157
8.3 The impact of COVID 19	165
8.4 Migration.....	170
8.5 Conclusions	173

Chapter 9. Barriers, prospects, and policy aspects 177

9.1 Main barriers, constraints and bottlenecks faced by actors in the GVC	177
9.1.1 Agri-food	177
9.1.2 Textile industry	178
9.1.3 Automotive industry.....	179
9.1.4 Energy.....	180
9.1.5 Tourism.....	180
9.1.6 IT	181
9.2 Outlook and prospects.....	181
9.2.1 Agri-food industry.....	181
9.2.2 Textile sector	184
9.2.3 Automotive sector.....	185
9.2.4 Energy.....	186
9.2.5 Tourism.....	187
9.2.6 IT	187
9.3 Policy options for developing the selected value chains	188
9.3.1 Agri-food	188
9.3.2 Textiles	188
9.3.3 Automotive	189
9.3.4 Energy.....	189
9.3.5 Tourism.....	190
9.3.6 IT	190

Chapter 10. Conclusions..... 192

REFERENCES	194
LIST OF BOXES	198
LIST OF FIGURES.....	199
LIST OF TABLES	203

A. Description of data sources.....207

A.1 Data on production integration and trade	207
A.1.1 wiiw multi-country input-output database	207
A.1.2 Trade data	207
A.1.3 FDI data	207
A.2 Detailed industry, employment and firm-level data.....	207
A.2.1 Employment data	207
A.2.2 Industry-level data	208
A.3 Firm-level data.....	208

A.3.1 Orbis data	208
A.3.2 fDI Markets database	208
A.4 Science and innovation data.....	209
A.4.1 Patent data	209
A.4.2 Scopus	209
A.4.3 Trademarks	209
B. Methodological description of quantitative indicators used in the report	211
C. Presentation of quantitative and qualitative indicators for selection of value chains	215
C.1 Size indicators	215
C.1.1 Value-added shares.....	215
C.1.2 Employment.....	215
C.2 GVC integration and trade specialisation	215
C.2.1 GVC integration	215
C.2.2 Revealed comparative advantages.....	223
C.3 Foreign direct investment	223
C.4 Innovation and science indicators	238
C.4.1 Patent data analysis	238
C.4.2 Data on scientific output	240
C.5 Qualitative indicators.....	252
C.6 Summary.....	253
D. Top 30 firms in the selected value chains.....	259
E. Interviews and survey	271

EDITORS

Monika Matusiak,

European Commission, Joint Research Centre (JRC), Seville, Spain

Nikola Radovanovic,

European Commission, Joint Research Centre (JRC), Seville, Spain

Ruslan Rakhmatullin,

European Commission, Joint Research Centre (JRC), Seville, Spain

AUTHORS

Monika Matusiak,

European Commission, Joint Research Centre (JRC), Seville, Spain

Nikola Radovanovic,

European Commission, Joint Research Centre (JRC), Seville, Spain

Ruslan Rakhmatullin,

European Commission, Joint Research Centre (JRC), Seville, Spain

Robert Stehrer,

The Vienna Institute for International Economic Studies (wiiw), Vienna, Austria

Isidora Beraha,

Institute for Economic Sciences (IES), Belgrade, Serbia

Helmut Berrer,

Economica, Vienna, Austria

Michael Boch,

Economica, Vienna, Austria

Sonja Djuricin,

Institute for Economic Sciences (IES), Belgrade, Serbia

Georg Graser,

Economica, Vienna, Austria

Branimir Jovanovic,

The Vienna Institute for International Economic Studies (wiiw), Vienna, Austria

Niko Korpar,

The Vienna Institute for International Economic Studies (wiiw), Vienna, Austria

Isidora Ljumovic,

Institute for Economic Sciences (IES), Belgrade, Serbia

Darko Marjanovic,

Institute for Economic Sciences (IES), Belgrade, Serbia

ABSTRACT

Identification of promising areas is among the main goals of economic and innovation policy development and a focal point of the Smart Specialisation approach. The economies of the Western Balkan region are applying Smart Specialisation to determine the economic domains in which they should direct further efforts towards exploiting their potential. The recent studies show many similarities in regard to key economic domains across the Western Balkans.

In order to investigate the strengths of some of the key domains in the region and to better understand both national and regional competitiveness in that regard, analysis of competitive value chains was carried out in the following six areas: textile, automotive, agrifood, energy, tourism and ICT industries. The work employed a specific methodology and looked into various dimensions for determining the potential of the Western Balkan economies in relation to the selected value chains. This report aims at providing information on possibilities for regional collaboration for improving the value chains and yielding better results in the market, as well as on the strengths and challenges in terms of enhancing the positions of the economies in relation to the value chains analysed.

EXECUTIVE SUMMARY

Western Balkan economies have committed to develop Smart Specialisation Strategies to facilitate knowledge-based transformation of their economies. This effort has been supported by the European Commission, in particular the Joint Research Centre, the Directorate General for Neighbourhood and Enlargement Negotiations and the Directorate General for Research and Innovation.

This report aims to support the implementation of Smart Specialisation Strategies in the Western Balkans by looking at future cooperation opportunities along the value chains connected with most common priority domains in the region. With this purpose in mind, the report reviews the position of the Western Balkan economies in six selected global value chains and discusses policy options for improving the intra-regional and international cooperation.

A dedicated methodological approach has been developed for this purpose, looking at a number of factors indicating the strategic importance of selected industries and sectors. It starts with an overview of key indicators that describe the position of the Western Balkan economies in terms of comparative advantage, knowledge base, international linkages and also EU policy agendas. Based on the results of this initial screening the report identifies barriers to upgrading the position of the region in the global value chains, as well as opportunities for strengthening regional and transnational cooperation. The next step is the analysis of several global megatrends and their implications for the Western Balkan economies and the selected value chains. Finally, the study derives relevant policy options for improving the position of the region in the selected chains and for improving the regional cooperation in these areas. The analysis and results can support the implementation of Smart Specialisation Strategies in the Western Balkans.

The value chains analysed include agri-food, textiles and clothing, automotive, energy, tourism and

information technology. For these six value chains an in-depth quantitative and qualitative assessment has been undertaken, focusing on opportunities for intraregional (i.e. within the Western Balkans) and international cooperation in the context of Smart Specialisation across the Western Balkans and the European Union. Specifically, the selected value chains are reviewed following the M3DA methodology, which consists of five stages – *mapping, digging, determining, decomposing, and ascertaining*.

In the *mapping* process, each of the value chains is analysed using industry-level input-output tables. In the *digging* stage, these are enriched by other data, such as firm-level data and microdata, including patents, scientific citations, and trademarks. In the '*determining stage*' more detailed performance information is provided for the main actors – representatives of the business sector, representatives of government, civil-society actors, and universities. In the '*decomposing stage*' further detailed aspects are presented, on the grounds of interviews and stakeholder consultations, leading to an analysis of issues, key obstacles, and constraints and bottlenecks affecting the position of the Western Balkans in the value chains.

The final, *ascertaining* stage, investigates the future options and discusses the likely evolution of the six chosen sectors and their value chains, considering several global megatrends – digitalisation and automation, climate change and greening, the COVID-19 pandemic and migration. It also discusses the repercussions from the EU accession process, constraints, and ongoing negotiations. This further includes a consideration of new EU policy priorities, such as the Digital Agenda and the Green Deal, which are likely to impact the evolution of the selected WB sectors and value chains.

Based on these assessments, the report outlines possible ways for the Western Balkan region and economies to address the respective challenges, threats, and opportunities. This includes a discussion of the main barriers, constraints and bottlenecks faced by the actors in the respective GVCs in response to new EU policies and the megatrends.

The most frequently mentioned barriers and constraints are lack of skilled workers, geographical location, poor infrastructure, lack of finance, limited production and operational capacities, and the high price of input raw materials. These concerns are mentioned in at least half of the selected value chains. For the agri-food, automotive and textiles sectors, the largest number of barriers and constraints are reported. The remaining barriers and constraints, such as complicated customs, tariffs and trade regulations, cost of energy/supplies, lack of quality standards, limited access to input raw materials, political instability, red tape or bureaucracy, seem to refer more to individual firms.

General strategies and relevant policy options have been derived from the analysis for each of the value chains under consideration.

The general strategy for the *agri-food* chain should be to focus on providing premium rather than cheap products. The Western Balkan economies have the potential to provide high-quality, ecological products that can be competitive even with a relatively higher selling price. The ongoing green transition megatrend provides a positive impetus in this respect, as it will tend to increase the demand for these types of product in the coming years.

The overall strategy for the development of the textiles chain should be to transform the sector from its current low-value, low-cost position to a high-value position, where local firms would provide high-quality final products, under their own brands, that will compete not only on price but also on quality.

The *automotive* chain, which has been dominated by investment from foreign companies, should turn towards higher value-added activities that are based on higher technology and not just on cheap labour. Efforts should also be made to improve the cooperation between local and foreign companies from this area.

The overall strategy for the energy chain should be to focus on renewable energy, energy efficiency, reduction of emissions and reduction of pollu-

tion in accordance with the Green Agenda for the Western Balkans and the European Green Deal.

The overall strategy for the *tourism* chain should be to transform the sector into an industry that offers a unique and premium experience, based in alternative tourism.

Finally, the overall strategy for the IT chain should be to focus on greater innovation while supporting the successful development of the sector in general. For each of these strategies concrete policy options are formulated in the final chapter of the report.

CHAPTER

1



Chapter 1. Introduction

Supported by the European Commission and the Joint Research Centre, the Western Balkan economies have started to analyse their economic and innovation potentials and to elaborate their evidence-based Smart Specialisation strategies. Such orientation aims at promoting innovation-driven agenda in an environment characterised by economic transformation and the need to build sustainable growth models.

Smart Specialisation process intends to identify different priority areas based on the analysis economic, innovation and scientific potential and subsequent stakeholder dialogue. These priority areas should remain in focus of national authorities for further investments and targeted policy actions as they represent the fields at which an economy excels and based on which it can built sustainable competitiveness.

The Western Balkan region is far from homogeneous, as the structures of the economies of Albania, Bosnia and Herzegovina, Kosovo^(*), the Republic of North Macedonia, Montenegro and Serbia substantially differ². The same applies to their economic and innovation potentials with relation to their integration into transnational innovation ecosystems and value chains. However, Smart Specialisation processes in the Western Balkans revealed that there are certain priority areas, which appear to be common for several economies from the region. These common priorities can stimulate the

(*) This designation is without prejudice to positions on status and is in line with UNSCR 1244/1999 and the ICJ Opinion on the Kosovo declaration of independence. This applies to the whole document and each time Kosovo is mentioned.

(2) This is documented, for example, in the EU strategy 'A credible enlargement perspective for and enhanced EU engagement with the Western Balkans' and the adoption and implementation of various ongoing EU initiatives.

interregional and international cooperation in the region, as well as beyond it. Such targeted cooperation can help upgrade the regional value chains and identify niches to compete on international markets. Stronger collaboration within these areas can foster economic growth of the region and also elevate other industries through cross-innovation.

Smart Specialisation can contribute to these efforts by helping identifying specialised areas in which international value chains can be developed or upgraded. To support such efforts, a comprehensive study of regional value chains in the Western Balkans and the potential for their integration into global value chains has been carried out. This study aims at enriching potential for collaboration in the promising areas of the economies of the Western Balkan region.

This report gives an overview of the indicators describing the integration of the WB economies into selected GVCs as well as their competitive position in these chains. Based on these results, the report identifies barriers to upgrading the position of the region and individual economies in European and global value chains, as well as opportunities for strengthening regional and transnational cooperation. The analysis takes ongoing global megatrends and challenges into account and can serve as a basis for the development of smart specialisation strategies for the WB economies.

The focus of the report is the detailed description of the selected value chains based on quantitative and qualitative indicators (Chapters 2-7). This is followed by an overview of the most important megatrends impacting the evolution of the selected value chains ([Chapter 8](#)). The report concludes with an assessment of the barriers, challenges and policy options that are available to the Western Balkan economies to improve their respective positions. The next subsections in this chapter provide a more detailed overview of these steps.

1.1 Selection of value chains for a detailed analysis

The study follows a couple of steps that build on each other and are partly integrated. Generally, the

Table 1.1. Selection of industries and value chains

Description	Agri-food industry	Textiles and clothing	Automotive industry	Energy	Tourism	IT
Relevant NACE industries	A+CA	CB	CL	D	I	JC
Size						
Employment						
International linkages						
Revealed comparative advantages						
Patents						
Scientific citations						
Export and innovation promotion programmes						
Business support organisations						
Priority area in existing S3*						
Common regional market strategy			yes	yes	yes	yes
Compatibility with EU agendas	EGD	EGD and EU Textiles Strategy	(EGD)	EGD	EGD	Digital agenda for Europe

* For economies with available information. **Source:** Own elaboration.

approach has been structured along the following lines. First, it starts with an analysis of Western Balkan industries' value chains and the potential for their integration into global value chains including all industries (with the exception of public services). These are based on a variety of data sources described in Appendix A, from which numerous indicators are derived (see Appendix B for technical details). Given these indicators, six value chains of the industries of the WB economies that are relevant for the region have been selected according to both quantitative and qualitative criteria, which are reported in detail in Appendix C. For the selection a couple of criteria have been considered. First, value chains which are relevant for the whole WB region – i.e. those that have a strong regional character rather than those that

are important for individual economies – are of interest. The selection has been based on ongoing initiatives at country level (e.g. with existing smart specialisation strategies). Further, although the integration potential with the EU is an important aspect, the selected value chains may be significant and important from a social or environmental perspective (e.g. agriculture/ food, renewable energy, etc.). Summarising, the selection is based on a variety of criteria, including prospects for EU integration (linkages) and social and environmental considerations.

The following is a summary of the results of this analysis and the selection of industries and value chains that are deemed to be relevant according to the above-mentioned criteria. *Table 1.1* provides an overview of the criteria and their rele-

vance for the selected industries and value chains compared with other industries.

The criteria chosen are quantitative indicators, including the size (value added share in the 'market economy') of these industries, total employment and employment of women, relevance of international linkages, existing comparative advantages, scientific potential indicators (patents and scientific citations), existence of support programmes or already ongoing or planned smart specialisation strategies, as well as relevance for and compatibility with EU policies and agendas. Based on these criteria, the six value chains and their associated industries indicated in [Table 1.1](#) have been selected. In this table, a darker green area indicates that it is relatively important compared with all other industries on average across economies. The darker shade of the green colour designates the higher importance of related aspect for the industries of the Western Balkan economies.

- The *agri-food industry* is characterised by a large share in most economies of the Western Balkans (export specialisation, innovation activities) and is supported by various public or government programmes. Further, it aligns with the agenda outlined in the European Green Deal (EGD), understood as ecological and sustainable food production. In addition, scientific potential and specialisation in agricultural and biological sciences is one of the strongest fields, with several institutions with a high reputation in the region (e.g. Serbia's BioSense Institute) and in the EU. Thus, there is potential to increase regional innovation and technology diffusion in both the public and the private sector to increase productivity.
- The significance of the *textiles and clothing industry* is less obvious from the indicators chosen (as can be seen from [Table 1.1](#)) and therefore needs some further reasoning. First, it is important because it employs a large number of people in the WB economies, even though it is a low value-added, labour-intensive industry. It is also important for social outcomes, as it is mainly located in poorer or even deprived areas with fewer opportunities

and thus helps to reduce poverty and inequalities, and since it employs predominantly female workers, it contributes towards gender equality and other related issues. Furthermore, the industry has a strong tradition in these economies, whose workforces are skilled in such activities, and it has great potential for inter-industry linkages (e.g. connections with the automotive industry, agriculture and food) as well as intra-regional linkages (i.e. connections between different companies from different WB economies), thus offering scope for intra-regional cooperation.

- The *automotive industry* is probably the one with greatest potential for catch-up opportunities and technological upgrading. It is highly integrated into global supply chains, although at the moment it is the backward linkages that dominate (i.e. a high share of imports). Over time, however, it is expected that the forward linkages will grow too, as the companies that are active in this area are rather new, i.e. they have been established in the past few years and are expected to upgrade in the coming years. Even though its value-added share in the WB economies is still small overall, the industry is growing strongly, driven by high foreign direct investment (FDI) in the sector in recent years, and is expected to continue to grow. In addition to its direct contribution to the value added, it is also making an indirect contribution via the many subcontractors active in the industry. These ongoing trends and projects are thus very promising, indicating a strong potential for investment, innovation and technology upgrade, employment and high value added. The industry is also characterised by already existing reasonable international linkages and a pronounced scope for linkages to other technology-intensive industries. Finally, it has a direct connection to the EGD through the EU agenda of smart and sustainable mobility.
- The *energy industry* is important in terms of its size, international linkages (particularly forward linkages) and specialisation, and is

supported by various public initiatives. It is also very relevant for the EGD with respect to supplying clean, affordable and secure energy. Even though the industry overall is dominated by big monopolistic or oligopolistic firms (mostly publicly owned), there is still a high potential for private initiatives, especially in the area of sustainable energy and energy efficiency. The current capacity of the region in the energy sector is viewed in terms of scientific potential, with a number of educational, scientific and research organisations that may support and improve industry competitiveness through innovation, research and development. Parallel to this, economies from the region possess natural resources for the production of energy from renewable sources.

- This is also the case for the *tourism industry*, which is important for all the economies in the region and not just for those with access to the sea, as all WB economies have a high potential for tourism development, including winter, spa, rural, historical and health tourism, for example. Tourism may also be characterised by further linkages to other industries, such as agriculture and food, as well as future goals for preserving and restoring ecosystems and biodiversity, which are directly related to the EGD agenda. Finally, tourism can have positive implications for social outcomes, as it contributes to balanced regional development and employs many people, especially from the socially disadvantaged groups, such as women and youth. The Western Balkan region is one of the oldest and richest cultural environments in Europe both from a geographical and a heritage perspective. A series of cultural routes and itineraries spreads across these economies, connecting both the people and the stories they tell.
- Finally, *information technology* (IT) is an industry with a particularly high potential as far as future technologies and the EU digital agenda are concerned. Apart from the fact that it already plays a significant role in some Western Balkan economies and has support from var-

ious initiatives such as business programmes, IT has been selected as a Smart Specialisation Strategies (S3) priority area in some economies. The IT industry has a strong business community in the region, while support organisations also play an important role. Links with global players from the industry already exist and increase the potential for employability and competitiveness.

These are the main reasons for the selection of the six industries and their associated value chains, which are analysed in more detail in the next stage of the project.

1.2 Detailed review of selected value chains

For these six value chains an in-depth quantitative and qualitative assessment (see Chapters 2-7) is undertaken, focusing on opportunities for intraregional (i.e. within the Western Balkans) and international cooperation in the context of smart specialisation across the WB and the wider EU. Specifically, the selected value chains are then reviewed in more depth following the M3DA methodology – *digging, determining and decomposing* (see Brennan and Rakhmatullin, 2015). This is preceded with a more detailed assessment of economic links and trade flows.

In the *digging* stage, these are enriched by other data, such as firm-level data (based on Orbis) and microdata, including patents, scientific citations and trademarks (see Appendix A and B for details on data and indicators).

In the *'determining stage'* more detailed performance information is provided for the main actors, and in the *'decomposing stage'* further detailed aspects are presented. Specifically, to complement the information gathered on the business actors, field interviews with different players – representatives or participants from government, civil-society sectors and universities – in the triple helix (companies, technology centres and universities) were conducted.

To deliver such an in-depth analysis of value-chain integration in the WB economies and their competitive position we supplemented chosen qualitative and quantitative indicators with field research, including interviews and surveys with regional business actors from the WB region (see Appendix E for details). The goal of this process was to collect information on and acquire knowledge of different aspects of GVC functioning (reported in Chapters 2-7, respectively), together with an analysis of issues, key obstacles, constraints and bottlenecks affecting WB participants in GVCs, leading to potential outlooks and prospects (which are summarised in *Chapter 9* together with a policy discussion).

1.3 Assessment of megatrends

Based on the analysis described above, the study develops an understanding of the likely evolution of the six chosen sectors and their value chains in *Chapter 8*. This requires taking the challenges and opportunities into account that are likely to emerge concerning the future trajectories of these value chains. In doing so, the study investigates the potential impact of various external stress factors, including digitalisation and automation, climate change and greening, the COVID-19 pandemic and migration. Repercussions from the EU accession process, constraints and ongoing negotiations are also likely to have an impact. Further, the study includes a consideration of new EU policy priorities, such as the Digital Agenda and the Green Deal, which are likely to impact the evolution of the selected WB sectors and value chains, shaping some of the challenges, threats and opportunities, in particular with respect to potential EU accession and integration strategies.

1.4 Assess policy responses to foster integration of Western Balkan economies into value chains and increase their competitiveness

On the basis of these assessments, the report outlines possible ways for the WB region and economies to address these challenges, threats and opportunities. This includes a discussion of the main barriers, constraints and bottlenecks faced by the actors in the respective GVCs, based on further results of the 'decomposing' analysis and an analysis of the prospects of the selected WB sectors in response to new EU policies and the megatrends described in Section 8 for each of the selected industries and value chains.



CHAPTER

Chapter 2. Agri-food value chain

The agri-food value chain includes the following industry sectors: agriculture, forestry and fishing (NACE A) and the manufacture of food products, beverages and tobacco products (NACE CA).

2.1 Overview

2.1.1 Overall patterns and trends

First, we present the size of this industry in the six Western Balkan economies. *Figure 2.1* shows the share of value added in the agri-food sector as a percentage of the sum of gross value added in the cumulated NACE industries A to N. The share of the agri-food sector in the total value added varies between 25% in Albania and slightly above 10% in Montenegro and Bosnia and Herzegovina. In most economies these shares have been on a declining trend since 2012, with the exception of Albania.

Downward trends are also observed with respect to employment in Bosnia and Herzegovina and Serbia, and to a lesser extent in Albania and North Macedonia (see *Figure 2.2*). According to these data, in Montenegro and Kosovo employment levels in the agri-food sector have been increasing.

All economies (with the exception of Albania) are characterised by having a revealed comparative advantage, which for most economies is stable over time and slightly declining for Montenegro and Kosovo (*Figure 2.3*).

Considering the value-added structure of gross exports³ of agri-food products of the six economies

(3) Using multi-country input-output tables allows to decompose gross exports into the contribution of domestically produced value added and value added produced in foreign countries which are imported via intermediary inputs.

(*Figure 2.4*), we find that the domestic value-added content accounts for around 90% in Albania and Kosovo (with a declining trend). The domestic content is smaller in Montenegro (around 80%) and Bosnia and Herzegovina, North Macedonia and Serbia (around 70%). The foreign value-added content of exports is in all cases dominated by the EU27, but in some economies (e.g. Serbia, North Macedonia) even more so by other economies (i.e. rest-of-world), while the Western Balkans' share is always marginal.

The backward linkages with the other Western Balkan economies, measured through the Western Balkan value-added content in each economy's exports, are relatively small in all the economies and account for 1.5–2.5% in most cases (*Figure 2.5*). Only Montenegro shows higher backward linkages of around 4%. In most cases these are dominated by linkages to the biggest economy, Serbia.

In terms of the relative GVC position⁴ (*Figure 2.6*), we find that backward linkages are in most cases stronger. The only exception is Albania, which is characterised by relatively stronger forward linkages (in accordance with the high domestic value-added content of exports).

2.1.2 Detailed patterns

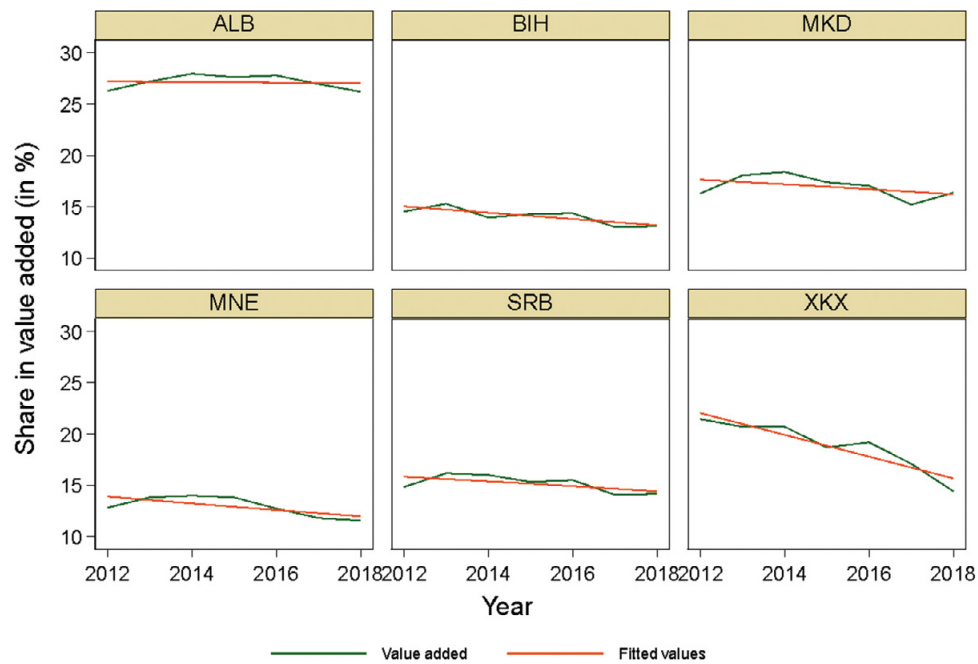
Trade structures shown in *Figure 2.7* are dominated by crop and animal production in Albania (with a strong dynamic), North Macedonia and Serbia, and by the manufacture of food products in Albania, Bosnia and Herzegovina, North Macedonia, Montenegro, Serbia and Kosovo. Montenegro and Kosovo also show a relatively high share of exports of tobacco products. Exports have been rising strongly in Albania, Serbia and Kosovo.

For the economies for which SBS data⁵ are availa-

(4) The GVC position indicates whether the industry of a country has stronger forward linkages (a country's value added in exports which goes into exports of other countries) or backward linkages (the foreign value added of a country's gross exports).

(5) Eurostat, Structural business statistics (SBS). These data do not include agriculture (NACE A).

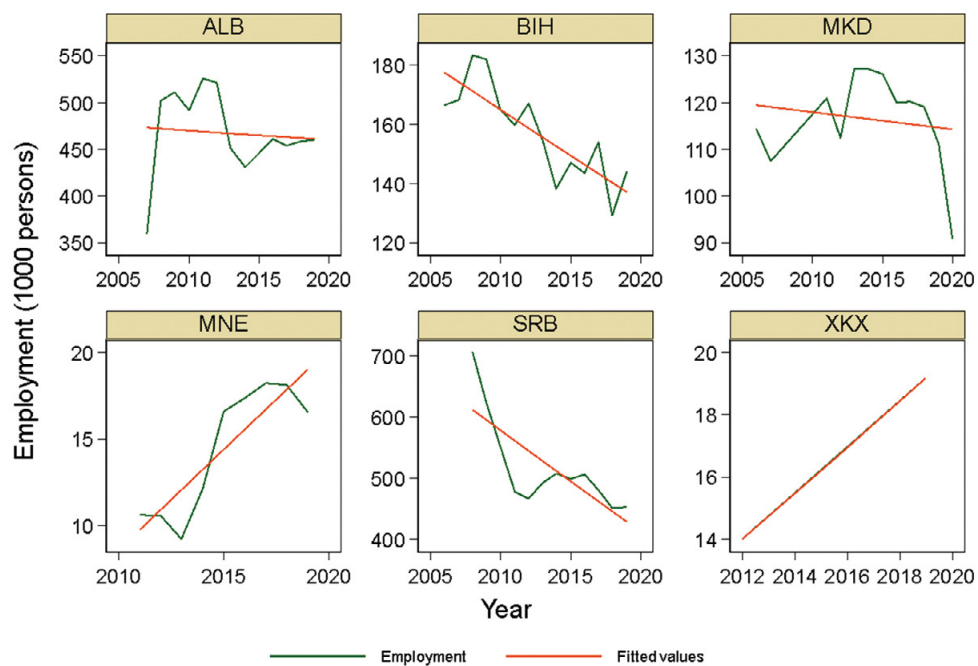
Figure 2.1. Value added shares of the agri-food sector



Note: Fitted values are calculated as a linear trend.

Source: wiiw MC IOD (Reiter and Stehrer, 2021); own calculations.

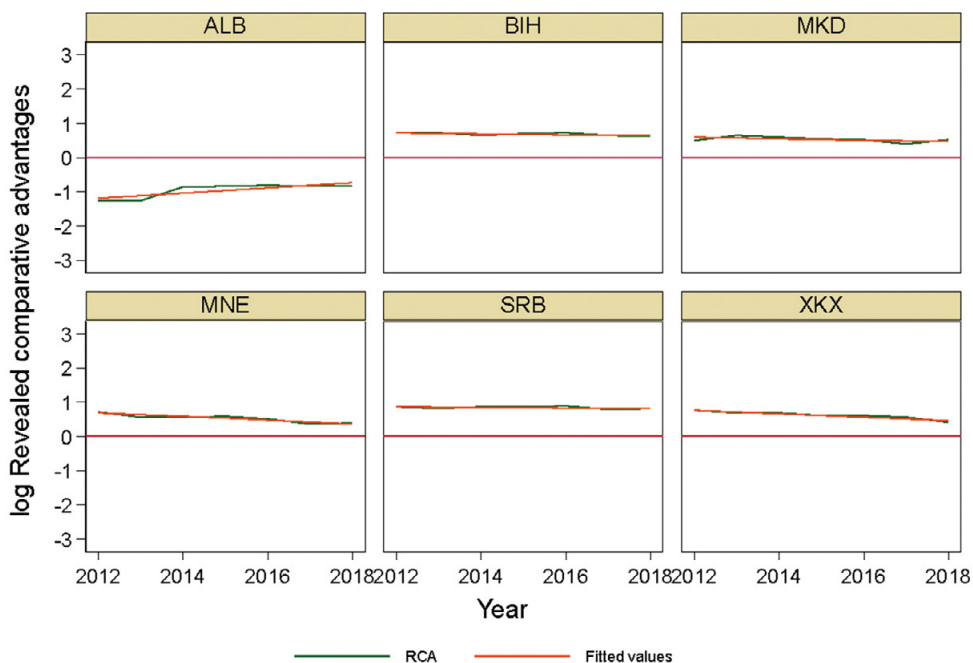
Figure 2.2. Employment levels in the agri-food sector



Note: 1) Fitted values are calculated as a linear trend. 2) For Kosovo only data for 2012 and 2019 are available.

Source: Sources: ILO (accessed March 2021); own calculations.

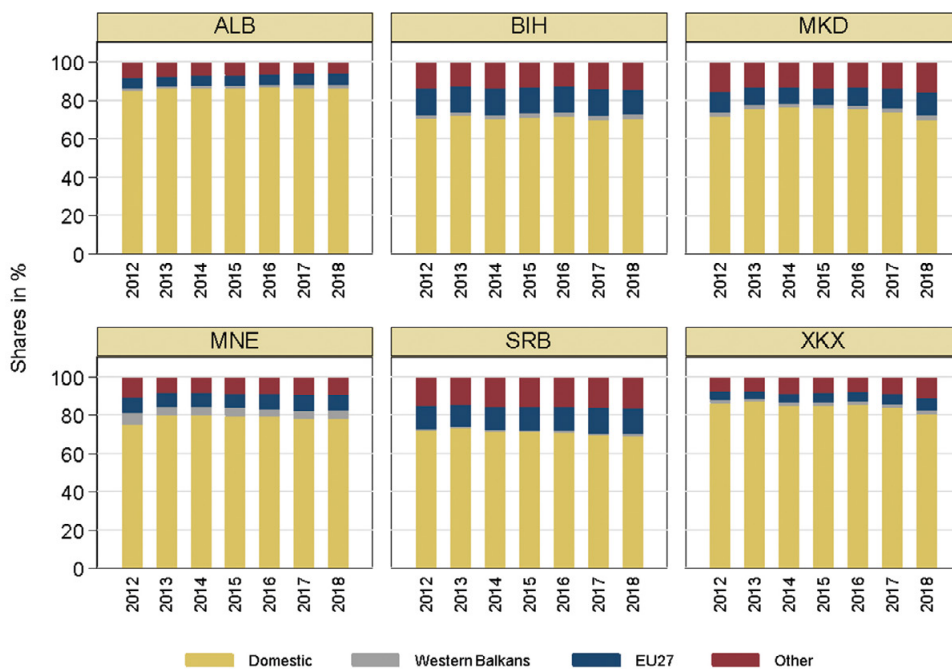
Figure 2.3. Revealed comparative advantages in the agri-food sector



Note: Fitted values are calculated as a linear trend.

Source: wiiw MC IOD (Reiter and Stehrer, 2021); own calculations.

Figure 2.4. Value-added structure of gross exports in the agri-food sector

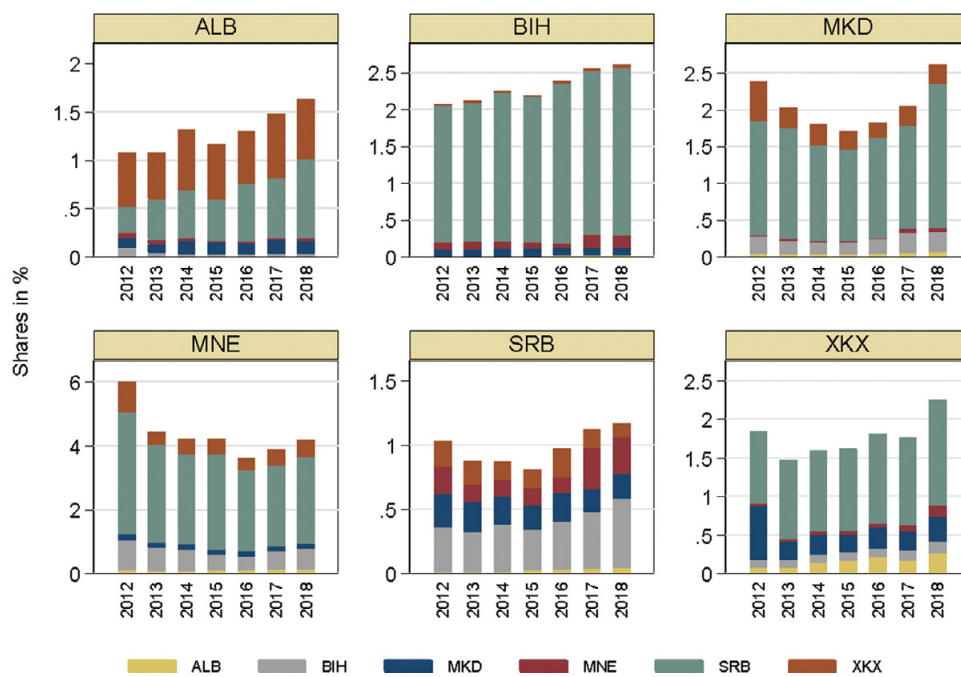


Source: Sources: wiiw MC IOD (Reiter and Stehrer, 2021); own calculations.

ble (Bosnia and Herzegovina, North Macedonia and Serbia), the data show that the industry structure is dominated by the manufacture of food products and much less so by beverages (*Table 2.1*). Within the food products industry (*Table 2.2*), the manufacture of bakery and farinaceous products (NACE

C107) is particularly important in Bosnia and Herzegovina and North Macedonia (especially when considering the number of firms and persons employed), whereas the structure in Serbia is more differentiated.

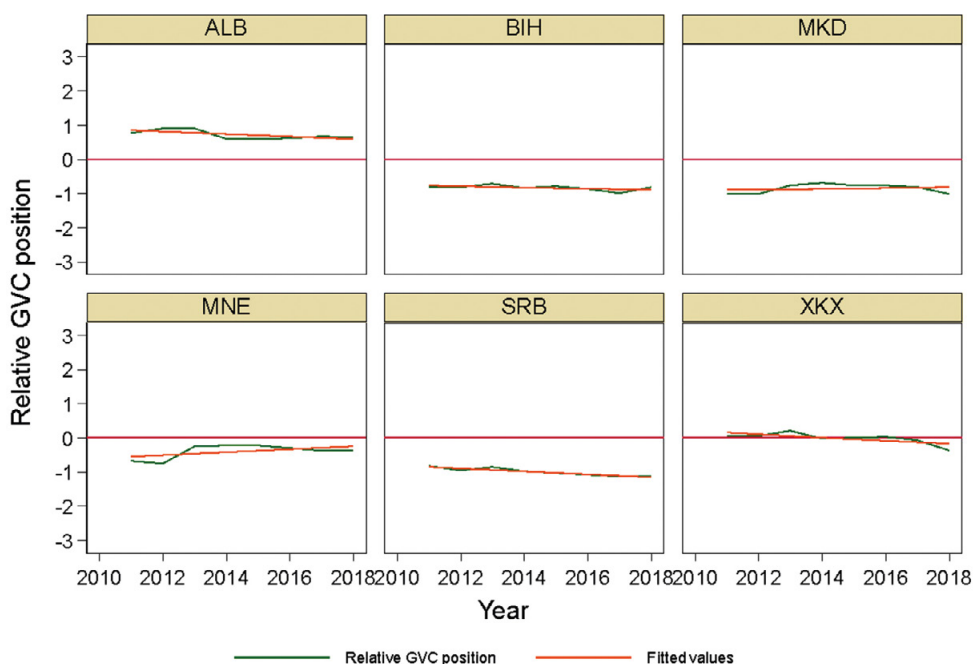
Figure 2.5. Intra-WB backward linkages in the agri-food sector



Note: Fitted values are calculated as a linear trend.

Sources: *wiiw MC IOD (Reiter and Stehrer, 2021); own calculations.*

Figure 2.6. Relative GVC position of the agri-food sector



Note: Fitted values are calculated as a linear trend.

Sources: wiiw MC IOD (Reiter and Stehrer, 2021); own calculations.

Figure 2.7. Gross exports in the agri-food sector



Note: 01 ... Crop and animal production, hunting and related service activities; 02 ... Forestry and logging; 03 ... Fishing and aquaculture; 10 ... Manufacture of food products; 11 ... Manufacture of beverages; 12 ... Manufacture of tobacco products

Sources: EU Comtrade (accessed March 2021); own calculations.

Table 2.1. Detailed industry structure of CA, 2019

NACE Rev. 2 code	Description	Levels			Shares in %		
		Bosnia and Herzegovina	North Macedonia	Serbia	Bosnia and Herzegovina	North Macedonia	Serbia
		Enterprises - number					
CA	Manufacture of food, beverages and tobacco	2,525	1,772	3,309	100.0	100.0	100.0
C10	Manufacture of food products	2,401	1,656	2,909	95.1	93.5	87.9
C11	Manufacture of beverages	118	106	388	4.7	6.0	11.7
C12	Manufacture of tobacco products	6	10	12	0.2	0.6	0.4
		Value added at factor cost – EUR million					
CA	Manufacture of food, beverages and tobacco	378	180	1,341	100.0	100.0	100.0
C10	Manufacture of food products	296	158	974	78.3	87.3	72.7
C11	Manufacture of beverages	89		256	23.5	0.0	19.1
C12	Manufacture of tobacco products	-7	23	111	-1.8	12.7	8.2
		Persons employed - number					
CA	Manufacture of food, beverages and tobacco	28,650	18,951	75,316	100.0	100.0	100.0
C10	Manufacture of food products	25,657	17,751	65,717	89.6	93.7	87.3
C11	Manufacture of beverages	2,619		8,168	9.1	0.0	10.8
C12	Manufacture of tobacco products	374	1,200	1,431	1.3	6.3	1.9

Sources: SBS Eurostat (accessed March 2021); own calculations.

Table 2.2. Detailed industry structure of C10 (Manufacture of food products), 2019

NACE Rev. 2 code	Description	Levels			Shares in %		
		Bosnia and Herzegovina	North Macedonia	Serbia	Bosnia and Herzegovina	North Macedonia	Serbia
		Enterprises - number					
C10	Manufacture of food, beverages and tobacco	2,401	1,656	2,909	100.0	100.0	100.0
C101	Processing and preserving of meat and production of meat products	413	56	346	17.2	3.4	11.9
C102	Processing and preserving of fish, crustaceans and molluscs			16			0.6
C103	Processing and preserving of fruit and vegetables	135	138	713	5.6	8.3	24.5
C104	Manufacture of vegetable and animal oils and fats			45			1.5
C105	Manufacture of dairy products	88	95	173	3.7	5.7	5.9
C106	Manufacture of grain mill products, starches and starch products	78	58	193	3.2	3.5	6.6
C107	Manufacture of bakery and farinaceous products	1,418	947	727	59.1	57.2	25.0
C108	Manufacture of other food products	203	333	533	8.5	20.1	18.3
C109	Manufacture of prepared animal feeds	45	19	163	1.9	1.1	5.6
		Value added at factor cost – EUR million					
C10	Manufacture of food products	296	158	975	100.0	100.0	100.0
C101	Processing and preserving of meat and production of meat products	84	11	142	28.4	7.0	14.6
C102	Processing and preserving of fish, crustaceans and molluscs			0			0.0
C103	Processing and preserving of fruit and vegetables	16	23	133	5.5	14.2	13.7
C104	Manufacture of vegetable and animal oils and fats			30			3.1
C105	Manufacture of dairy products	30	25	160	10.0	15.9	16.5
C106	Manufacture of grain mill products, starches and starch products	10		55	3.3		5.6
C107	Manufacture of bakery and farinaceous products	95	39	161	32.0	24.9	16.5
C108	Manufacture of other food products	41	50	204	13.8	31.8	20.9
C109	Manufacture of prepared animal feeds	16		89	5.4		9.1
		Persons employed - number					
C10	Manufacture of food products	25,657	17,751	65,717	100.0	100.0	100.0
C101	Processing and preserving of meat and production of meat products	5,147	1,313	12,546	20.1	7.4	19.1
C102	Processing and preserving of fish, crustaceans and molluscs			104			0.2
C103	Processing and preserving of fruit and vegetables	1,413	1,870	10,420	5.5	10.5	15.9
C104	Manufacture of vegetable and animal oils and fats			2,268			3.5
C105	Manufacture of dairy products	1,426	1,906	6,369	5.6	10.7	9.7
C106	Manufacture of grain mill products, starches and starch products	1,380		4,702	5.4		7.2
C107	Manufacture of bakery and farinaceous products	11,764	7,201	14,591	45.9	40.6	22.2
C108	Manufacture of other food products	2,576	4,462	10,680	10.0	25.1	16.3
C109	Manufacture of prepared animal feeds	1,241	64	4,037	4.8	0.4	6.1

Sources: SBS Eurostat (accessed March 2021); own calculations.

2.2 Review of the agri-food chain

2.2.1 Digging

2.2.1.1 Firm-level data analysis

According to the Orbis database,⁶ there are 281,697 business entities in the Western Balkans operating in the agri-food sector. The distribution by economies is shown in [Figure 2.8](#). Most of the entities are from North Macedonia (202,284, or 72%).⁷ The majority of these entities are individual agricultural producers (156,000), listed in the business registry owing to their tax benefits. Individual producers are present in the other economies too, but their number is relatively limited. Albania and Serbia have 11% and 10% of these organisations, respectively. Kosovo accounts for 5% of the units, while Bosnia and Herzegovina and Montenegro have 1% each.

Of these 281,697 entities, financial data are available for 20,157 firms ([Table 2.3](#)), and here individual producers are just several hundred, not distorting the picture. These entities own total assets of EUR 26 billion and generate operating revenues of EUR 14 billion annually, making the agri-food sector one of the biggest of the six value chains analysed in this report. They employ 192,000 people, which is by far the largest number among the six chosen sectors. These are mainly domestically owned (65%).

The average organisation in the sector has assets of EUR 1.3 million and generates annual revenues of EUR 800,000, meaning that entities from this sector are moderately big. The average gross salary per worker is EUR 641 per month, which is around the mean for all the sectors. Each worker employed generates EUR 76,000 per year, making these companies highly productive. Each asset worth EUR 1 generates 55 cents worth of operat-

ing revenues per year, which is again around the mean for all the sectors.

[Table D.1](#) in the Appendix shows the 30 biggest companies in the agri-food sector according to operating revenues. It can be seen that most of the companies are major multinational companies with operations in different economies. Most of the companies are foreign-owned (around two-thirds).

FDI Markets, an online foreign direct investment (FDI) database, lists 645 projects for cross-border greenfield investment in the Western Balkan economies in 2015-2020. Of these, 45 projects are in the agri-food sector (7%). Their total value is EUR 652 million (3% of all investment), and they employ 5,093 people in total (2% of employment). These figures are among the smaller ones for the six sectors, indicating that the agri-food sector is not particularly attractive for foreign investors.

Most of the agri-food projects are located in Serbia, accounting for 75% in terms of the capital investment and for 71% in terms of employment. The share of the other economies ranges between 2% and 12%. This indicates that Serbia is by far the most attractive destination for foreign investors as far as the agri-food sector is concerned.

The agri-food investment projects in the WB region are in general small. The average size of a project is EUR 14 million, with 113 employees, which is relatively small compared with the other chosen sectors. The biggest project is the investment of the Barry Callebaut Group, a manufacturer of chocolate and cocoa products, in Novi Sad in Serbia. The investment was announced in 2019 and the plant is expected to become operational in 2021. The value of the investment is EUR 50 million, and around 100 people are expected to work in the factory. The facility, which is expected to have an initial annual production capacity of over 50,000 tonnes of chocolate, compound and filling products, will serve as a regional hub for the markets of Southeast Europe. The Group's annual sales amount to around EUR 6 billion; it has 60 production facilities worldwide and employs a diverse and dedicated global workforce of more than 11,500 people.

(6) The data were extracted on 08/04/2021 and were last updated on 06/05/2021 (n° 209001).

(7) It should be noted that there could be insufficient observations for certain WB countries in the Orbis database.



Sources: Own calculations using data from Orbis (accessed May 2021).

The second-biggest project is the EUR 34 million investment in a baby-food factory by the Russian company Farmalakt in Serbia's capital, Belgrade. The plant was opened in 2018 and employs 100 highly qualified experts of various profiles; this number is expected to grow to 300 in the coming

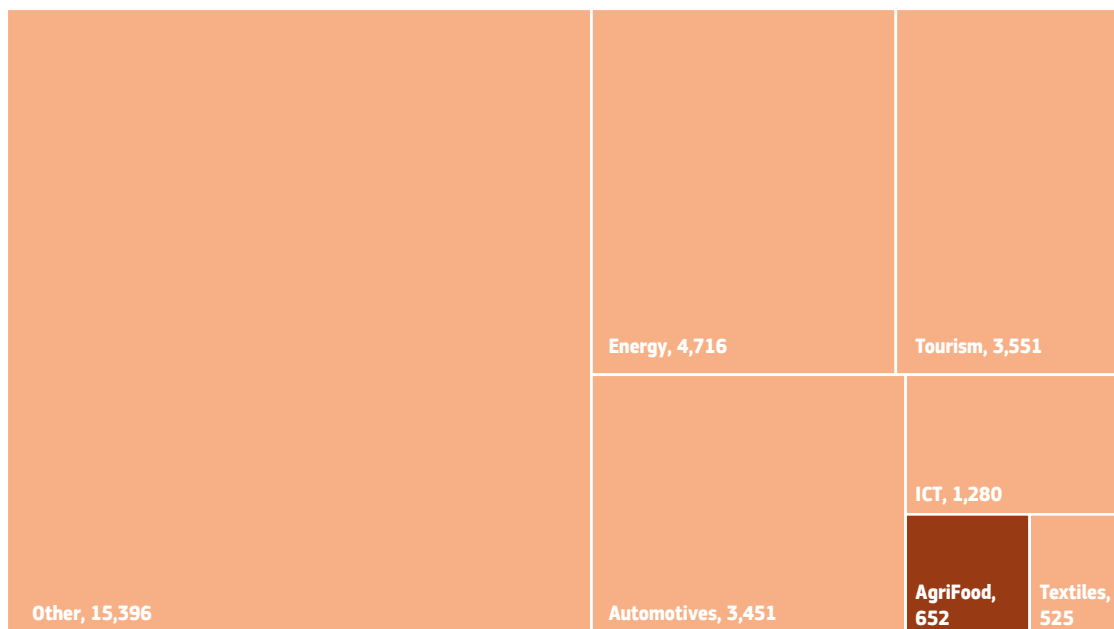
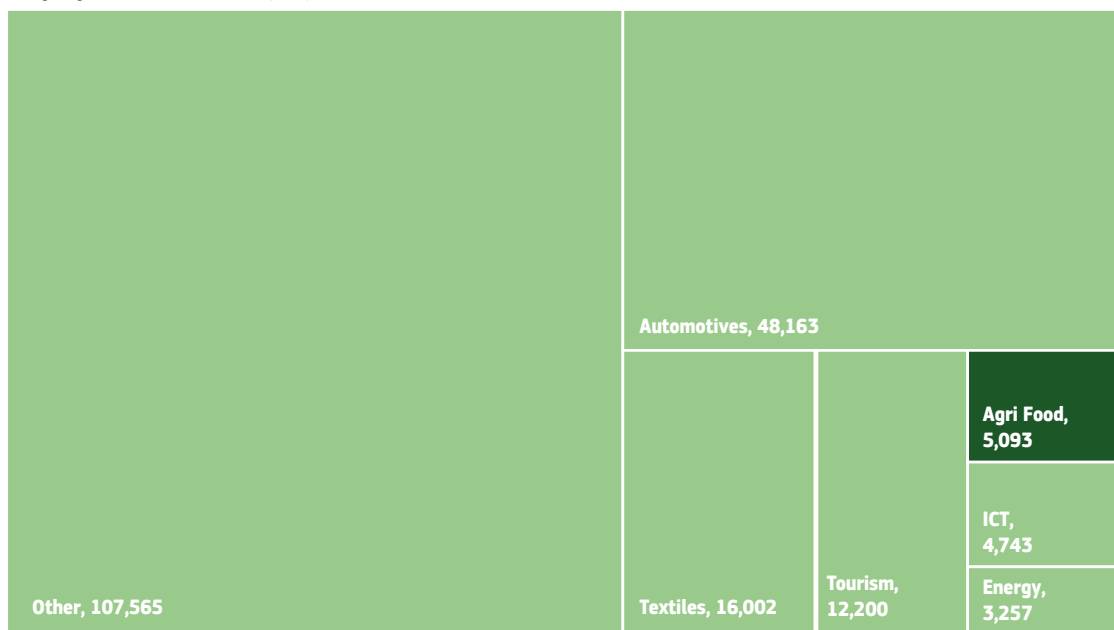
years. The factory is high-tech and equipped with physico-chemical and microbiological laboratories. It produces baby products under the brand name Nutrino that are expected to be sold throughout the region.

Table 2.3. Overview of companies in the agri-food sector (in 2019)

Number of firms	Total assets (EUR)	Operating revenue/turnover (EUR)	Costs of employees (EUR)	Number of employees	Foreign owned
20,157	26,293,603,880	14,496,707,929	1,477,574,829	191,954	35%
Average assets per firm (EUR)	Average revenue per firm (EUR)	Average number of employees per firm	Average gross monthly salary (EUR)	Revenue per 1 EUR assets (EUR)	Revenue per worker (EUR)
1,304,440	719,190	10	641	0.55	75,521

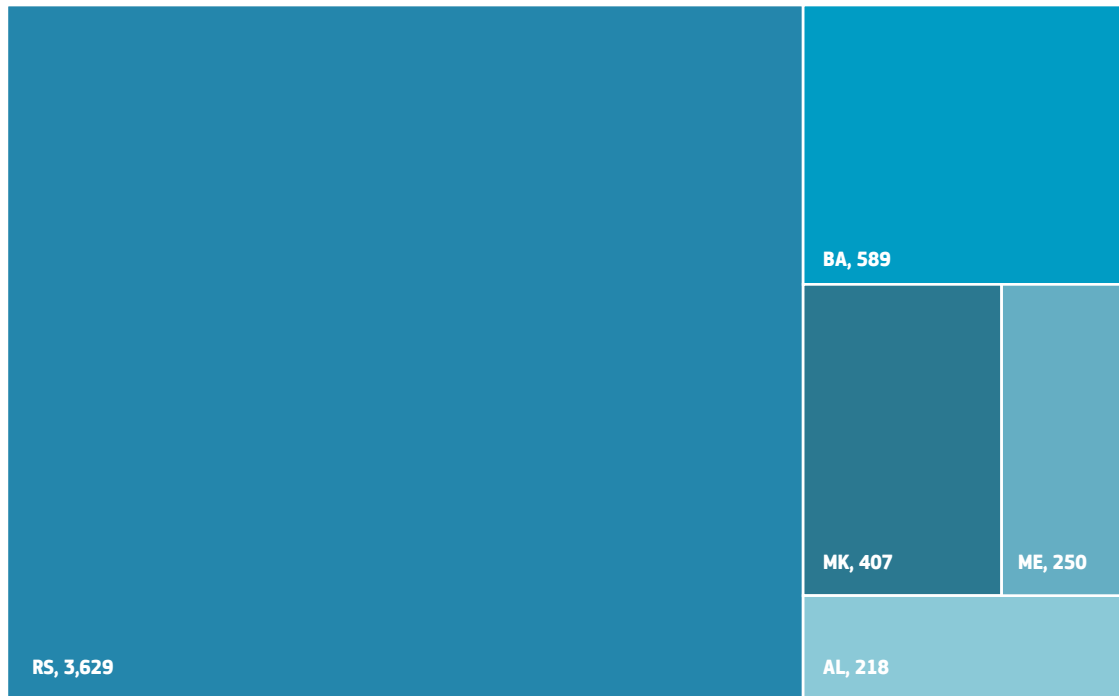
Source: Own calculations using data from Orbis (accessed May 2021).

Figure 2.9. Share of agri-food projects in all fDi projects

Capital investment (EUR million)**Employment** (number of people)

Sources: Own calculations using data from the fDI Markets database (accessed May 2021).

Figure 2.10. Distribution of the agri-food projects by economies

Capital investment (EUR million)**Employment** (number of people)

Sources: Own calculations using data from the fDI Markets database (accessed May 2021).

2.2.1.2 Patent data analysis

Efforts in R&D are an important indicator of prospective economic success. For this reason, we examine the patent activities of the region's economies (for total numbers see [Table C.7](#) in Appendix C.4.1). Holding an intellectual property right (IPR) already presumes a degree of technological know-how, which can be commercially exploited in the future. However, this analysis has to distinguish between various economic sectors, since there are substantial differences in lead times between R&D commitment and business success in different areas of the economy. The following analyses show in detail the various strengths of the WB economies in the six examined value chains. The key findings are based on a breakdown of the patents according to different technology areas within the value chain.

The patent analysis in the field of agri-food examined here overlaps with other technology areas. With the help of a technology network the most important technology areas in the core area are identified and overlaps with other technologies are ascertained. The analysis is based on patents awarded over the period 2000–2020. The larger the nodes, the more connections there are with other areas. The largest cluster in this technology area is found in patent groups A23L2 (Non-alcoholic beverages), A23L27 (Spices) and A23C (Dairy products), and in addition subclass A23L is the most frequently featured (see [Table 2.4](#)). It can thus be seen that non-alcoholic beverages are the most IPR-protected items in this group. In the largest networks (marked in green, orange and light orange) there are almost no overlaps with other sectors. Apart from this large and interconnected cluster there are also smaller networks. The largest of these (in blue) is the network around patent class A23 (Animal feed). Here we can also see connections with medical products. Another strongly IPR-protected area is patent class A01H (New plants or non-transgenic processes for obtaining them), where overlaps in the chemical sector can also be seen ([Figure 2.11](#)).

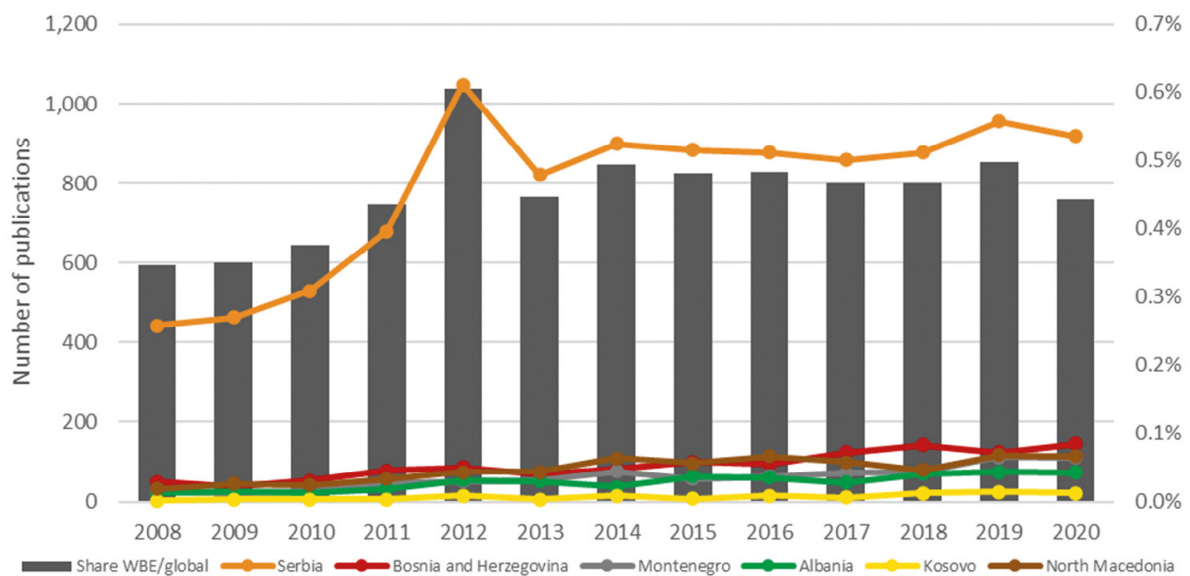
2.2.1.3 Scientific and research publications

The Scopus database – one of the central scientific citation databases with about 80 million documents – is used to evaluate scientific publications in this study. The period considered covers the period 2008–2020, and therefore the latest scientific developments. In order to analyse the share of the WB economies in all scientific publications in the different technologies, a global benchmark is applied in this publication analysis. A quantitative analysis sheds light on the 'dynamic' of a research field (value chain) and provides information about the impact of the WB economies as a whole and individually. At the country level, cooperation networks are mapped based on the identified co-authored publications. These science maps show the extent of the interaction of the WB economies in an international context for each value chain. In addition, the integral actors of the WB economies in these cooperation networks can be determined.

In the Scopus database, the documents are grouped in thematic 'subject areas', which in turn are subdivided into different 'subject categories'. In order to conduct the analysis, publications in the subject area 'Agricultural and Biological Sciences' are examined. This subject area includes the following subject categories: 'General Agricultural and Biological Sciences', 'Agricultural and Biological Sciences (miscellaneous)', 'Agronomy and Crop Science', 'Animal Science and Zoology', 'Aquatic Science', 'Ecology, Evolution, Behaviour and Systematics', 'Food Science', 'Forestry', 'Horticulture', 'Plant Science' and 'Soil Science'.

Scopus contains a total of 2,784,562 documents on the subject area 'Agricultural and Biological Sciences' for the period 2008–2020. Serbia is the most active of the WB economies, with 10,256 publications, followed by Bosnia and Herzegovina with 1,178 and North Macedonia with 1,052. Altogether, the share of the WB economies in the global output of scientific publications is 0.5%. The share increased between 2008 and 2012 and has been relatively stable since then (see [Figure 2.12](#)).

Figure 2.12. Scientific publications in 2008–2020 in the agri-food sector



Note: WBE denote Western Balkan economies

Sources: Scopus (accessed March 2021); own calculations.

The previous analysis provides interesting findings and grants a holistic overview. However, the results are not yet meaningful enough, as absolute values are compared. The weighting applied to publications from Serbia, with around 7 million inhabitants, is the same as that applied to publications from Montenegro with 620,000 inhabitants. Therefore, in the next step we control for size effects and put the publications in relation to 100,000 inhabitants (*Figure 2.13*).

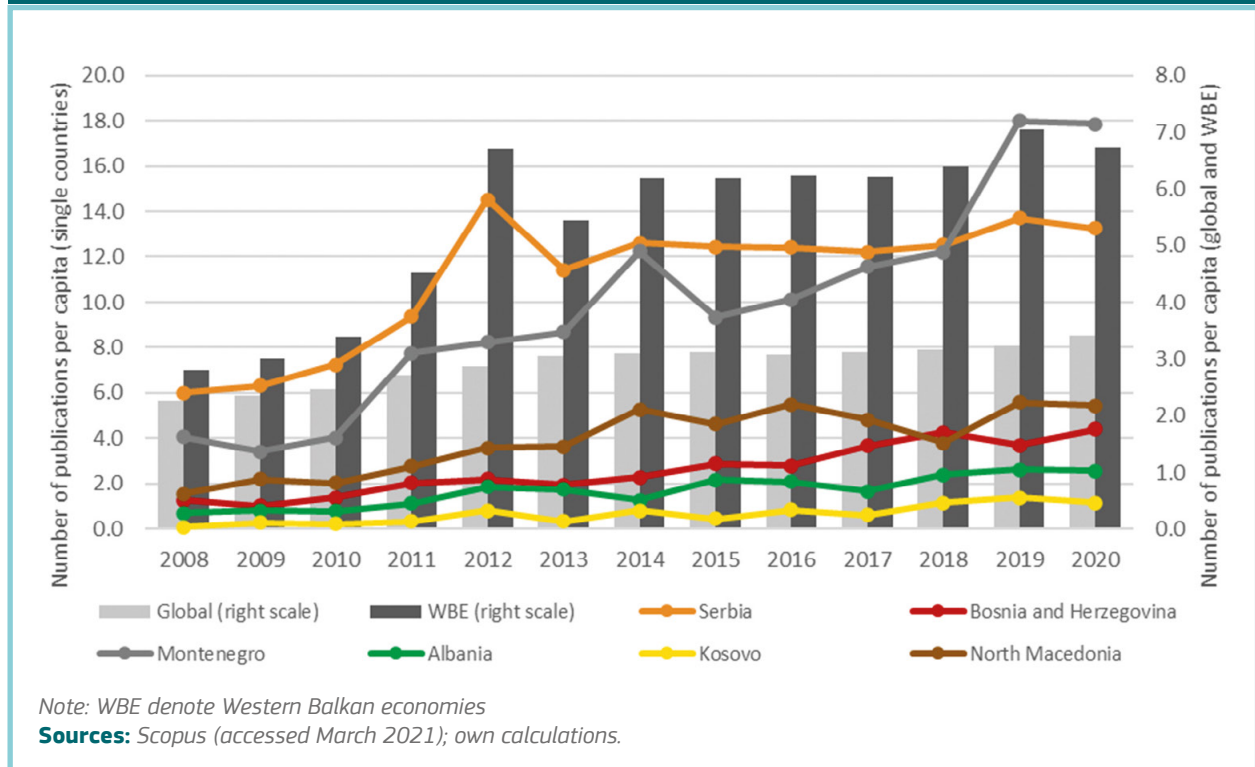
In 2008 the global output of publications per 100,000 inhabitants was almost the same as the output of the WB economies (2.3 versus 2.8). Subsequently, output per 100,000 inhabitants in the WB economies increased to 6.7 in 2020, compared with 3.4 globally. In 2020 the most active contributors among the WB economies were Montenegro (17.8) and Serbia (13.3).

The science map (*Figure 2.14*) shows the international cooperation network of the WB economies over the period 2008–2020. The database consists of publications with the involvement of at least one WB economy. Each node represents

one territory, where the size reflects the number of publications in the respective economy and the edges the number of co-authored publications with another economy. The location of an economy on the map is determined by the attraction to its research partners and the repulsion from economies without co-authored publications. The different colours mark the affiliation to a 'narrower research cluster'.

In the value chain 'agri-food' the research network of the WB economies consists of 160 countries. The research organisations in Serbia, which is the most active economy with a total of 10,256 documents, cooperate with almost every country in this sample (153 out of 160). Serbia has the strongest connections with Croatia (604 joint publications), Italy (590), and Germany (574). Bosnia and Herzegovina, which comes second in this value chain, often cooperates with Serbia (404), Croatia (362) and Slovenia (151). Serbia is also the most important research partner for Montenegro (254) and North Macedonia (262). However, Albania's most important cooperation partner is Italy, with 166 shared publications, followed by Serbia (107).

Figure 2.13. Scientific publications per capita in the agri-food sector, 2008–2020



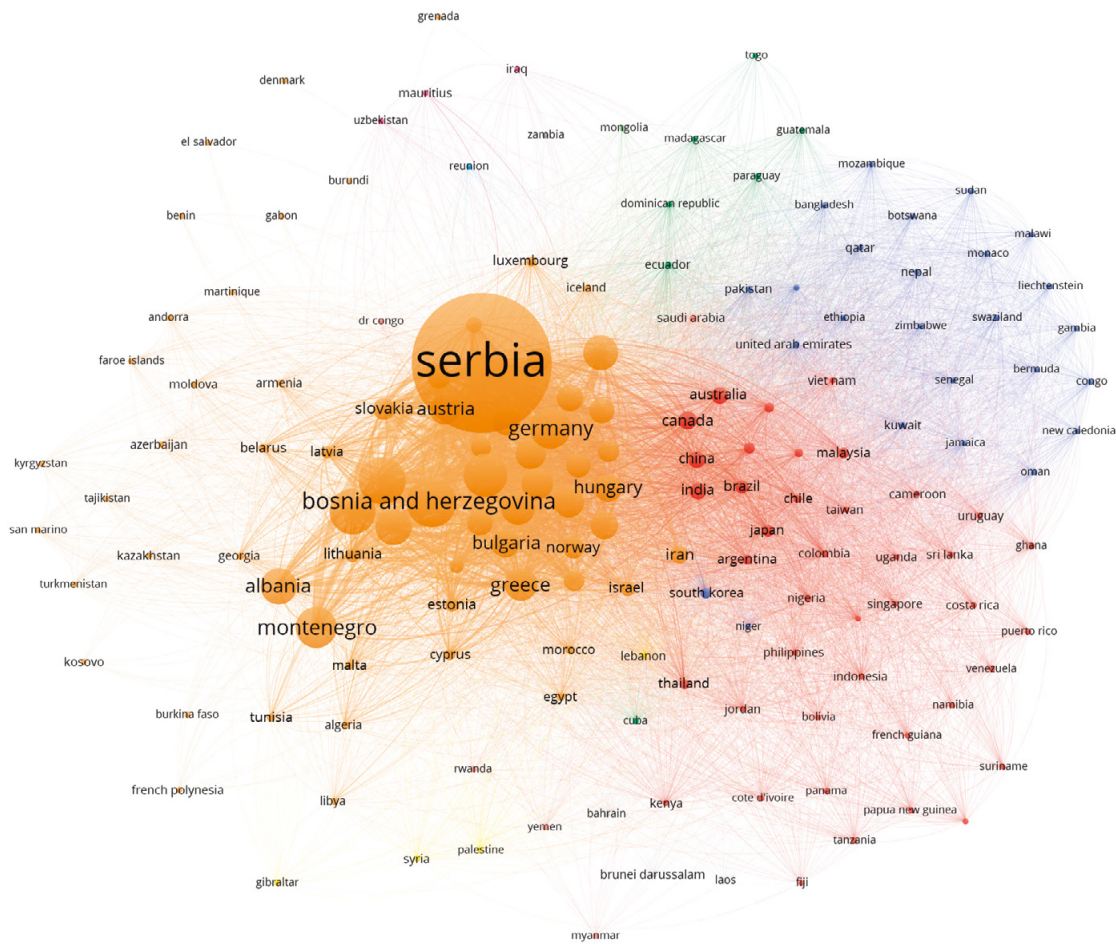
On the meso level (Figure 2.15), the most active organisations are the University of Belgrade with more than 5,500 documents in the agri-food value chain, followed by the University of Novi Sad (Serbia), the University of Montenegro, the Institute of Field and Vegetable Crops in Novi Sad and the University of Niš (Serbia).

2.2.2 Determining

The largest number of companies analysed in this study are located in Serbia and North Macedonia. The companies that are active in the agri-food sector in the Western Balkans have a simple value chain composed of the following levels: input supply, production, collection, processing, transport/storage and retailing. Each level of the value chain has its actors, and in some cases one actor may be involved in several different levels of the value chain. The nature of the production process in the agri-food sector classifies all actors as equally important participants in the value chain. Observed by levels, the main actors in the value chain perform the following activities:

- Input supply:** The first level of the value chain, which includes actors such as small agricultural households and smallholders. Small farmers and smallholders supply inputs to actors from the second level of the value chain (production). At this level of the value chain veterinary stations and agricultural pharmacies, whose services ensure the smooth operation of actors from the second level of the value chain, are often included.
- Production:** The second level of the value chain, which includes medium-sized and large-scale farmers. At the same time, if they have sufficient production capacity, smallholder farmers can also be actors at this level of the value chain. These actors are engaged in the production of cereals, fruits, vegetables, large and small livestock and all by-products (e.g. eggs, milk, leather, etc.).
- Collection:** The third level of the value chain, which includes actors such as traders and agricultural cooperatives. Stakeholders at this level of the value chain produce and purchase

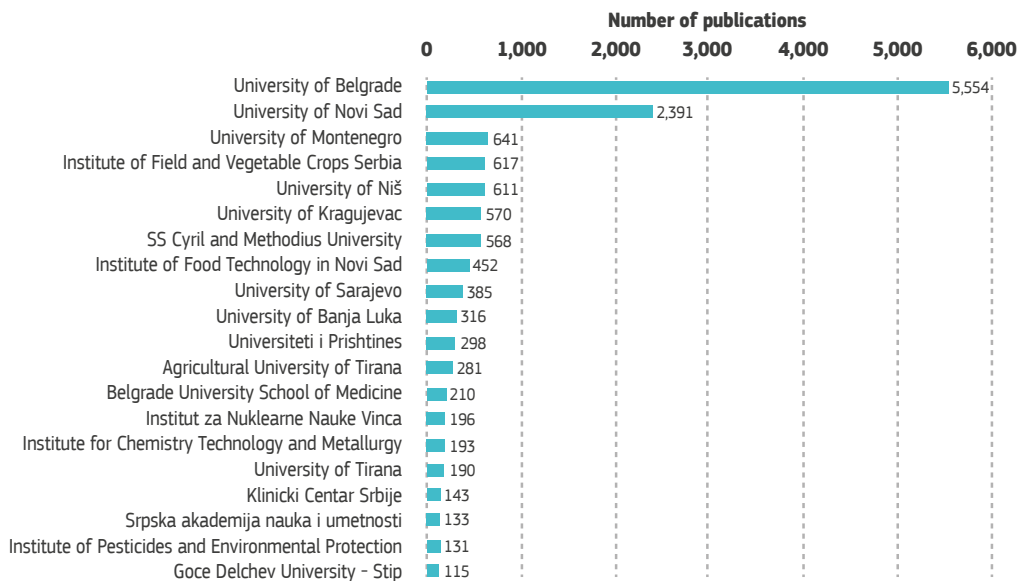
Figure 2.14. Cooperation network WB economies in the agri-food sector, 2008-2020



Note: Nodes = Number of documents; Edges = Number of co-authored publications.

Sources: Scopus (accessed March 2021); own calculations.

Figure 2.15. Active organisations* in the agri-food sector, 2008-2020



Sources: Scopus (accessed March 2021); own calculations.

products independently of smallholders and medium-sized and large-scale farmers. In this way, they have a larger number of products that can meet the needs of actors from the next level of the value chain (processing).

- **Processing:** The fourth level of the value chain, in which the main actors are medium-sized and large-scale processing companies. These companies process raw materials that have been supplied by actors from the previous level of the value chain. Going through different phases of the production process in these companies, a finished product is formed. The analysed companies offer the following products: fruit juices, fruit nectar, non-carbonated drinks, different types of beer, bottled wine, soybean oil, rapeseed oil, sunflower oil, soybean cake, rapeseed cake and sunflower cake, mayonnaise, margarine, fresh meat, finished meat products and meat processing services, etc.
- **Transport/storage:** The fifth level of the value chain, in which the main actors are shipping companies and warehouses. Shipping and warehousing companies act as intermediaries between processing companies and retailing actors.
- **Retailing:** The sixth level of the value chain, in which the main actors are wholesale and retail facilities (e.g. supermarkets, restaurants, hotels, airlines, schools, kindergartens, animal feed suppliers, etc.). Actors at this level of the value chain deal with the placement of the finished product.
- **Consumption:** The seventh level of the value chain, where the main actors are the final consumers. Consumer satisfaction determines future trends in the entire value chain.

2.2.3 Decomposing

2.2.3.1 Overview

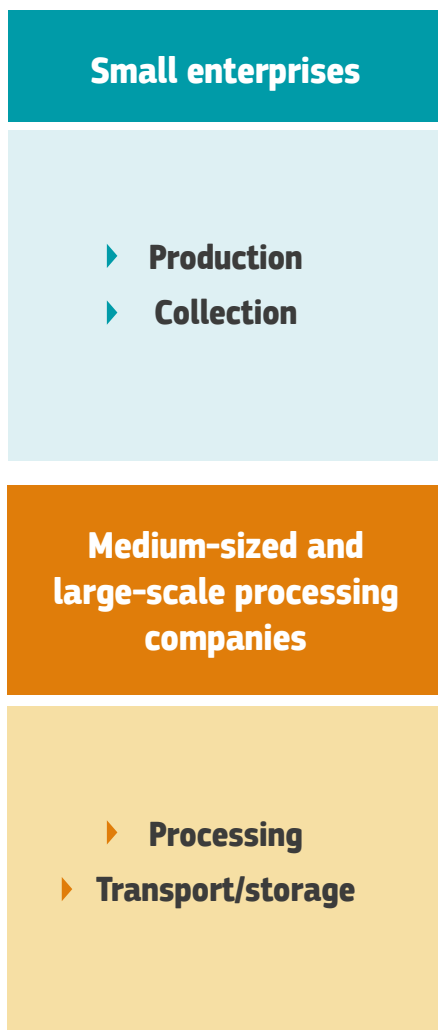
Food production is a precondition for human survival, and as such it is the basis for the development of regional and international cooperation. The analysed companies, in different phases of their business processes, cooperate to different degrees with companies from almost all economies in the Western Balkans. The agri-food sector is a significant segment of the economic and social structure and plays an important role in the stability of the overall economic flows in the Western Balkans. The abundance of natural resources and favourable climatic conditions make agri-food one of the sectors with the longest tradition in this region. The average length of time during which the analysed companies have been doing business is 22 years. None of them has been operating for less than a decade, and the companies with the longest tradition have been operating successfully for almost a century.

In addition to a long tradition, the transition process and the effects of the global economic crisis have driven a large number of Western Balkan residents to seek a source of income in the agri-food sector. Although it generates a significant number of jobs, economic reforms have seen to it that the agri-food sector, unlike the services sector, has not prospered sufficiently and failed to achieve substantial development dynamics. Actors at all levels of the value chain in the WB agri-food sector have the potential to develop further and strengthen their inter-relationships primarily through the modernisation of business processes. This refers mainly to small agricultural households, smallholders and medium-sized farmers who dominate the sector but who, because of their size, do not have enough capacity and financial resources to reach the required level of quality of their products. What is also holding them back is the fierce competition between them, and the chances of being included in the value chain increase in proportion to their abilities and capabilities to meet the needs of processing companies, which are fewer in number. In order to develop the

potential of the agri-food sector, it is necessary for the governments of all the WB economies to develop measures aimed primarily at subsidising small agricultural producers.

Regarding the number of employees, small businesses mainly perform the activities within the second (production) and third (collection) levels of the value chain. Medium-sized and large companies mainly perform activities in the fourth (processing) and fifth (transport/storage) levels of the value chain (*Figure 2.16*).

Figure 2.16. The size of enterprises at different levels of the agri-food value chain



Sources: According to survey results (for details see Appendix Section E).

The needs of processing companies significantly determine the direction of development of small producers. Processing companies are domestic private companies or foreign companies (more than 50% of the capital). On the other hand, actors in the lower levels of the value chain (input supply, production and collection) are mostly domestic private companies.

Agricultural and food products are among the most important components of trade for the economies of the Western Balkans. Low value-added products, which account for a negligible share of international trade, form the basis of the WB region's foreign trade. Most processing companies are export-oriented. Processing companies export between 10% and 78% of their total production. The high level of exports in this case is characteristic primarily for companies engaged in wine production. In addition to marketing their products in the Western Balkans region, these companies export a significant share of their production to the EU, Russia, China and the United States. Actors from the collection level of the value chain (traders and agricultural cooperatives) who have the necessary quality certificates are also export-oriented. Certified actors from the collection level export approximately 20% of their products.

In most cases the inputs are obtained from the country in which the processing companies' headquarters are located, mainly because that country generally has a sufficient amount of input. If imports are necessary, processing companies tend to restrict themselves to raw materials such as various packaging, labels, cork, etc., which account for 5-10% of total inputs. These raw materials are not necessarily procured from the region of the Western Balkans but also from EU Member States. It is only when the parent company has its headquarter in one of the EU Member States that processing companies import part of their inputs from other economies in the Western Balkans.

The future development of the agri-food value chain should be based on the integration of national, regional and global objectives in this sector, the coordination of agricultural development with industry, services and other activities, and

the preservation of the environment. The objective is to produce more with less, to use better technologies, to leverage larger capital and knowledge intensities, and to take advantage of

economies of scale while sustaining and increasing small-scale and family farmers' livelihoods. The economy-based representation of agri-food value chain is given in [Box 2.1](#).

Box 2.1 Economy-based representation of the agri-food value chain

Considerable potential in the agri-food sector has been observed in all Western Balkan economies. Fragmented agricultural properties and the unfinished restitution process, i.e. unresolved property-legal relations, have shaped the structure of the value chain in which the actors of the first three levels (input supply, production and collection) dominate. The six economies of the Western Balkans are characterised by a significant number of small agricultural households and smallholders. There are also medium-sized processing companies and a slightly smaller number of large-scale processing companies, as well as traders and agricultural cooperatives. In most cases, these actors in the value chain are domestically privately owned and are widespread in all Western Balkan economies. Actors from the processing level are in domestic private ownership or mixed (private and foreign) ownership, but in most cases these are foreign-owned, and their owners are not from the Western Balkans. Among the Western Balkan economies, the greatest development potential in these companies has been observed in the Republic of Serbia, which generates the highest percentage of agri-food projects in terms of capital investments and as such is the most attractive destination for foreign investors. Connecting small agricultural households, smallholders, medium-sized and large-scale processing companies with medium-sized and large-scale processing companies needs to be improved through national and regional programmes and measures and activities of supporting institutions. Actors in the value chains should be connected at both the national and the regional level to ensure the strengthening of existing value chains and the creation of new ones in the agri-food sector in the Western Balkans. The results from the survey⁸ show that Bosnia and Herzegovina and North Macedonia have the greatest potential in the production of bakery and farinaceous goods. In addition to the production of these goods, the Republic of Serbia has potential in the processing and preserving of fruit and vegetables, the processing and preserving of meat and the production of meat products. Montenegro and Albania lack the capacity to be actors in the processing industry but have significant potential in the production of seasonal fruits, vines and olives as well as in livestock.

(8) Methodological aspects of the survey and interviews including the questionnaire are presented in Appendix Section E.

2.2.3.2 Value-added dynamics in the GVC, identifying types of linkages and relationships between different actors in the GVC

The internationalisation of the food industry requires high-quality production and technological innovation. In that sense, tradition is an important – but not sufficient – condition for the development of competitive products. Involvement in the GVC by a large number of participants from the agri-food sector is complex, but it is also the only possible way to survive and gain international recognition. Therefore, the strategic question arises as to the relations and connections that exist between the participants in the value chain, i.e., small agricultural households and smallholder farmers; medium-sized and large-scale farmers; traders and agricultural cooperatives; medium-sized and large-scale processing companies; shipping companies and warehouses; wholesale and retail facilities; and consumers.

Twenty stakeholders from the agri-food sector from six WB economies participated in our research. We interviewed 6 companies, 4 people from business support organisations, and 1 representative from the scientific community and received survey responses from 9 companies. The analysed companies from the agri-food sector in the Western Balkans claim that their position in GVCs has been upgraded in recent years. The most significant actors in their GVC, according to these companies, are:

- suppliers (medium-sized and large-scale farmers as well as medium-sized and large-scale processing companies),
- users of product/services (buyers), and
- service providers (transport, marketing, post-sale, consulting, financial services, insurance, etc.).

The cooperation between major GVC actors is assessed by them as good (67%) and excellent (33%). As major barriers and bottlenecks, they point to the lack of investment assistance and the distance between their companies and their respective headquarters (e.g. the IT sector). The GVC key partners are:

- buyers (mainly all WB economies),
- suppliers (mainly Serbia and the EU27), and
- service providers (Serbia and the EU27).

The analysed companies have already established cooperation with partners from the WB region. The companies plan to scale up GVC operations in the future. Factors that have led to the decision to set up or join GVC operations in WB economies are geographical location, availability of skilled labour, flexibility of the labour market, cost of energy/supplies and availability of cheap labour.

The value chain in the agri-food sector is characterised by a combination of links between participants. Differences may or may not be conditional on different types of agricultural production (livestock, farming, vegetables, fruit growing, viticulture, etc.) or different types of food industry (dairy, wine, soft drinks, fats and edible oils, meat industry, etc.).

Medium-sized and large-scale processing companies are in the best position in the agri-food value chain in the economies of the Western Balkans. This statement, observed from the point of view of actors in the first three levels of the value chain (input supply, production and collection), is based on the fact that medium-sized and large-scale processing companies have often integrated the production of raw materials into their business processes. For example, in addition to processing, wineries are also engaged in the production of vines on their plantations and depend to a much lesser extent or not at all on individual small agricultural households and smallholder farmers (input supply level), or medium-sized and large-scale farmers (production level). This is one of the reasons why actors from the input supply level and the production level find it more difficult to be included in the value chain. Another reason is their size, i.e., their capacity and the quality of their production, which means that they are often unable to meet the needs of medium-sized and large-scale processing companies. For these reasons, the value chain includes traders and agricultural cooperatives (collection level), which are able to collect larger quantities of raw materials (from input sup-

ply and production-level actors) and deliver them to processing-level actors. Also, traders and agricultural cooperatives find it easier to obtain certificates of different quality standards (they have greater financial power and have a larger quantity of raw materials that they can classify and obtain the same quality certificates for the same items). From the point of view of actors at higher levels of the value chain, medium-sized and large-scale processing companies are again in a better position. This is because medium-sized, and above all large-scale processing companies can have their own warehouses and vehicles and they carry out forwarding on their own either completely or in part, which allows them to be independent or only partially dependent on shipping companies and warehouses (transport/ storage level).

Value added increases with increasing value chain levels. From the first to the last level of the value chain, the number of activities and resources used that add value to the final product increases. Observed by levels, the cooperation between the different actors and value-added growth works as follows:

- **Input supply:** The need for inputs is determined by the type of agricultural production that the second-level actors in the value chain are engaged in. Small agricultural households and smallholder farmers produce the following types of inputs: seeds, seedlings, animal feed, manure, etc. In most cases actors from this level of the value chain do not have a sufficient amount of input with which to act directly on the market. Such cases are very rare and involve mainly the placement of raw materials in local markets. The added value of the product at this level of the chain is the lowest.
- **Production:** Smallholders and medium-sized and large-scale farmers produce inputs themselves or obtain them from actors from the first level of the value chain (input supply). Smallholder farmers are mainly engaged in extensive agricultural production, which is why they generally do not have enough capacity to deliver their products to fourth-level actors (processing) independently. Actors from the third level of the value chain (collection) act as intermediaries. On the other hand, medium-sized and large-scale farmers who depend on their capacities and levels of development are included in the value chain in three ways: they either deliver products through actors from the collection level to actors from the processing level, or they deliver their products directly to actors from the processing level, or they place their products directly on the market (wholesale and retail). The type of inclusion in the value chain depends on their production capacity and the extent to which they meet quality standards. Medium-sized and large-scale farmers engaged in intensive agricultural production are generally directly linked to actors from the fourth, fifth or sixth level of the value chain. Intensive agricultural production, characterised by a higher level of invested capital and human resources, rejects higher yields per unit of sown area and livestock. It is a commercial agricultural production that relies on industrial production methods, i.e. the intensive use of modern mechanisation. Therefore, the added value of the product at this level is still low.
- **Collection:** This is the level at which value is added to agricultural products through the charging of classification and storage services (storage in silos or cold stores). Also, it is at this level of the value chain that agricultural products of the best class and quality, with certification provided by agricultural cooperatives, become attractive to actors from the next levels of the value chain.
- **Processing:** At this level added value increases at each stage of the production process. The added value grows from the raw material classification line through the various stages of production to the product labelling and packaging line. All analysed medium-sized and large-scale processing companies are subcontractors of the parent company. Medium-sized and large-scale processing companies place their products directly on the local and inter-

national market in wholesale and retail facilities, or they do so indirectly. Direct placement is possible if processing companies have their own warehouses and shipping facilities. Otherwise, these companies are connected to the sixth level of the value chain (retailing) through companies engaged in storage and forwarding. The shares of analysed processing companies in the total value of the GVC are mostly between 5% and 15%.

- **Transport/storage:** The results obtained from our research show that warehousing companies also provide forwarding. Whether they have their own carriers or pay distributors, in addition to storing goods warehousing companies also perform a transport service. These are warehouses that are located in the industrial zones of larger cities and have their distribution centres in the Western Balkans region. These warehouses are used by manufacturers, importers, exporters, transport companies, customs and others. Warehousing companies either own or rent the space. Value added at this level increases by the amount that processing companies pay for transport, sorting, storage and packaging services for wholesale and retail facilities. The specifics of the agri-food sector need to be met by the actors in this stage of the value chain. This primarily refers to the specifics of the transport and storage of products with thermal printing. Thermal printing is a document which states the exact temperature that certain products require during transport and shipping. Another specificity concerns the return of expired goods. Since these are food products, a contract regarding the return of expired goods is concluded between the processing companies and the companies that store them. According to the contract, warehousing companies return expired goods to their premises and start destroying them. Destruction of expired goods is carried out in accordance with the contract, in the presence of or without a representative of the processing company and under the supervision of the utility service.

- **Retailing:** Value added at this level is increased by the amount of the retail and wholesale margin, value-added tax (VAT), customs costs, etc. The amount of value that is added at this level is directly related to the demand for specific products, the quantity obtained, the conditions in which actors of this level operate (e.g. own premises, leased facilities, location of sales facility, number of employees), and in retail it is also related to exhibition facilities.

- **Consumption:** Value added is measured indirectly through consumer satisfaction, which directly affects the demand for a particular type of product and initiates all activities in the value chain from input supply to retailing.

Support activities are necessary for the smooth functioning of the value chain. In some cases it is very difficult to distinguish between basic activities and support activities. This is the case with activities identified at the input supply level and at the transport/ storage level in the agri-food value chain. At the input supply level, veterinary stations are identified as value chain actors that provide the services necessary for the functioning of actors from the production level. This refers to smallholders and medium-sized and large-scale livestock farmers. Due to the nature of the production process, the services of veterinary stations are still classified as the main activities provided by actors from the input supply level. The situation is similar regarding the activities of actors from the transport/ storage level. In the agri-food chain the value of activities from the transport/ storage level are classified as basic, due to the specificity of the finished products and their need for a special type of transport and storage.

The most common support activities in the agri-food value chain are financial services, insurance services, accounting agency services and marketing agency services. Financial services primarily include the services of commercial banks, where actors from the value chain take out the loans, they need to carry out their activities. Users of this type of service can be actors of all levels of the value chain, but they are still less represented in

agricultural households and smallholder farmers. Insurance services are used by actors of all levels of the value chain and include insurance covering crops, livestock, products in warehouses, goods in freight forwarding, and goods in wholesale and retail facilities. This includes insurance against floods and droughts, workers' insurance, etc. The services of accounting agencies are mainly used by larger agricultural households, smallholder farmers, medium-sized and large-scale farmers and agricultural cooperatives. Medium- and large-scale processing enterprises, which are involved in transport/ storage and retailing, typically have their own accounting departments to provide this service. Unless they exist as separate departments within companies, the services of marketing agencies are primarily used by actors from the processing and retailing levels. These services usually include the development of a marketing communication strategy, the development of a digital communication strategy, company branding, product branding (business portfolio), etc.

In addition to the support activities outlined above, the services provided by associations, business networks, clusters, governments and research institutions have to be taken into consideration. In addition to government institutions, which implement national policies in the agri-food sector, our research found that the most significant support for actors in this value chain comes from business associations and research institutions. Actors of different levels of the value chain access business associations for various reasons. Membership facilitates and improves the representation of common interests, joint promotion, easier access to financial resources, business expansion, easier product placement, etc. Companies engaged in the production of raw materials are typically members of national associations in the domain of their business. Companies engaged in the production of raw materials are typically members of associations of primary agricultural producers, such as Vojvodina agrar in Serbia, for example. Although it is not necessary, the membership of processing companies is mostly determined by the sort of food production in which they are involved. For

companies which are simultaneously engaged in the production and the processing of raw materials, participation in both national and international associations is typical. In this segment, companies from the Macedonian wine industry are dominant, as demonstrated by their membership in the Association Wines of Macedonia and the Association PGI Vardar River Valley. Companies which are exclusively engaged in processing tend to be members of associations as well as of chambers of commerce and large international groups. Some examples are the Chamber of Commerce and Industry of Serbia (CCIS), the Serbian Fruit Juice Producer Association, the Serbian Cold Storage Industry Association, the Group of Importers and Distributors of Alcoholic Beverages, the Fortenova Group, etc. Because support organisations play an important role in the agri-food value chain, information obtained from interviews with their representatives is included in [Box 2.2](#).

2.2.3.3 Labour issues

The average educational attainment level of workers in companies in the agri-food sector is high school or primary education. Agricultural and food production workers, as well as craft/ associated trades workers, plant/ machine operators and assemblers, make up the majority of the workforce in these businesses ([Figure 2.17](#)). The skills these workers possess include mostly working with machinery and specialised equipment, communication as well as collaboration and creativity. In a small number of companies (17% of the companies surveyed) the average educational attainment of workers is college/ university education. These are processing companies which use a specific production technology, and employees in these companies typically work in science, engineering and ICT, etc. The skills of other workers mostly include communication, collaboration and creativity. According to the respondents to our survey, the economy in which they operate does not provide – or provides only partially – the type of occupation and skills that employees need. Lack of skilled workers, emigration, rigid pay structures and labour rules are all major labour restraints.

Box 2.2. Support organisations play an important role in the agri-food value chain

To identify more accurately the forms of support available, the following business associations and scientific research institutions were interviewed:

■ Chamber of Commerce and Industry of Serbia (CCSI). At the level of the Western Balkans, the CCSI is a leading promoter of regional cooperation. Through the work of representative offices in several European countries which are major foreign trade partners, the CCIS places special importance on the internationalisation of business and the international integration of the domestic economy. Through its chamber system, the CCIS represents the interests and goals of its members by participating in the drafting of legislation and regulations that are important to the business community; promotes economic cooperation with foreign countries; provides information and analytical support to the economy; encourages export activity and the involvement of domestic companies in international supply chains; encourages the application of new technologies and knowledge in modern business and production methods by connecting economy and science, etc. The CCIS has established the Centre for Innovation Activity, which contributes to the improvement and development of innovative processes of companies. Also, with the support of international institutions, the CCIS has established the Western Balkans Chamber Investment Forum (KIF ZB6). The Investment Forum's work is becoming increasingly successful, as evidenced by the establishment of the Regional Business Council, which includes representative companies from all Western Balkan economies. The Forum is supported by the European Commission, Directorate-General for Neighbourhood and Enlargement Negotiations, the European Bank for Reconstruction and Development (EBRD), the Regional Cooperation Council (RCC), the Central European Free Trade Agreement (CEFTA) Secretariat as well as other business associations and organisations, such as the Association of European Chambers of Commerce and Industry (EUROCHAMBRES), the Austrian Federal Chamber of Commerce (WKO) and the Association of German Chambers of Commerce (DIHK).

■ National Alliance for Local Economic Development (NALED – the Food and Agriculture Alliance). The Food and Agriculture Alliance aims to support the establishment of a modern regulatory and institutional framework as well as a stable business environment in the food and agriculture sector. The Alliance advocates the institutionalisation of a public-private dialogue as well as the establishment of a stable, predictable and sustainable business environment for economic entities in the food and agriculture sector, including the policy of incentives in the field of agriculture. A significant number of Food and Agriculture Alliance members are involved in the GVC in the agri-food sector.

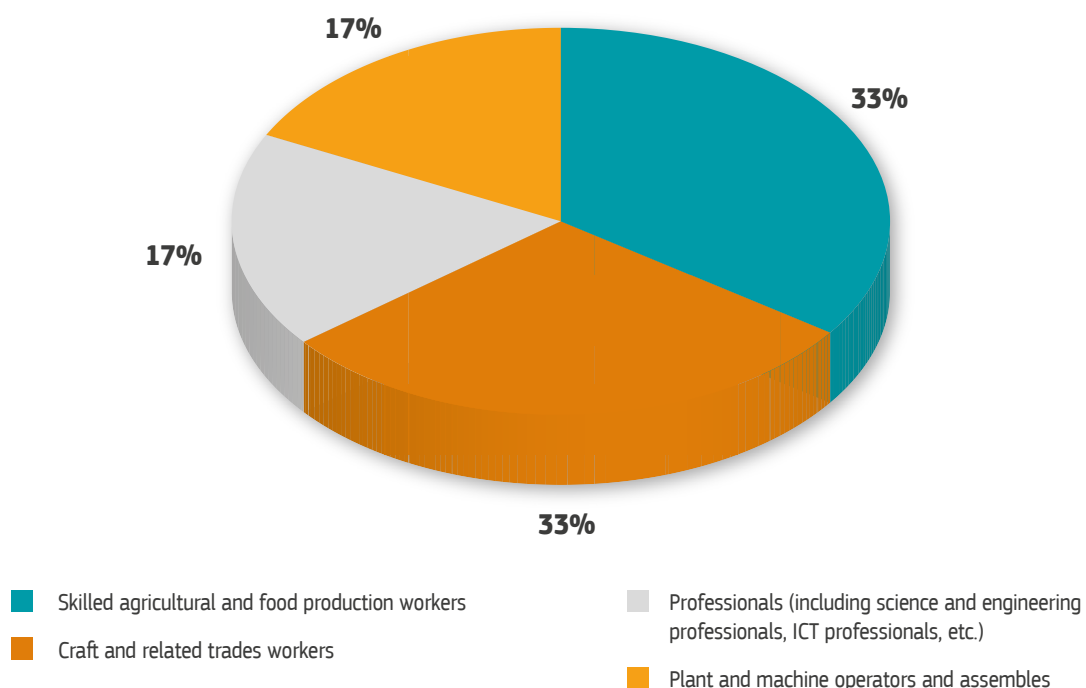
■ Invest North Macedonia. Its Export Promotion Department works closely with the Department for Competitiveness within the Ministry of Economy and with the Marketing Department within the Ministry of Agriculture. Invest North Macedonia is involved in

providing help for already exporting domestic companies to expand their presence and to penetrate new markets. However, a more difficult role for Invest North Macedonia is to help domestic producers to start exporting.

- Association Wines of Macedonia (WoM). The association represents common interests of its members and aims, among others, to provide strategic support to the country's wine sector, increase exports of both bottled and bulk wines, and improve the recognition of Macedonian wines on the regional and international markets. The WoM, together with the Wine Q Centre of Serbia, the Association Salon Žilavka Bosnia and Herzegovina and the Wine Academy of Montenegro, has founded the Balkan Wine Network, which aims to implement the project 'Wine as a bridge to connect the Western Balkans'.

- Institute of Agricultural Economics (IAE). The main aim of the IAE is to further co-operation with policy makers, mainly ministries and international and public institutions active in agriculture, such as the Regional Rural Development Standing Working Group (SWG) in Southeast Europe, as well scientific institutes, local governments, cooperatives and family farms. Both small and large-sized companies are interested in cooperating with the IAE. Cooperation usually implies ad hoc business arrangements related to a certain expertise in agricultural economics, such as the development of business plans, evaluation of investments, monitoring of allowed credit lines, economic impact assessment, consultancy in business development and marketing, etc.

Figure 2.17. The typical occupation of employees in the agri-food value chain



Sources: According to survey results (for details see Appendix Section E).

CHAPTER

3



Chapter 3. Textile value chain

This value chain includes the manufacturing of textiles, apparel, leather and related products (NACE Rev. 2 CB).

3.1 Overview

3.1.1 Overall patterns and trends

The textile sector accounts for up to 4% of value added in North Macedonia, for around 3% in Albania and Bosnia and Herzegovina, and for 2% or less in the remaining economies (Figure 3.1). In the first three economies the shares are growing, in Kosovo the share is stable, and in the other two economies the share is declining.

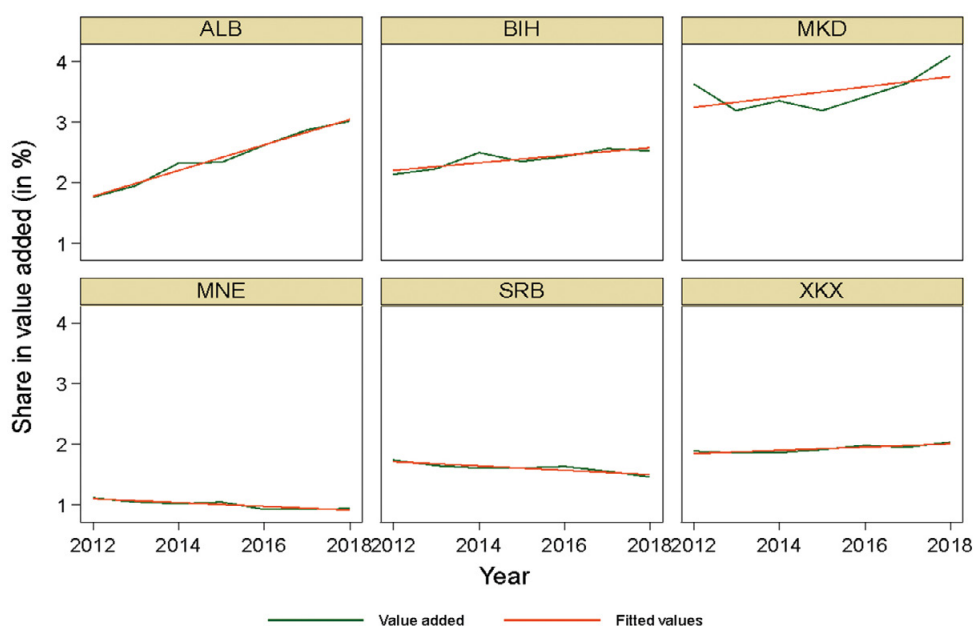
According to International Labour Office (ILO) data, employment in the textile industry has been increasing in Albania, Bosnia and Herzegovina and Serbia over the period 2005–2020 but declining in the three other economies (Figure 3.2).

For Albania, Bosnia and Herzegovina and North Macedonia the data indicate a revealed comparative advantage, whereas for the other economies the revealed comparative advantage is close to zero (Figure 3.3).

Considering the value-added structure of the economies' gross exports,⁹ we can see that the domestic value-added content is between approximately 60% in Serbia and 80% in Albania

(9) Using multi-country input-output tables allows to decompose gross exports into the contribution of domestically produced value added and value added produced in foreign countries which are imported via intermediary inputs.

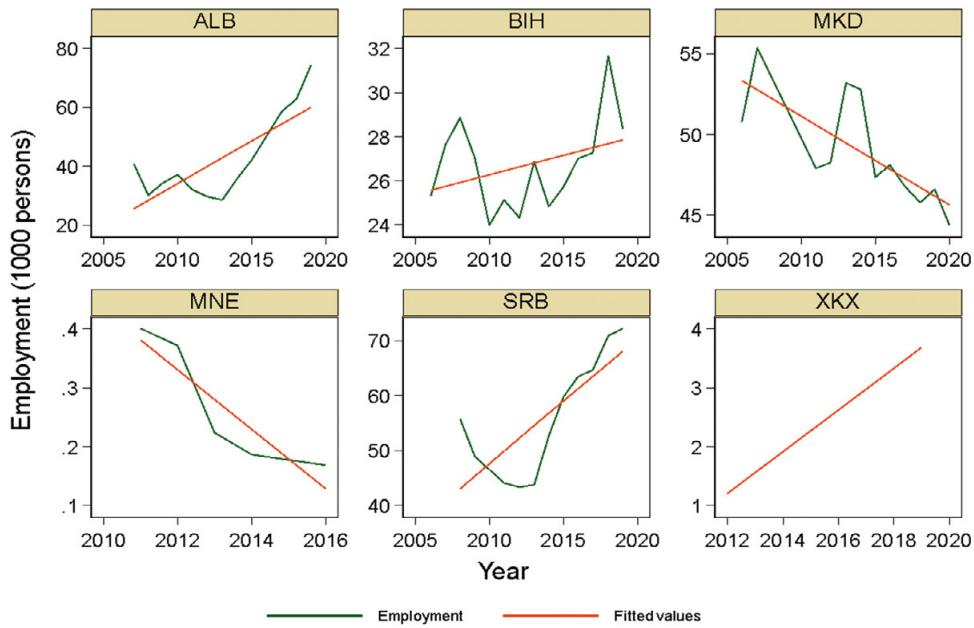
Figure 3.1. Value-added shares of the textile sector



Note: Fitted values are calculated as a linear trend.

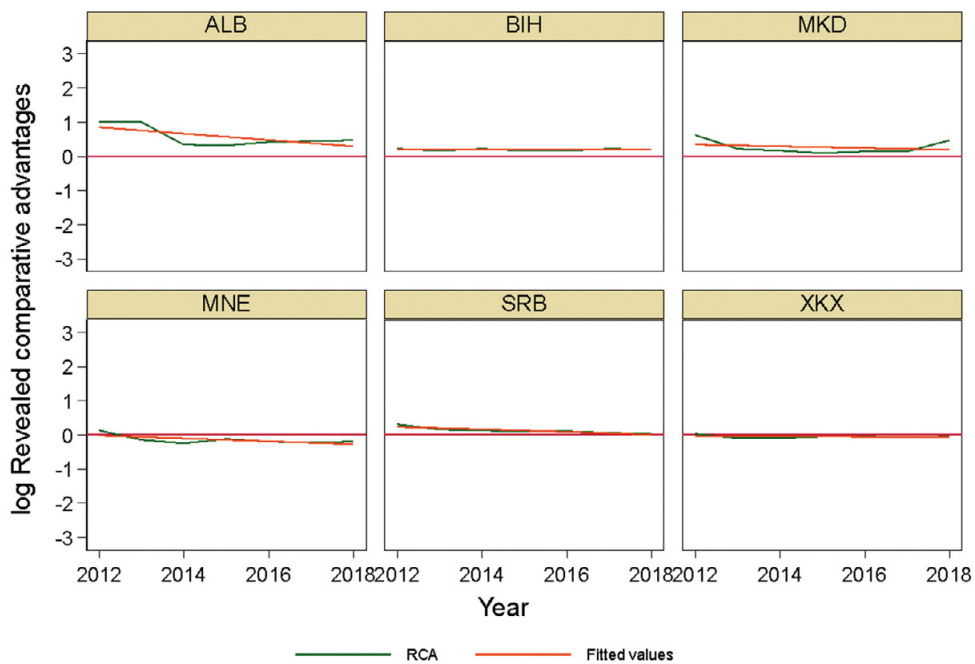
Source: wiiw MC IOD (Reiter and Stehrer, 2021); own calculations.

Figure 3.2. Employment levels in the textile sector



Note: 1) Fitted values are calculated as a linear trend. 2) For Kosovo only data for 2012 and 2019 are available.
 Source: ILO (accessed March 2021); own calculations.

Figure 3.3. Revealed comparative advantages in the textile sector



Note: Fitted values are calculated as a linear trend.
 Source: wiiw MC IOD (Reiter and Stehrer, 2021); own calculations.

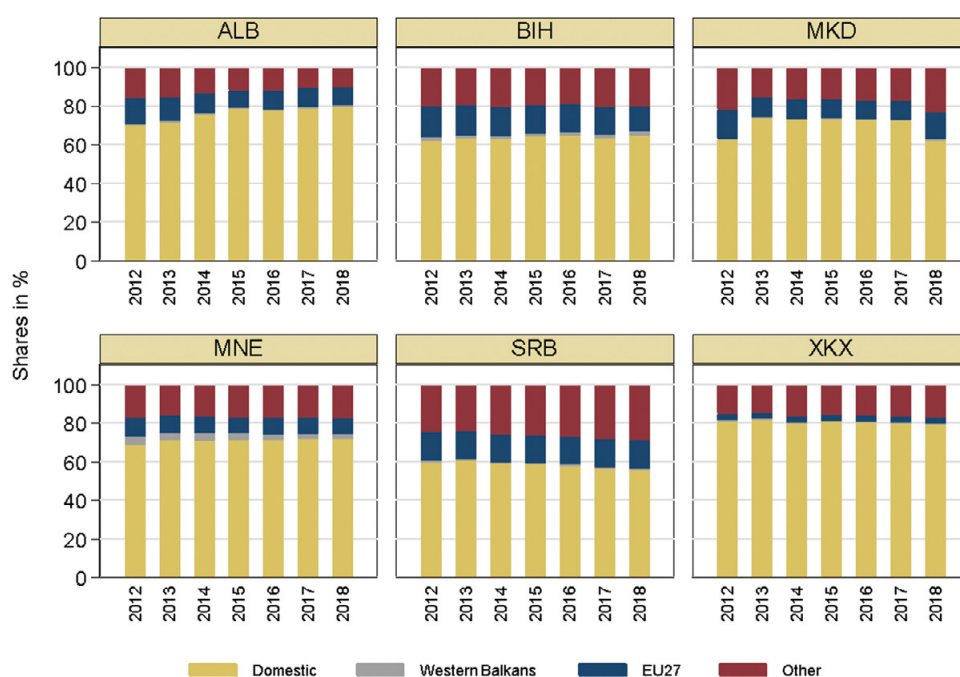
and Kosovo (Figure 3.4). The share of the EU27 value added in exports is relatively important in Albania, Bosnia and Herzegovina and Serbia. The value-added content of exports from all other economies (rest-of-world) accounts for up to 20% and is particularly large in Serbia.

The backward linkages with the other Western Balkan economies (in terms of the value-added content of exports) are very small, and with the exception of Montenegro and Bosnia and Herzegovina they are less than 1% (see Figure 3.5). In most cases they are dominated by linkages to the biggest economy, Serbia.

In all economies the backward linkages dominate the forward linkages,¹⁰ as indicated by the negative relative GVC position indicator documented in Figure 3.6.

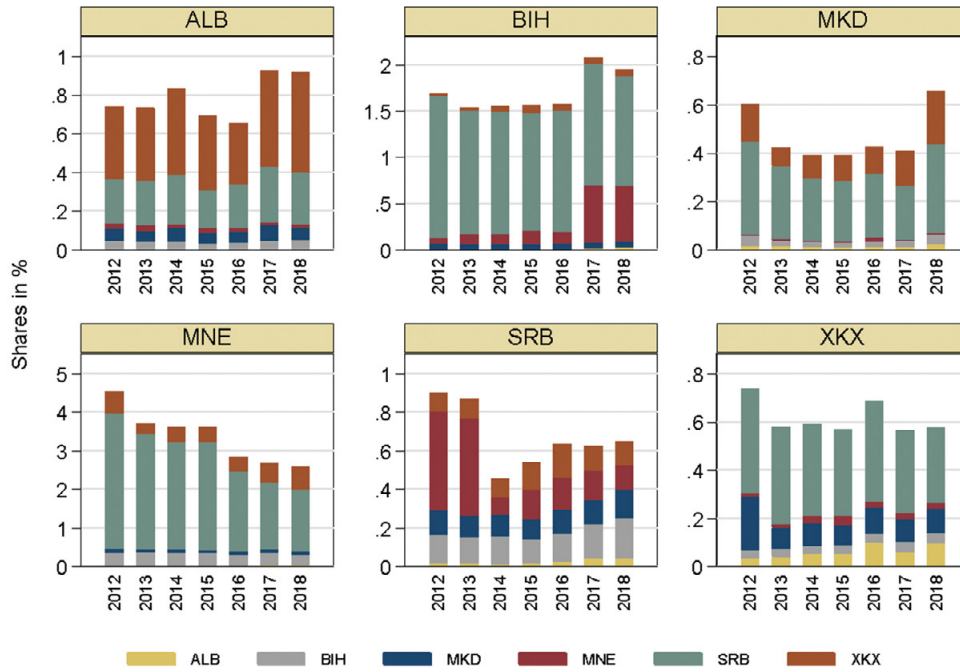
(10) The GVC position indicates whether the industry of a country has stronger forward linkages (a country's value added in exports which goes into exports of other countries) or backward linkages (the foreign value added of a country's gross exports of the country).

Figure 3.4. Value-added structure of gross exports in textiles



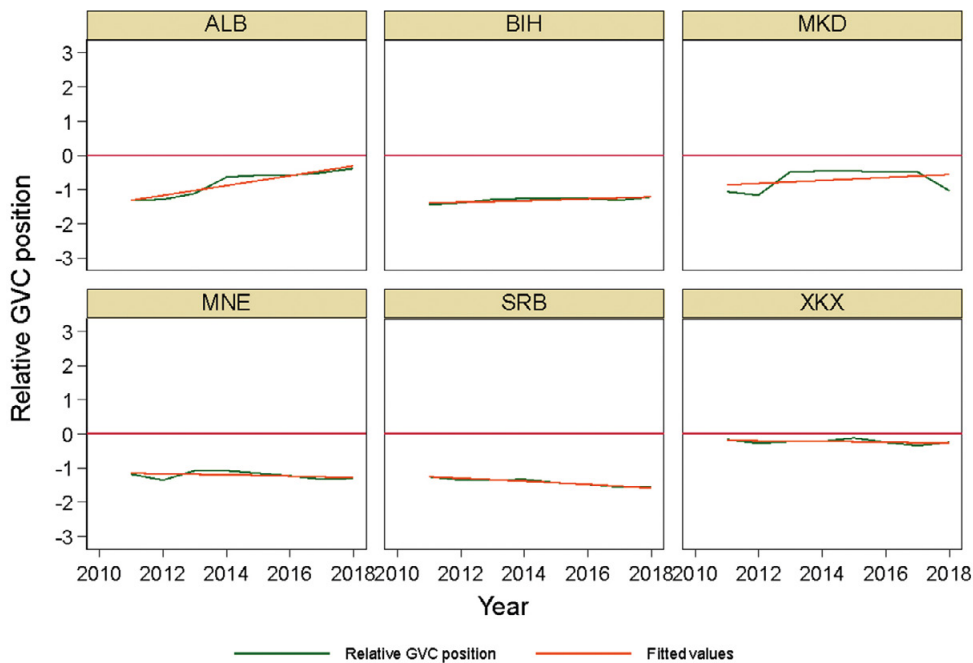
Sources: wiiw MC IOD (Reiter and Stehrer, 2021); own calculations.

Figure 3.5. Intra-WB backward linkages in textiles



Sources: wiiw MC IOD (Reiter and Stehrer, 2021); own calculations.

Figure 3.6. Relative GVC position in textiles



Note: Fitted values are calculated as a linear trend.

Sources: wiiw MC IOD (Reiter and Stehrer, 2021); own calculations.

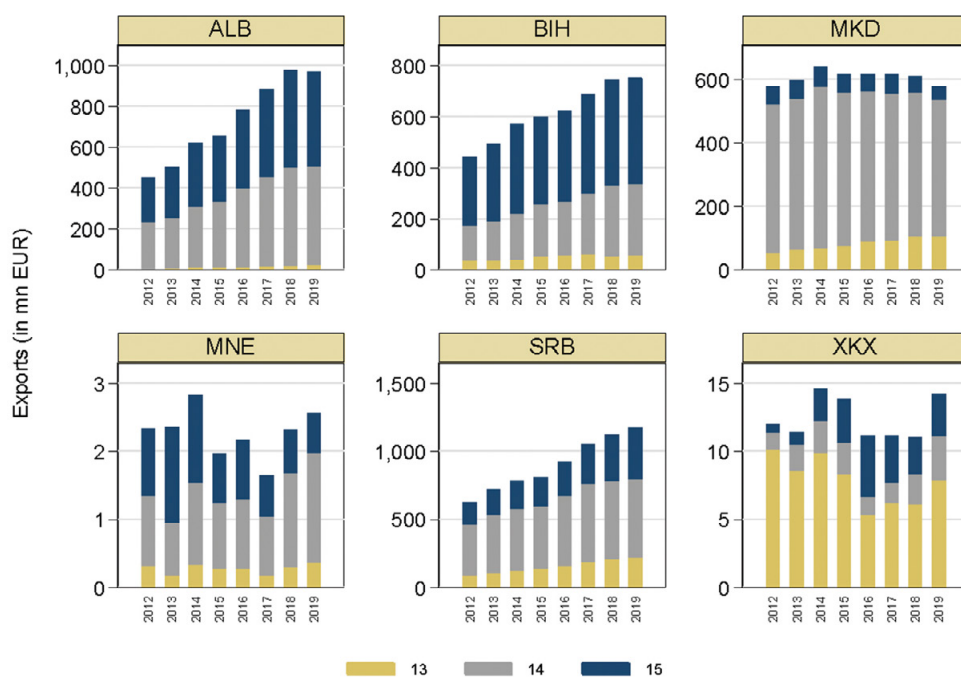
3.1.1 Detailed patterns

Trade structures are dominated by the manufacture of wearing apparel and the manufacture of leather and related products in all economies, with the exception of Kosovo, where exports of textiles clearly dominate.

For the economies for which Structural Business Survey (SBS) data are available (Bosnia and Her-

zegovina, North Macedonia and Serbia), the manufacture of wearing apparel dominates in terms of the number of enterprises and the number of persons employed, whereas in terms of value added the patterns are more diverse (*Table 3.1*). Further details at the 2- and 3-digit level are found in *Table 3.2* and *Table 3.3*.

Figure 3.7. Trade developments (NACE 2-digit) in textiles



Note: 13 ... Manufacture of textiles; 14 ... Manufacture of wearing apparel; 15 ... Manufacture of leather and related products

Sources: EU Comtrade (accessed March 2021); own calculations.

Table 3.1. Detailed industry structure (textiles, wearing apparel and leather, CB), 2019

NACE Rev. 2 code	Description	Levels			Shares in %		
		Bosnia and Herzegovina	North Macedonia	Serbia	Bosnia and Herzegovina	North Macedonia	Serbia
		Enterprises - number					
CB		1,262	1,247	1,578	100.0	100.0	100.0
C13	Manufacture of textiles	284	216	398	22.5	17.3	25.2
C14	Manufacture of wearing apparel	758	886	903	60.1	71.1	57.2
C15	Manufacture of leather and related products	220	145	277	17.4	11.6	17.6
		Value added at factor cost – EUR million					
CB		286	244	434	100.0	100.0	100.0
C13	Manufacture of textiles	72	80	102	25.0	32.6	23.5
C14	Manufacture of wearing apparel	95	146	230	33.2	59.7	53.0
C15	Manufacture of leather and related products	120	19	102	41.8	7.6	23.5
		Persons employed - number					
CA		37,781	41,475	53,481	100.0	100.0	100.0
C13	Manufacture of textiles	6,549	8,878	11,370	17.3	21.4	21.3
C14	Manufacture of wearing apparel	13,620	28,753	29,099	36.0	69.3	54.4
C15	Manufacture of leather and related products	17,612	3,844	13,012	46.6	9.3	24.3

Sources: SBS Eurostat (accessed March 2021); own calculations.

Table 3.2. Detailed industry structure of C13 (Manufacture of textiles), 2019

NACE Rev. 2 code	Description	Levels			Shares in %		
		Bosnia and Herzegovina	North Macedonia	Serbia	Bosnia and Herzegovina	North Macedonia	Serbia
		Enterprises - number					
C13	Manufacture of textiles	284	216	398	100.0	100.0	100.0
C131	Preparation and spinning of textile fibres		6	29		2.8	7.3
C132	Weaving of textiles	6	11	47	2.1	5.1	11.8
C133	Finishing of textiles		51	18		23.6	4.5
C139	Manufacture of other textiles	251	148	304	88.4	68.5	76.4
		Value added at factor cost – EUR million					
C13	Manufacture of textiles	71.5	80	102	100.0	100.0	100.0
C131	Preparation and spinning of textile fibres			13			12.6
C132	Weaving of textiles	5		7	7.0		6.8
C133	Finishing of textiles		5	0		6.2	0.2
C139	Manufacture of other textiles	62.2		82	87.0		80.4
		Persons employed - number					
C13	Manufacture of textiles	6,549	8878	11,370	100.0	100.0	100.0
C131	Preparation and spinning of textile fibres			2,040			17.9
C132	Weaving of textiles	380		501	5.8		4.4
C133	Finishing of textiles		944	50		10.6	0.4
C139	Manufacture of other textiles	5,629		8,779	86.0		77.2

Sources: SBS Eurostat (accessed March 2021), own calculations.

Table 3.3. Detailed industry structure of C14 (Manufacture of wearing apparel), 2019

NACE Rev. 2 code	Description	Levels			Shares in %		
		Bosnia and Herzegovina	North Macedonia	Serbia	Bosnia and Herzegovina	North Macedonia	Serbia
		Enterprises - number					
C14	Manufacture of wearing apparel	758	886	903	100.0	100.0	100.0
C141	Manufacture of wearing apparel, except fur apparel	685	846	799	90.4	95.5	88.5
C142	Manufacture of articles of fur	7	4		0.9	0.5	
C143	Manufacture of knitted and crocheted apparel	66	36		8.7	4.1	
		Value added at factor cost – EUR million					
C14	Manufacture of wearing apparel	95	146	230	100.0	100.0	100.0
C141	Manufacture of wearing apparel, except fur apparel	88		142	92.3		61.8
C142	Manufacture of articles of fur	0			0.1		
C143	Manufacture of knitted and crocheted apparel	7			7.6		
		Persons employed - number					
C14	Manufacture of wearing apparel	13,620	28,753	29,099	100.0	100.0	100.0
C141	Manufacture of wearing apparel, except fur apparel	12,844	27,881	22,064	94.3	97.0	75.8
C142	Manufacture of articles of fur	20			0.1		
C143	Manufacture of knitted and crocheted apparel	756			5.6		

Sources: SBS Eurostat (accessed March 2021); own calculations.

Table 3.4. Detailed industry structure of C15 (Manufacture of leather and related products), 2019

NACE Rev. 2 code	Description	Levels			Shares in %		
		Bosnia and Herzegovina	North Macedonia	Serbia	Bosnia and Herzegovina	North Macedonia	Serbia
		Enterprises - number					
C15	Manufacture of leather and related products	220	145	277	100.0	100.0	100.0
C151	Tanning and dressing of leather; manufacture of luggage, handbags, saddlery and harness; dressing and dyeing of fur	89	23	54	40.5	15.9	19.5
C152	Manufacture of footwear	131	122	223	59.5	84.1	80.5
		Value added at factor cost – EUR million					
C15	Manufacture of leather and related products	120	19	102	100.0	100.0	100.0
C151	Tanning and dressing of leather; manufacture of luggage, handbags, saddlery and harness; dressing and dyeing of fur	12		26	9.9		25.0
C152	Manufacture of footwear	108		76	90.1		75.0
		Persons employed - number					
C15	Manufacture of leather and related products	17,612	3,844	13,012	100.0	100.0	100.0
C151	Tanning and dressing of leather; manufacture of luggage, handbags, saddlery and harness; dressing and dyeing of fur	1,332		1,352	7.6		10.4
C152	Manufacture of footwear	16,280		11,660	92.4		89.6

Sources: SBS Eurostat (accessed March 2021), own calculations.

3.2 Review of the textile value chain

3.2.1 Digging

3.2.1.1 Firm-level data analysis

The Orbis database (accessed May 2021) publishes data on 19,253 companies from the Western Balkans operating in the textile sector. Their distribution by economies is shown in *Figure 3.8*. Most of the firms are located in Serbia (58%), North Macedonia comes second with 24%, while Kosovo is third with 10%. The remaining three economies have fewer textile companies.

Of these 19,253 companies, financial data are available for 5,762 companies. Basic information for these companies is presented in *Table 3.5*. These companies have total assets of EUR 2.9 billion and generate annual operating revenues of EUR 2.4 billion – less than any of the other five chosen sectors. Despite this they employ 124,000 people, which is the second-highest number among the six chosen sectors, meaning that these companies are very labour-intensive, with low capital investment. Two-thirds of the companies are domestically owned.

The average company in the sector has assets of around EUR 500,000, generates annual revenues of EUR 413,000 and employs 22 people, which means that these companies are small. The average gross salary is EUR 435 per month, the lowest level in all the chosen sectors. One worker generates USD 19,000 of annual revenues, which is the lowest level of productivity of the six sectors reviewed here. On the other hand, EUR 1 of investment in assets generates 82 cents of revenues, which is the second-highest amount in the six chosen sectors (see Section 1), meaning that capital investment in this sector is likely to yield a high return.

Table D.2 in the Appendix shows the 30 biggest companies in this sector according to operating revenues, of which 25 are foreign-owned. Some of them have been established in recent years

in the form of greenfield investment related to the automotive industry (car seating, seat belts etc.). The others are traditional textile and clothing companies, often supplying famous international brands. This means that these companies are already integrated into global value chains, even though they are producing low value-added products.

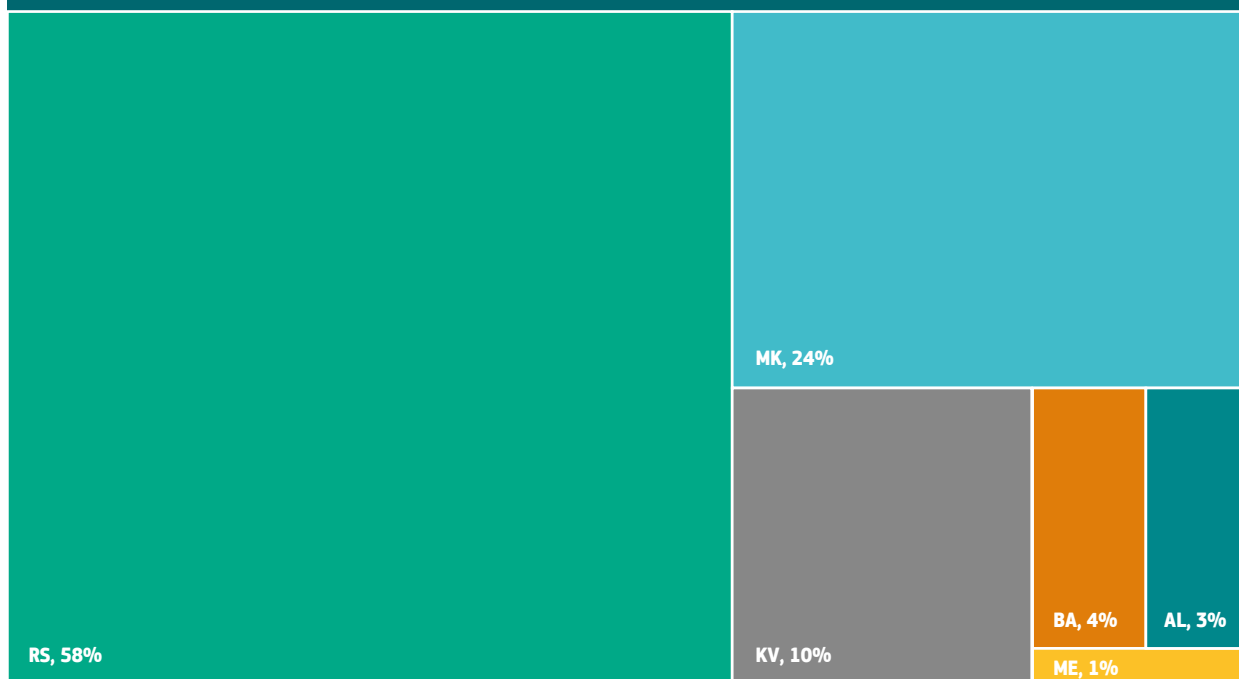
According to the fDi Markets database, of the 645 investment projects in the WB, 51 (8%) were in the textile sector in 2015-2020. Their total value was EUR 525 million (2% of all investment), and they employed 16,002 people in total (8% of total employment). Thus, the textile sector is attracting low-value projects, but with a high number of employees.

The data show that most of the projects are in Serbia – 77% in terms of the jobs opened up and 57% in terms of capital investment. Bosnia and Herzegovina comes second, with 22% of the jobs and 41% of investment. North Macedonia is third, while the other three economies do not have any projects in the textile sector on record. Thus, as far as this sector is concerned, Serbia and Bosnia and Herzegovina are the most attractive economies from the region.

The textile investment projects are rather small in terms of investment but rather big in terms of employment. The average investment in a project is EUR 10 million, which is the smallest amount among the six chosen sectors, but the average number of employed people is 314, which is among the highest. This is due to the high labour-intensity of the sector.

The biggest project is an investment by a Turkish company, Taypa Tekstil, in Kraljevo in Serbia. The group employs around 10,000 workers globally and has plants in Turkey, Egypt and Algeria. The Serbian company operates under the name Eurotay and produces jeans. The plant, which was opened in 2019 with an investment of EUR 37 million, currently employs several hundred people and intends to grow this number to 2,500. The company is expected to export most of its products, and the exports are expected to reach EUR 90 million

Figure 3.8. Distribution of companies by WB economies in textiles



Sources: Own calculations, using data from Orbis (accessed May 2021).

per year. The plant works with new technology and claims to work environmentally friendly.

Another big project is an investment by the Austrian manufacturer BOXMARK, which is expanding its activities in Bosnia and Herzegovina with a new plant worth EUR 35 million. The company already has a plant in Bosnia and Herzegovina, which cur-

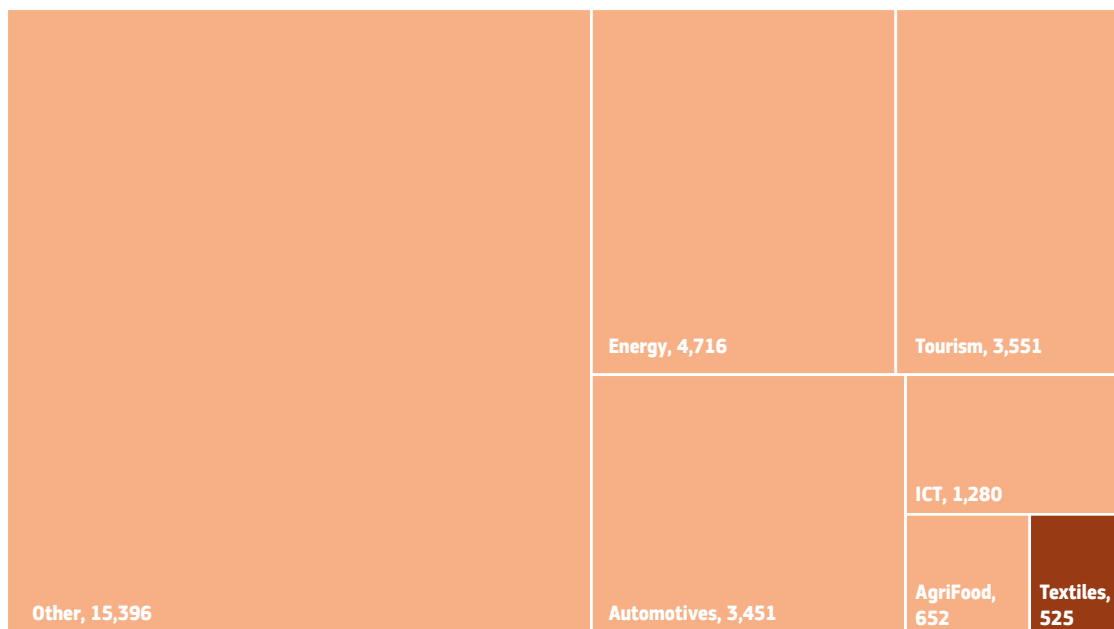
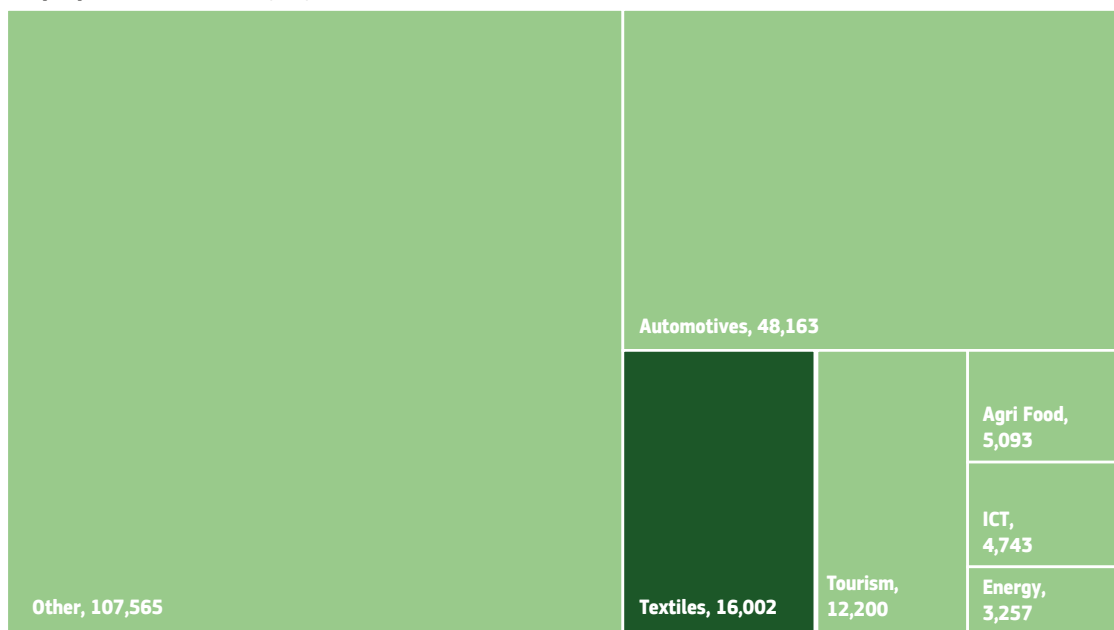
rently employs 800 people, and is now expanding its workforce by an additional 700 employees. The building of the new plant started in 2020. The company produces leather car upholstery and works with many top car companies. It has plants in several countries, including Austria, Croatia, Slovenia, and China.

Table 3.5. Overview of companies in the textiles sector (2019)

Number of firms	Total assets (EUR)	Operating revenue/turnover (EUR)	Costs of employees (EUR)	Number of employees	Foreign owned
5,762	2,894,427,146	2,379,214,896	649,774,935	124,444	33%
Average assets per firm (EUR)	Average revenue per firm (EUR)	Average number of employees per firm	Average gross monthly salary (EUR)	Revenue per 1 EUR assets (EUR)	Revenue per worker (EUR)
502,330	412,915	22	435	0.82	19,118

Source: Own calculations, using data from Orbis (accessed May 2021).

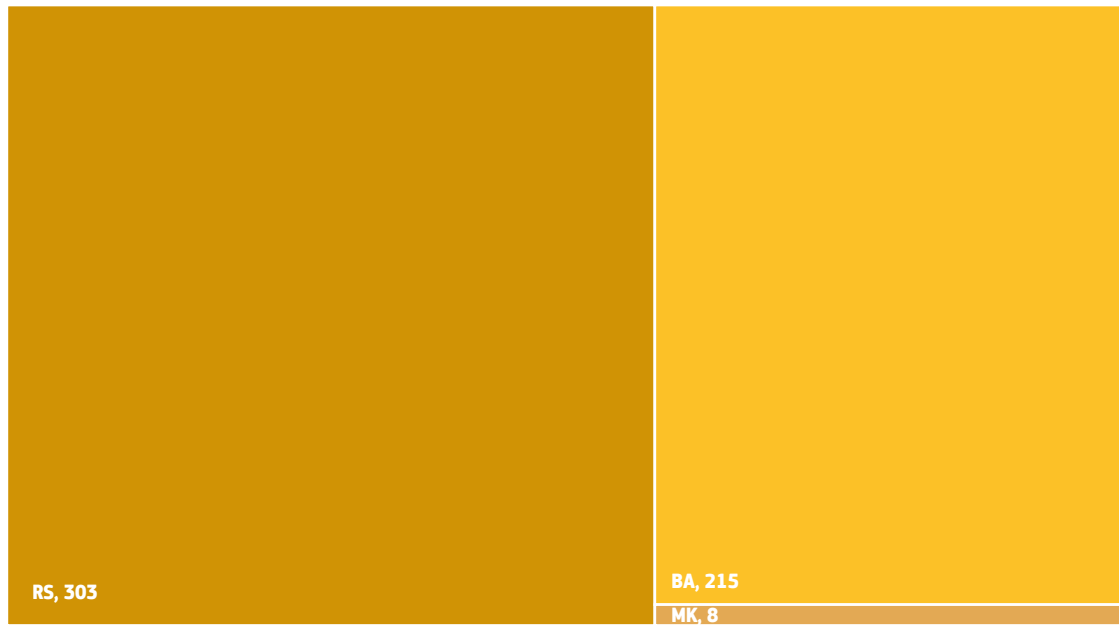
Figure 3.9. Share of textile projects in all fDI projects

Capital investment (EUR million)**Employment** (number of people)

Sources: fDI markets database; (accessed May 2021); own calculations.

Figure 3.10. Distribution of the textile projects by economies

Capital investment (EUR million)



Employment (number of people)



Sources: *fDI markets database (accessed May 2021); own calculations.*

3.2.1.2 Patent data analysis

One part of our patent analysis was the examination of overlaps with other technology areas. With the help of a patent network we identified the largest technology areas and overlaps. This patent analysis is based on patents taken out between 2000 and 2020 (see [Figure 3.11](#)) in the field of textiles (for total numbers see Table C.7 in Appendix C.4.1). The larger the nodes, the more connections there are with other areas. The measure used to determine the clusters is modularity.¹¹ Here, nodes with strong connections to each other but few connections to others are grouped together. This enables the discovery of community structures. All technologies from the field of textiles can be found in sections A (Human necessities) or D (Textiles). In section A, this largely comprises the subclasses A43B (parts of footwear | A43 footwear) and A41B (shirts | A41 wearing apparel) – see also [Table 3.6](#). In the network with the largest nodes (orange), the groups D06M 23 (Treatment of fibres, threads, ... | D06 treatment of textiles or the like; laundering; flexible materials not otherwise provided for) and D06M 11 (Treatment of fibres, threads, ... with inorganic substances) are represented. This is followed in the network by the second-largest nodes (green) D04H3 (Non-woven fabrics formed wholly of substantial length | D04 braiding; lace-making; knitting; trimmings; non-woven fabrics) and D04H1 (Non-woven fabrics formed wholly or mainly of staple fibres or like relatively short fibres). Overlaps with other technology areas were identified. The patent main group A43B 1/14 (Footwear made of gutta-percha, celluloid, or plastics) has links to C08G (Chemistry – macromolecular compounds | C08 organic macromolecular compounds; their preparation or chemical working-up; compositions based thereon) and C08J (Chemistry – General processes of compounding).

(11) Modularity is a measure of the structure of networks or graphs, where the strength of division of a network into clusters is examined. Networks with high modularity possess dense connections within the clusters but sparse connections outside the cluster.

3.2.1.3 Scientific and research publications

The Scopus database – one of the central scientific citation databases with about 80 million documents – was used to evaluate scientific publications in this study. The period considered covers the years 2008–2020 and therefore the latest scientific developments. In order to analyse the share of WB economies in all scientific publications in the different technologies, a global benchmark is applied in this publication analysis. A quantitative analysis sheds light on the ‘dynamic’ of a research field (value chain) and provides information about the impact of the WB economies as a whole and individually. At the country level, cooperation networks are mapped based on co-authorships of the publications identified in each to the value chain corresponding research field. These science maps show the extent of the interaction of the WB economies in an international context for each value chain. In addition, the integral actors of the WB economies in these cooperation networks can be determined.

To conduct the analysis, we used publications which contain the keywords ‘textile’, ‘cloth’, or ‘apparel’.¹² Scopus contains a total of 129,179 documents in this value chain for the period 2008–2020. Serbia is the most active of the WB economies with 376 scientific publications, followed by Bosnia and Herzegovina with 61 and North Macedonia with 48. Altogether, the share of the WB economies in the global scientific publication output is 0.4%. The share is strongly driven by the performance of Serbia, which has more than twice as many publications as the other economies. The peak was observed in 2014, with a share of 0.48% (see [Figure 3.12](#)).

The above analysis provides interesting findings and grants a holistic overview. However, the results are not yet meaningful enough, as absolute

(12) Using wildcards, other spellings can be included as well (e.g. the term cloth* also includes clothe, clothes, clothing, etc.).

Figure 3.11. Patent network in the textile value chain

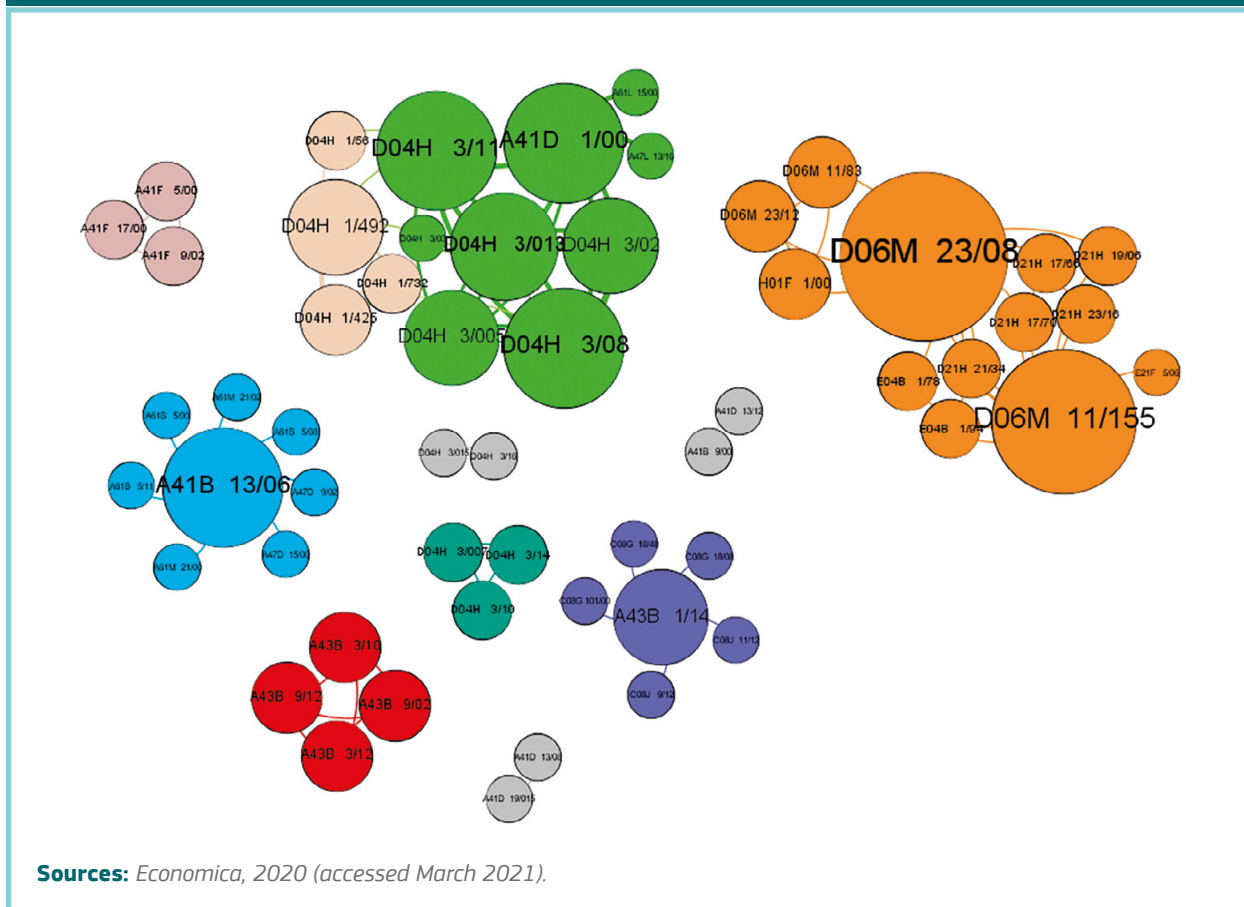
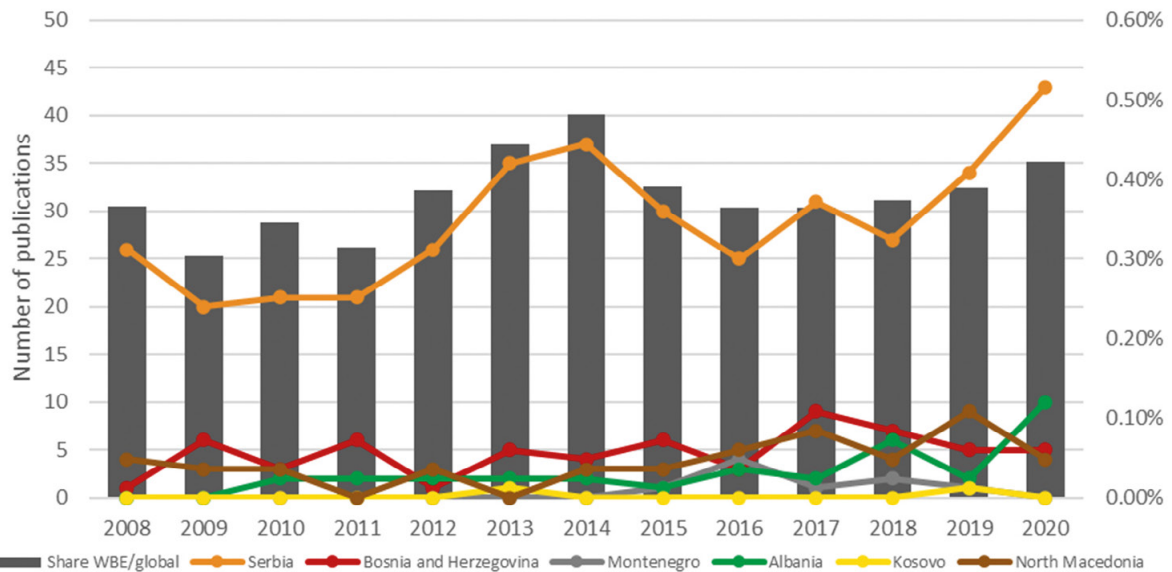


Table 3.6. Patent network – Most frequently featured textile subclasses

Subclass	Description	# Features
D04H	Braiding; lace-making; knitting; trimmings; non-woven fabrics	15
A43B	Characteristic features of footwear; parts of footwear	5
D21H	Pulp compositions; preparation	5
A41D	Outerwear; protective garments; accessories	4
D06M	Treatment of fibres, threads, yarns, fabrics, feathers or fibrous goods made from such materials	4

Source: *Economica, 2020 (accessed March 2021).*

Figure 3.12. Scientific publications 2008-2020 in the textile sector in the WB economies



Note: WBE denote Western Balkan economies

Sources: Scopus (accessed March 2021); own calculations.

values are compared. Publications from Serbia, with around 7 million inhabitants, are weighted the same as publications from Montenegro with 620,000 inhabitants. Therefore, in the next step, we control for size effects and place the publications in relation to 100,000 inhabitants (Figure 3.13).

In 2008 the publication output per 100,000 inhabitants globally and from the WB economies was almost the same (0.12 and 0.16). In the following years output in the WB economies increased comparatively more strongly (0.18 and 0.33). At the economy level, Serbia has the highest output per 100,000 inhabitants (0.62 in 2020).

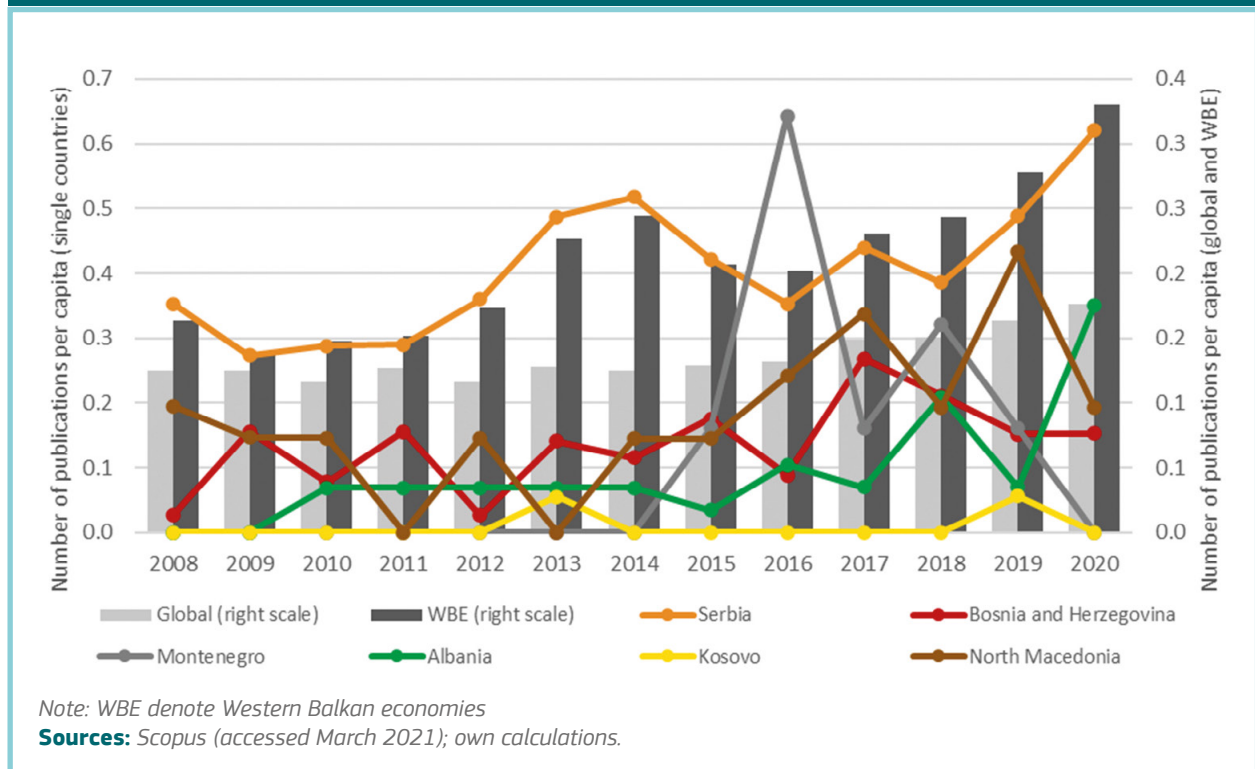
The science map (Figure 3.14) shows the international cooperation network of the WB economies over the period 2008-2020. The database consists of publications with the involvement of at least one WB economy. Each node represents one economy, with the size reflecting the number of publications in the respective territory and the edges the number of co-authored publications with another territory. The location of a territory

on the map is determined by the attraction to its research partners and the repulsion from territories without joint publications. The different colours mark the affiliation to a 'narrower research cluster'.

In the textile value chain the research network of the WB economies consists of 59 countries. These countries can be grouped into three main clusters, where Serbia, Bosnia and Herzegovina, North Macedonia, and Slovenia, among others, are clustered together (orange). The next cluster (red) consists, for example, of Albania, Belgium, Germany, France, Spain, and the United Kingdom, while the last cluster (green) consists of Bulgaria, Austria, Lithuania and countries in Africa and Asia.

On the meso level (Figure 3.15), the most active organisation is the University of Belgrade (222 publications), followed by the University of Novi Sad (61 publications) and the University of Niš (50 publications).

Figure 3.13. Scientific publications per capita, 2008–2020



3.2.1.4 Trademarks

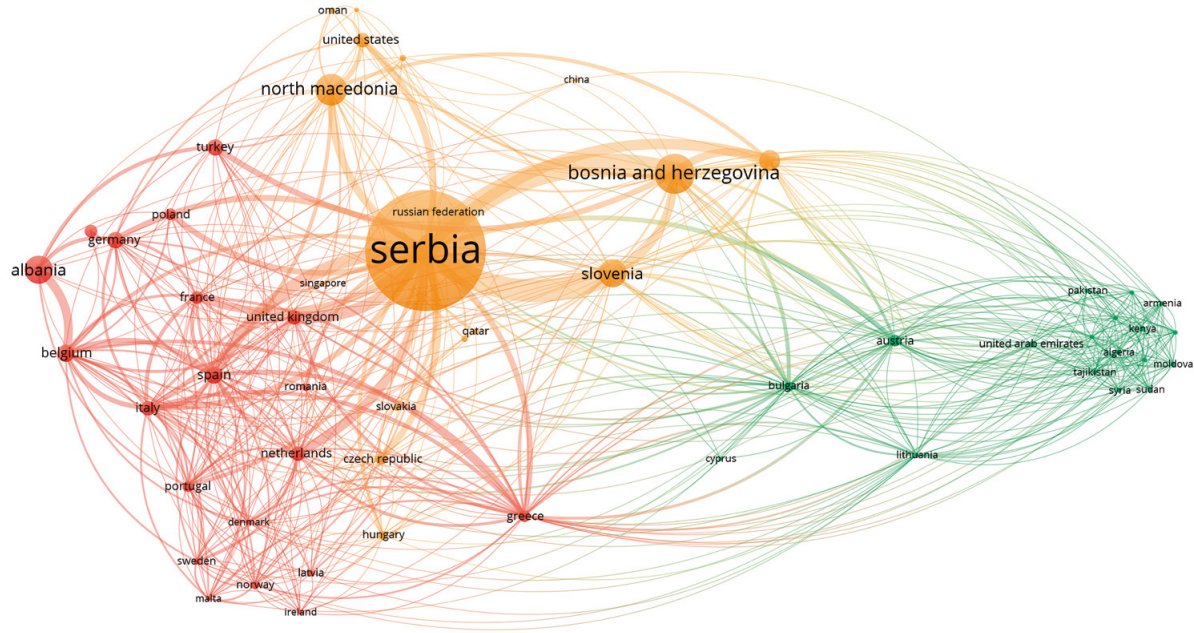
The protection of recognisable signs, designs or expressions that distinguish the goods and/or services of certain companies from their competitors is guaranteed by trademark law. On the one hand, trademarks are of high economic relevance because the value of a company is often linked to the awareness of trademarks. On the other hand, they are also important for economic analysis and, in particular, in this study focused on innovation. Empirical observations show that the propensity to patent varies from sector to sector, which is partly, but not only, a result of the predominant type of innovation. Industries with a dominant share of product innovations show a higher patent intensity than those with a prevalence of process- or business-model innovations.

The World Intellectual Property Organisation (WIPO) collects trademarks worldwide in its Global Brand Database (GBD). This database contains information about the owner of the trademark and the classes of goods and services under which the current trademark is stored. The classi-

fication is based on the Nice Classification (NCL) system, with a total of 45 classes (34 classes of goods and 11 classes of services). Table C.8 shows trademark data broken down according to Nice Classification¹³ (NCL).

(13) The Nice Classification (NCL) is an internationally used system to classify trademarks applications. It consists of 45 classes. The classes 1 to 34 are for goods and 35 to 45 for services. For more details see: <https://euipo.europa.eu/ohimportal/en/nice-classification>

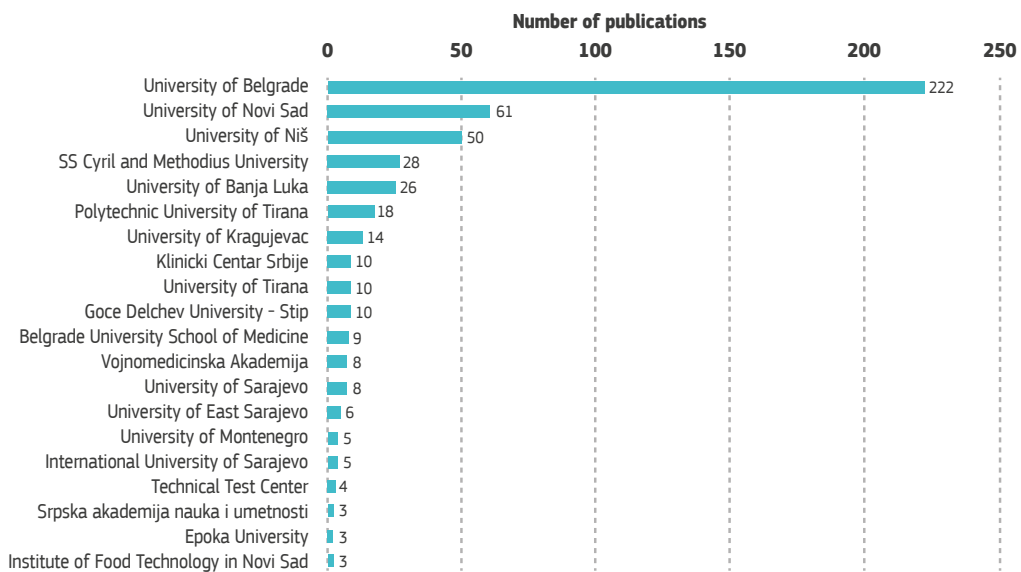
Figure 3.14. Cooperation network WB economies, Textiles, 2008-2020



Note: Nodes = Number of documents; Edges = Number of co-authored publications.

Sources: Scopus (accessed March 2021); own calculations.

Figure 3.15. Active organisations in the textile sector



Sources: Scopus (accessed March 2021); own calculations.

3.2.2 Determining

The textile industry is one of the oldest industries in the world. Within the European manufacturing industry the textile sector occupies an important place. The textile and clothing industry covers a range of activities, from the transformation of natural fibres (cotton, flax, wool, etc.) or synthetic fibres (polyester, polyamide, etc.) into yarns and fabrics to the production of a wide variety of products, such as hi-tech synthetic yarns, bed linens, industrial filters and clothing (European Commission, 2021). The textile and clothing industry in Europe has undergone major changes in the past 20 years, coinciding with the structural crises in the developed world, the process of globalisation and the accelerated liberalisation of world trade. Developed countries have sought to relocate part of their traditional production to countries with cheaper production costs by restructuring the fashion industries.

High-quality products at competitive prices, a skilled workforce and relatively low subcontracting costs are the main reasons why foreign investors decide to invest in the textile industry. Because the sector is highly labour-intensive, investments in the textile industry greatly reduce unemployment and therefore enjoy the full support of local governments. In most cases leading European and global companies create strategic partnerships with premium suppliers with the aim of increasing demand for products as well as reducing delivery times. The future market structure will mainly be determined by a country's location as well as the ability of its textile and apparel industry to provide cost-effective production, competitive skills, quality products and efficient lead times.

The textile sector in the WB economies includes two subsectors: textile production and clothing production. The textile sector produces fabrics and other textile products, while the clothing sector produces garments, underwear and socks. Although viewed within the textile sector, the two subsectors differ in their characteristics. Clothing production is a labour-intensive and fragmented sector, more tailored to the final consumer, and

thus provides more opportunities for the involvement of small and medium-sized enterprises (SMEs). The production of textiles, on the other hand, is more concentrated and to a greater extent related to raw materials that one country does not have. It also depends more on technology and is oriented towards production in larger, standardised quantities.

The business model in the Western Balkans is characterised by low production costs and proximity to large EU markets. This makes these economies attractive for the relocation of companies from EU Member States and for foreign direct investment mainly for the production of medium- and high-quality clothing. SMEs are increasingly becoming producers for EU buyers. The competitive advantages of the economies in the region – cheap labour and tax benefits – will be lost with their entry into the EU.

3.2.3 Decomposing

3.2.3.1 Overview

The textile sector is primarily concerned with the design, production, and distribution of clothing. When it comes to the Western Balkan economies' growth and development policies, the textile industry has a lot of potential. Companies who engage in the textile industry can see a considerable return on their investment. We must not overlook the fact that textiles have a high potential for innovation and can be employed in a variety of industries (e.g. automotive). The Western Balkan economies are an attractive destination for the global textile industry. As a result, it's critical to tailor conditions to the market, close the infrastructural gap, and assure the growth of textile manufacturing prospects.

The main actors in the textile sector are companies dealing with (a) the production of raw materials and semi-finished products, (b) the production of finished products, and (c) product sales (retail and wholesale). In most cases, companies have developed their own sales chain. In addition, some companies export finished products to foreign

markets, primarily to other Western Balkan economies as well as EU countries.

Textile and apparel production in the Western Balkan economies has a long-standing tradition and was for many years one of the main export industries. During the transition processes the sector was marginalized in the structure of national economies, and the role of textile and apparel production in the Western Balkan economies was diminished. Despite a drop in the production, compared to the period before the transition, the sector nevertheless has export potential, as assessed by the percentage of its exports in the total exports of most WB economies. There is a positive trend discernible in the growth of the textile sector's exports, which has for the most part of the past decade been more dynamic than the trends in international trade and the growth in the volume of textile imports into the EU market.

Serbia, North Macedonia, and Kosovo, to a degree, have substantial number of manufacturing companies with competent workers and the ability to expand their integration into global value chains. Typically, there are two groups of companies active in the GVC. Falke, Calcedonia, Golden Rose, UCB in Serbia for example, utilise their manufacturing facilities as secondary manufacturing locations to produce high-quality clothes. The second group consists of locally owned businesses such as Danitex, KuliConfection, and Metas (Macedonia), which manufacture for global brands and provide Cut, Made, Trim (CMT) or full garment production services, as well as a variety of other services (such as pattern making, creative services, design, washing and finishing, embroidery, dyeing and printing services). The sector is labelled as being particularly labour-intensive, where companies often manufacture low-value-added goods.

We have contacted over 100 stakeholders from the sector, with a request to participate in our research. Only 9 responded to our request (from Serbia and Bosnia and Herzegovina), 6 companies completed the questionnaire, and we had conducted interviews with one company representative, one from business support organisations and one

member of the scientific community¹⁴. Large textile companies showed no interest in participating in the research. We received answers from companies that are domestically owned, as well as from companies that are predominantly foreign-owned.

Only two surveyed companies stated that they are integrated into global value chains as they are a part of a network of companies headed by a mother firm, where the different stages of the production process could be located across different countries. Our research results reveal that by size and length of time in business they are mostly large companies, some of them with a long tradition in sector, operating for over 20 years. Others integrated in the production of internationally famous brand were established after 2008. Most of the companies are export oriented and are already integrated into global value chains. As a result of the loss of their own raw material base in WB economies during the transition, survey results revealed that a significant number of enterprises rely on inputs from neighbouring WB economies.

Observing the current situation in the textile sector, we can conclude that Serbia dominates in the Western Balkan region. Specifically, the growth of the textile sector was primarily influenced by foreign direct investment. However, the indigenous small and medium-sized companies also contributed to a more significant level of growth. The leading companies in Serbia, but also in the region of the Western Balkans, are Valy, Golden Lady, Pompea, Fiorano, Olimpias, Gordon, Falke and Real Knitting. The arrival of foreign companies is not an unusual phenomenon, given that the textile sector is primarily labour-intensive and does not imply a high complexity of work, and the production process itself is concentrated in these economies. The economy-based representation of the textile value chain is given in [Box 3.1](#).

(14) Methodological aspects of the survey and interviews including the questionnaire are presented in Appendix Section E.

3.2.3.2 Value-added dynamics in the GVC, identifying types of linkages and relationships between different actors in the GVC

Companies integrated into global value chains act as subsidiaries of a transnational corporation (majority stake-owned by the corporation) and are involved in the manufacturing of final goods. Depending on the operations they do in the textile value chain, different levels of cooperation exist within the value chain. The production of both foreign-owned and domestic companies in the sector is tailored to the specific need of their mother companies and contractors. Many companies in the sector are highly flexible, able to respond swiftly to market demands, and have a short production cycle from receipt of purchase orders through production and delivery. They are important suppliers to the mother company or contracting company, although their share in the total value created in the GVC is not as large, typically ranging between 5% and 15%. Due to the full range of services,

they provide (“full package product”), a number of enterprises involved in the global value chain have improved or remained constant in their positions in the chain over the last few years. GVC operations are expected to grow in the future, according to the surveyed companies.

Most important actors in the GVC are suppliers, users of product/services (buyers), governmental institutions and service providers (transport, marketing, post-sale, consulting, financial services, insurance, etc.). The cooperation along the value chain is rated as good. Companies from the countries where their parent firm was based, namely Italy and Germany, are the key trading partners. However, trade within the region it is not negligible.

Research findings show that the cooperation activities of the support network should be improved. Most businesses are not members of an organisation or cluster because they do not perceive a compelling reason to do so at this time, as associations cannot help them grow their firm. Yet there

Box 3.1. Economy-based representation of the textile value chain

The textile industry’s potential is particularly strong in Serbia and Northern Macedonia, as demonstrated by the number of textile enterprises functioning in these countries as well as by the number of cluster organisations that provide major assistance to these businesses. In other economies the textile sector is developing at a considerably slower pace, which is particularly noticeable in Montenegro and Kosovo. Small and medium-sized enterprises (SMEs) account for the majority of textile and garment businesses in the Western Balkans. The textile sector’s expansion is primarily due to FDI inflows, but indigenous SMEs also played a role. The key challenge for Western Balkan economies is not just attracting FDI but also attracting phases of higher added value with it. Despite the fact that the textile manufacturing process is concentrated in developing or undeveloped nations because of their cheaper labour costs, the value-added distribution across the chain differs – design, branding, and promotion processes, for example, are typically centred in more developed countries.

is an awareness of significance and a positive attitude towards support organisations, as they can provide relevant information that can support textile business. Several associations within the textile sector are active in the Western Balkans region, aiming to increase the competitiveness and business efficiency of their members as well as advancing the fashion and clothing industry as a whole.

Geographical location, customs, tariffs and trade regulations, cost of energy/supplies, macroeconomic environment, availability of skilled labour, incentives provided by the government and labour market flexibility were main factors that influenced respondents' decision to start or join global value chain operations.

Compared to other economies in the Western Balkans, Serbia has comparative advantages in the clothing subsector. These advantages are primarily reflected in lower costs because of early strength, tradition and skills, as well as a favourable geostrategic position. In order to increase competitiveness in the coming period, it is very important to explore the possibilities of extending the value chain further, as well as reducing the impact of fragmentation. Therefore, it is possible to single out the three most important opportunities which relate to (a) gaining higher levels of added value within FDI, (b) more active support of the fashion industry, and (c) more active support of firms.

We were unable to locate institutions that collaborate with textile industries while mapping the scientific community. One of the reasons is the diminishing interest among young people to pursue a career in the textile sector. Lack of interest in quantitative and qualitative terms has had a negative effect on the sectoral infrastructure of education at all levels. Textile and apparel study programmes at colleges and universities are often combined with other departments or faculties and have lost their identity as well as significant resources in terms of teaching and research staff and budget.

3.2.3.3 Labour issues

Since the textile sector is based mainly on the production process, the level of education of the workforce is less important to companies. More precisely, performing work in production generally does not require a certain type of education. However, an analysis of the received answers from all companies shows clearly that most of their employees have primary and high school education. For the process itself to function smoothly, companies employ mostly craft and related trades workers and plant and machine operators and assemblers. The companies that participated in this research said that they needed workers with the following skills:

- working with machinery and specialised equipment,
- communication, collaboration and creativity, and
- IT skills.

The respondents from three companies believe that the country in which they operate provides them with a workforce that is able to adequately respond to all tasks. As a very important limitation – and one without which there is no success in business – they cite a lack of skilled workers, labour discipline and wage and labour regulations. One of the problems faced by companies is the large turnover of workers, which requires a constant review of the rules as well as the training of new workers.

When it comes to employee fluctuation in the textile sector, this can be viewed from two angles. On the one hand, fluctuations can be involuntary and occur due to a lack of ability or qualifications, inappropriate behaviour, termination of employment or legal violations and criminal offences. On the other hand, employee fluctuation can occur as a result of higher salaries offered by other companies located in the country or abroad, greater respect for the rights of employees, and opportunities for advancement/ training. In cases where the textile industry is more represented in a single region, the shortage of skilled labour may increase.

One possible solution to the problem of labour force qualifications could be mandatory retraining programmes similar to the ones that are offered in developed economies, for example. In any case, that would reduce the problem employers have faced for a long time. By changing occupations and acquiring higher levels of qualifications, new opportunities are opened up to meet the needs of all interested parties and raise the efficiency of businesses and the competitiveness of the economy. If companies want to survive and thrive in modern business conditions, which are characterised by constant and rapid change, they must constantly invest in the development and training of their employees. Looking ahead, the knowledge and innovative behaviour of employees will be a key factor that will make the difference between successful and unsuccessful companies.

One of the short-term measures that will be necessary for the revitalisation of the textile industry is education of the workforce. Therefore, it is necessary for textile companies to maintain good cooperation with higher education institutions, clusters in the textile/ clothing industry consisting of producers of raw materials and finished clothing, scientific and educational institutions, and governmental and non-governmental organisations. Long-term or strategic measures include initiatives and activities to strengthen competitiveness and productivity to encourage the development of society, the application of innovation, R&D, and the development and use of information and communications technologies.

CHAPTER

4



Chapter 4. Automotive value chain

The value chain considered in this section refers to motor vehicles, trailers and semi-trailers (NACE CL).

4.1 Overview

4.1.1 Overall patterns and trends

The automotive sector accounts for a relatively small share of value added in most WB economies, with Serbia and North Macedonia accounting

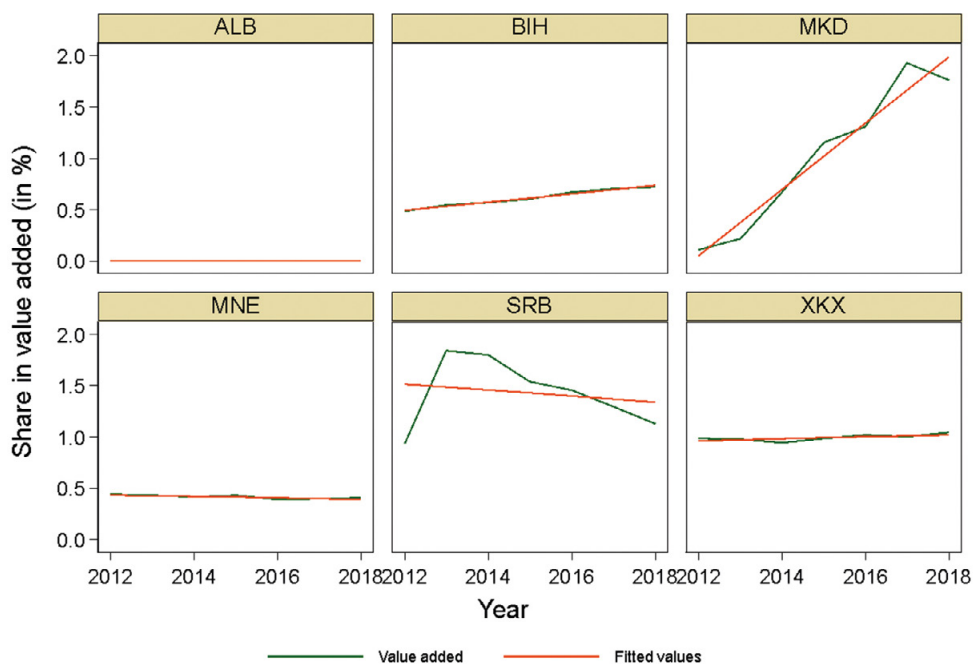
for around 1.5% (Figure 4.1).¹⁵ Shares have been increasing in North Macedonia and have risen slightly in Bosnia and Herzegovina, but they have been stable or even slightly declining in the other WB economies.

Employment levels are relatively low in all economies and are on a declining trend in most of them, according to ILO data (Figure 4.2).

With respect to revealed comparative advantage, only Serbia is characterised by a slightly positive indicator, with North Macedonia showing an increasing trend (Figure 4.3).

(15) These shares are expressed as a percentage of industries A to N.

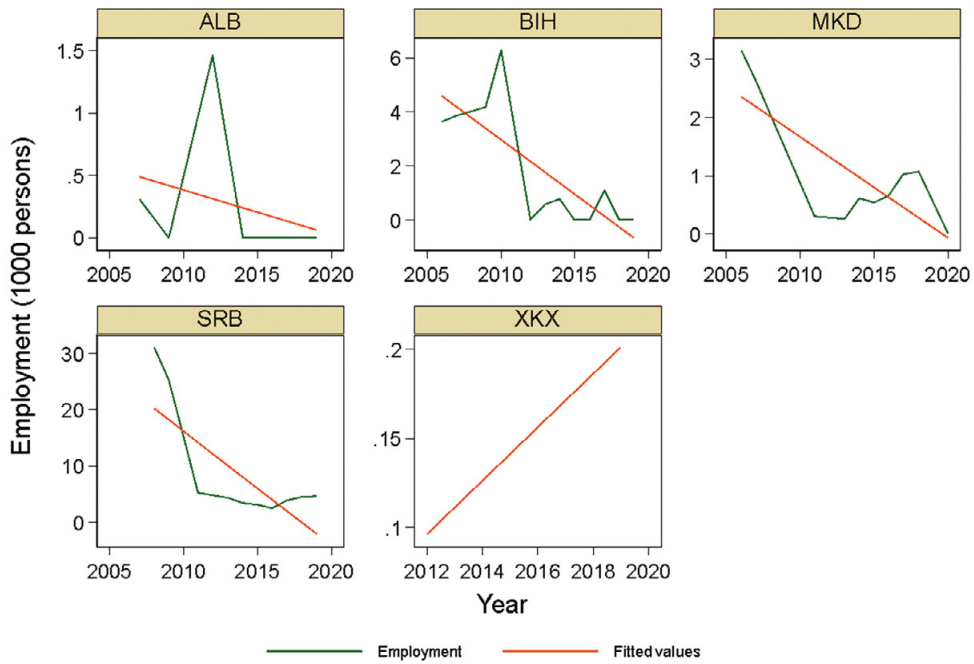
Figure 4.1. Value-added shares of the automotive industry



Note: Fitted values are calculated as a linear trend.

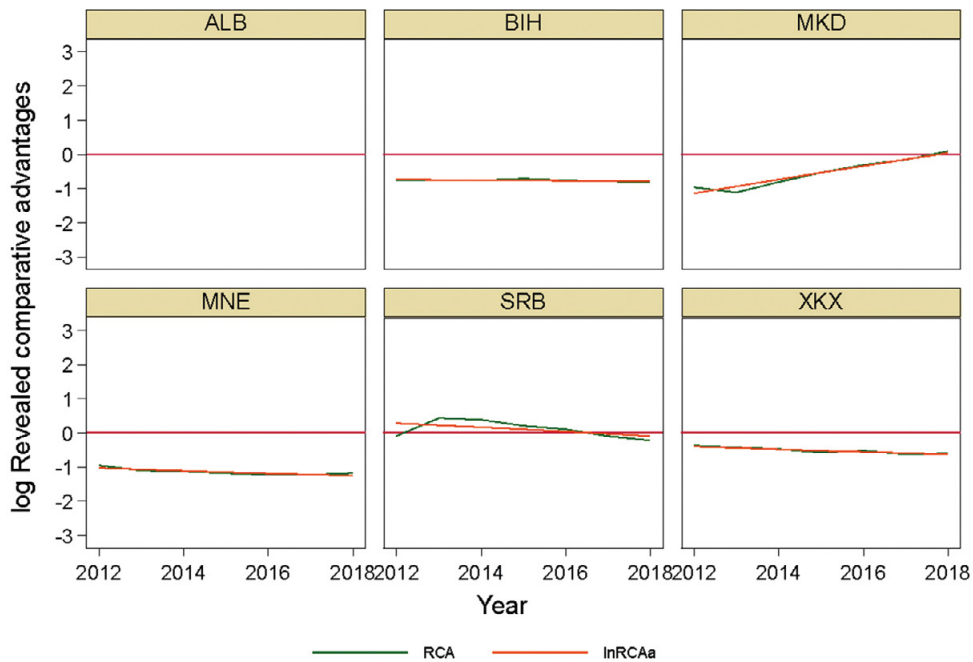
Source: wiiw MC IOD (Reiter and Stehrer, 2021); own calculations.

Figure 4.2. Employment levels in the automotive industry



Note: 1) Fitted values are calculated as a linear trend. 2) For Kosovo only data for 2012 and 2019 are available.
 Source: ILO (accessed March 2021), own calculations.

Figure 4.3. Revealed comparative advantages in the automotive industry



Note: Fitted values are calculated as a linear trend.
 Source: wiiw MC IOD (Reiter and Stehrer, 2021); own calculations.

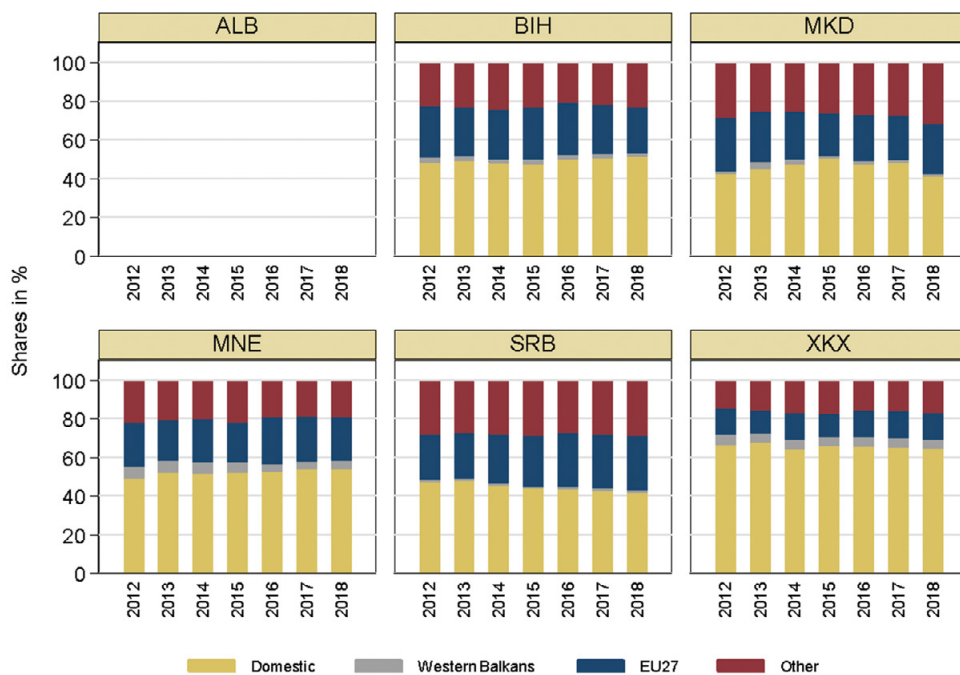
Considering the value-added structure of the economies' gross exports¹⁶ (Figure 4.4) compared with the other value chains under review, one finds a relatively low domestic content share of around 50%, with higher shares for Kosovo. Backward

linkages are particularly strong with respect to the EU27, accounting for about 20% of the value of gross exports, while in the rest of the world they are slightly smaller.¹⁷

(16) Using multi-country input-output tables allows to decompose gross exports into the contribution of domestically produced value added and value added produced in foreign countries that are imported via intermediary inputs.

(17) Data for Albania are not available.

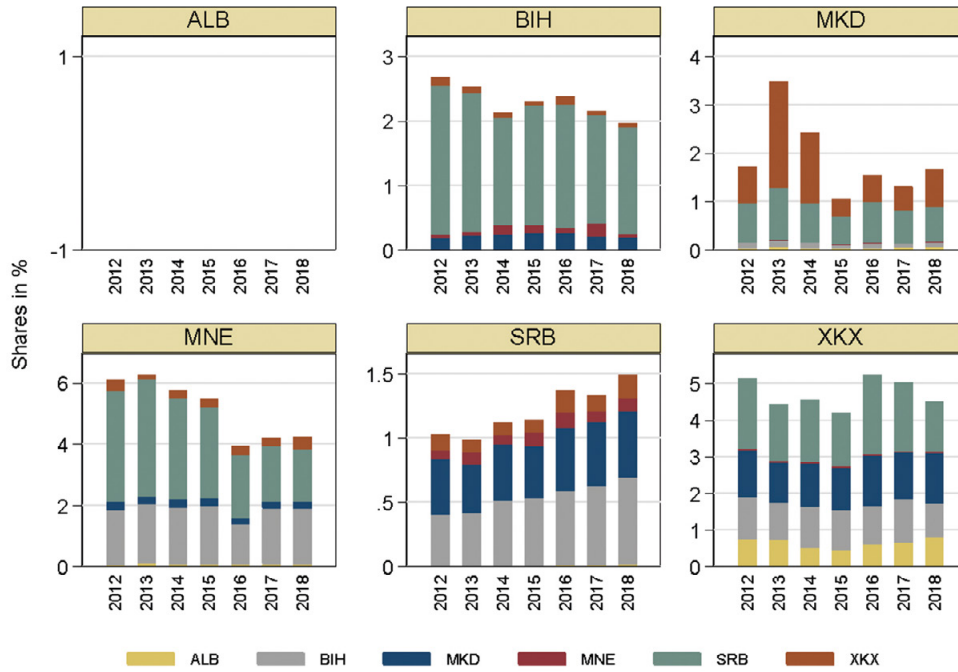
Figure 4.4. Value added structure of gross exports in the automotive industry



Note: Data for Albania are not available.

Sources: wiiw MC IOD (Reiter and Stehrer, 2021); own calculations.

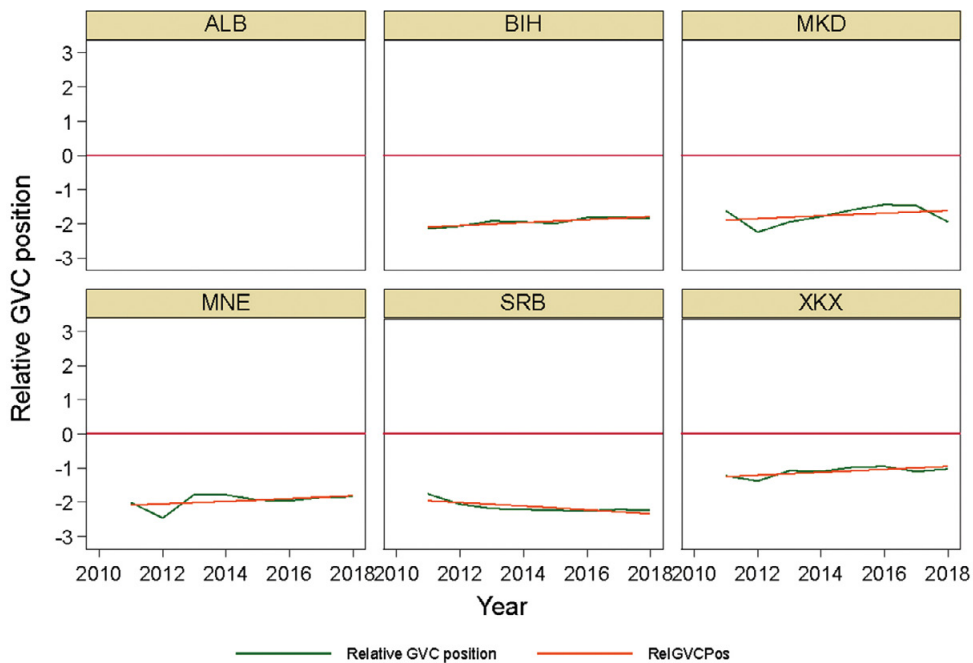
Figure 4.5. Intra-WB backward linkages in the automotive industry



Note: Data for Albania are not available.

Sources: wiiw MC IOD (Reiter and Stehrer, 2021); own calculations.

Figure 4.6. Relative GVC position in the automotive industry



Note: Fitted values are calculated as a linear trend. Data for Albania are not available.

Sources: wiiw MC IOD (Reiter and Stehrer, 2021); own calculations.

Backward linkages with the other Western Balkan economies are relatively strong (Figure 4.5) compared with the other selected value chains. The data also indicate some stronger bilateral backward linkages (e.g. between North Macedonia and Montenegro or Montenegro and Serbia with Bosnia and Herzegovina).

The relative GVC position¹⁸ (Figure 4.6) – indicating whether the industry is relatively stronger internationally forward- or backward-linked – shows

a strong dependency from international upstream industries and countries.

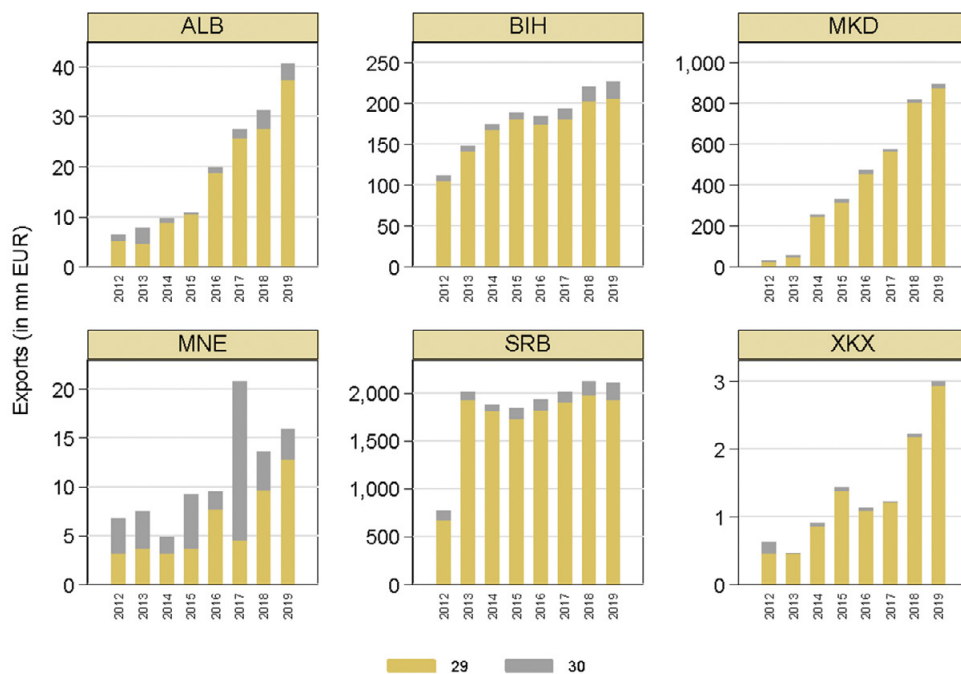
4.1.1 Detailed patterns

Trade structures are clearly dominated by the manufacture of motor vehicles (Figure 4.7); only Montenegro shows a larger share in other transport equipment. There are strong increases in exports reported for Albania, North Macedonia and Kosovo.

That the manufacture of motor vehicles dominates is also clearly visible from Eurostat's Structural Business Statistics (SBS) data (Table 4.1). Within C29 the manufacture of parts and accessories for motor vehicles plays a big role, followed by the manufacture of motor vehicles (Table 4.2).

(18) The GVC position indicates whether the industry of a country has stronger forward (a country's value added in exports which goes into exports of other countries) or backward linkages (the foreign value added of a country's gross exports).

Figure 4.7. Detailed trade structures (NACE 2-digit) in the automotive industry



Note: 29 ... Manufacture of motor vehicles, trailers and semi-trailers; 30 ... Manufacture of other transport equipment.

Sources: EU Comtrade (accessed March 2021); own calculations.

Table 4.1. Detailed industry structure (NACE CL), 2019

NACE Rev. 2 code	Description	Levels			Shares in %		
		Bosnia and Herzegovina	North Macedonia	Serbia	Bosnia and Herzegovina	North Macedonia	Serbia
		Enterprises - number					
CL	Manufacture of transport equipment	71	47	355	100.0	100.0	100.0
C29	Manufacture of motor vehicles, trailers and semi-trailers	61	47	244	85.9	100.0	68.7
C30	Manufacture of other transport equipment	10		111	14.1	0.0	31.3
		Value added at factor cost – EUR million					
CL	Manufacture of transport equipment	80	0	574	100.0		100.0
C29	Manufacture of motor vehicles, trailers and semi-trailers	75		546	93.5		95.1
C30	Manufacture of other transport equipment	5		28	6.5		4.9
		Persons employed - number					
CL	Manufacture of transport equipment	4,277	0	48,046	100.0		100.0
C29	Manufacture of motor vehicles, trailers and semi-trailers	3,725		45,805	87.1		95.3
C30	Manufacture of other transport equipment	552		2,241	12.9		4.7

Sources: SBS Eurostat (accessed March 2021), own calculations.

Table 4.2. Detailed industry structure of C12 (Manufacture of motor vehicles, trailers and semi-trailers), 2019

NACE Rev. 2 code	Description	Levels			Shares in %		
		Bosnia and Herzegovina	North Macedonia	Serbia	Bosnia and Herzegovina	North Macedonia	Serbia
		Enterprises - number					
C29	Manufacture of motor vehicles, trailers and semi-trailers	61	47	244	100.0	100.0	100.0
C291	Manufacture of motor vehicles	4	9	30	6.6	19.1	12.3
C292	Manufacture of bodies (coachwork) for motor vehicles; manufacture of trailers and semi-trailers	16	4	34	26.2	8.5	13.9
C293	Manufacture of parts and accessories for motor vehicles	41	34	180	67.2	72.3	73.8
		Value added at factor cost – EUR million					
C29	Manufacture of motor vehicles, trailers and semi-trailers	75		546	100.0		100.0
C291	Manufacture of motor vehicles	1		116	0.7		21.3
C292	Manufacture of bodies (coachwork) for motor vehicles; manufacture of trailers and semi-trailers	11	0	16	15.3		2.9
C293	Manufacture of parts and accessories for motor vehicles	63	173	414	84.1		75.9
		Persons employed - number					
C29	Manufacture of motor vehicles, trailers and semi-trailers	3,725		45,805	100.0		100.0
C291	Manufacture of motor vehicles	94		3,737	2.5		8.2
C292	Manufacture of bodies (coachwork) for motor vehicles; manufacture of trailers and semi-trailers	574		1,180	15.4		2.6
C293	Manufacture of parts and accessories for motor vehicles	3,057		40,888	82.1		89.3

Sources: SBS Eurostat (accessed March 2021), own calculations.

Table 4.3. Detailed industry structure of C30 (Manufacture of other transport equipment), 2019

NACE Rev. 2 code	Description	Levels			Shares in %		
		Bosnia and Herzegovina	North Macedonia	Serbia	Bosnia and Herzegovina	North Macedonia	Serbia
		Enterprises - number					
C30	Manufacture of other transport equipment	10		111	100.0		100.0
C301	Building of ships and boats	5	0	54	50.0		48.6
C302	Manufacture of railway locomotives and rolling stock						
C303	Manufacture of air and spacecraft and related machinery			17			15.3
C304	Manufacture of military fighting vehicles	0	0		0.0		
C309	Manufacture of transport equipment n.e.c.	3		23	30.0		20.7
		Value added at factor cost – EUR million					
C30	Manufacture of other transport equipment	5		28	100.0		100.0
C301	Building of ships and boats	1	0	13	11.5		47.7
C302	Manufacture of railway locomotives and rolling stock						
C303	Manufacture of air and spacecraft and related machinery			3			11.0
C304	Manufacture of military fighting vehicles	0	0		0.0		
C309	Manufacture of transport equipment n.e.c.	0		5	3.8		19.2
		Persons employed - number					
C30	Manufacture of other transport equipment	552		2,241	100.0		100.0
C301	Building of ships and boats	108	0	975	19.6		43.5
C302	Manufacture of railway locomotives and rolling stock						
C303	Manufacture of air and spacecraft and related machinery			323			14.4
C304	Manufacture of military fighting vehicles	0	0		0.0		
C309	Manufacture of transport equipment n.e.c.	34		556	6.2		24.8

Sources: SBS Eurostat (accessed March 2021); own calculations.

4.2 Review of the automotive value chain

4.2.1 Digging

4.2.1.1 Firm-level data analysis

The Orbis database has data on 1,205 companies from the Western Balkans operating in the automotive sector. Their distribution by economies is shown in *Figure 4.8*. Most of them are from Serbia (74%), followed by North Macedonia and Bosnia and Herzegovina with 12% and 9%, respectively. The other three economies have fewer companies.

Of these 1,205 companies, financial data are available for 634 companies, which is the smallest number of all the chosen sectors. These 634 companies possess total assets of EUR 4.6 billion, generate annual operating revenues of EUR 5.3 billion and employ 72,000 people, which is at the middle of the six sectors. The companies are mainly domestically owned (56%).

The average company in the sector has assets of EUR 7.2 million, generates annual revenues of EUR 8.4 million and employs 114 people, meaning that companies in this sector are large, with big capital investments and many employees. The average gross salary for all the six economies is EUR 697 per month, which is around the average for all the sectors. One worker generates EUR 73,000 of annual revenues, which is again around the average for all the sectors. The return on EUR 1 of investment in assets is EUR 1.16, which is by far the highest of all the sectors surveyed (*Table 4.4*).

Table D.3 in the Appendix lists the 30 biggest companies in the sector according to operating revenues. Most of them are major multinational companies; they are deeply integrated into global value chains and sell their products to big international car companies. They often employ thousands of workers. Most of these companies have been established in the last 10-15 years in the form of greenfield investments in the Western Balkan economies.

According to the fDI Markets database, the auto-

motive sector has been the most attractive sector for foreign investment in the Western Balkans during 2015-2020. The 87 projects in this field have capital investment of EUR 3.5 billion (12% of all investment) and 48,163 employees (24% of total employment).

Serbia dominates again, accounting for 87% of the value of the projects and 78% of employment. North Macedonia comes second, Albania third and Bosnia and Herzegovina fourth. Montenegro and Kosovo have no automotive project on record.

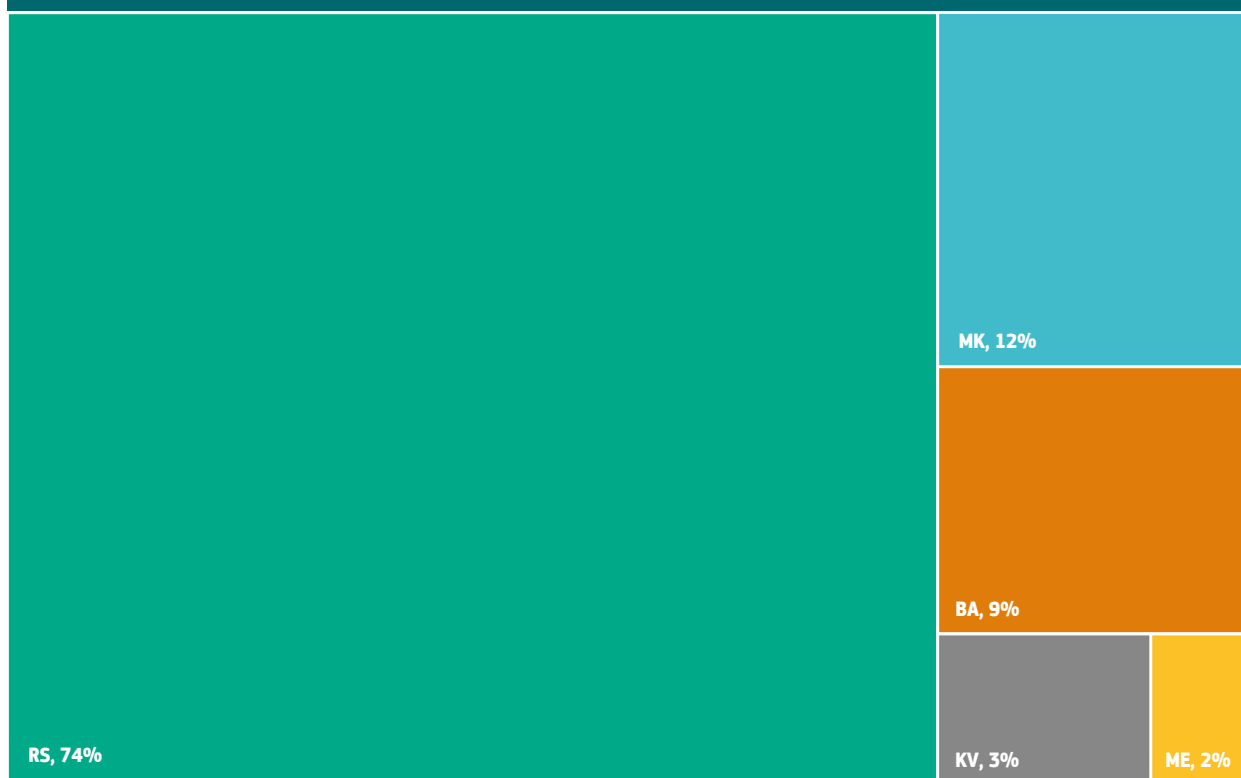
According to information from the fDi database, automotive projects are in general large, with an average investment of EUR 40 million and employment of 554 people. The biggest projects exceed investment worth EUR 100 million and employ more than 1,000 people. Most of them are located in Serbia.

Also according to the fDi database, the biggest project in terms of investment is that of the Japanese Nidec Corporation, which plans to invest EUR 1.5 billion in the production of motors for electric vehicles and inverters in Novi Sad in Serbia. The two projects are expected to employ 1,200 people in total and to start operating in 2022. The company provides electric motors to some of the biggest global car manufacturers, and the factory will be one of its largest production hubs in Europe. It has signed a strategic alliance agreement with the University of Novi Sad to actively engage in technological exchanges via industry-academia partnerships.

Another big project is the investment by Germany's Siemens in a plant producing aluminium car bodies for passenger trains in Kragujevac, Serbia. The plant started operating in 2020, the entire investment amounts to EUR 220 million, and the project is expected to employ 2,000 people.

According to fDi Markets, Germany's Brose is opening a factory worth EUR 180 million to produce car parts in Panchevo, Serbia. The company is also planning to launch a R&D centre in Serbia. It is expected to employ 1,100 people, most of them highly qualified engineers, and the plant is expected to start working in 2021.

Figure 4.8. Distribution of automotive companies by WB economies



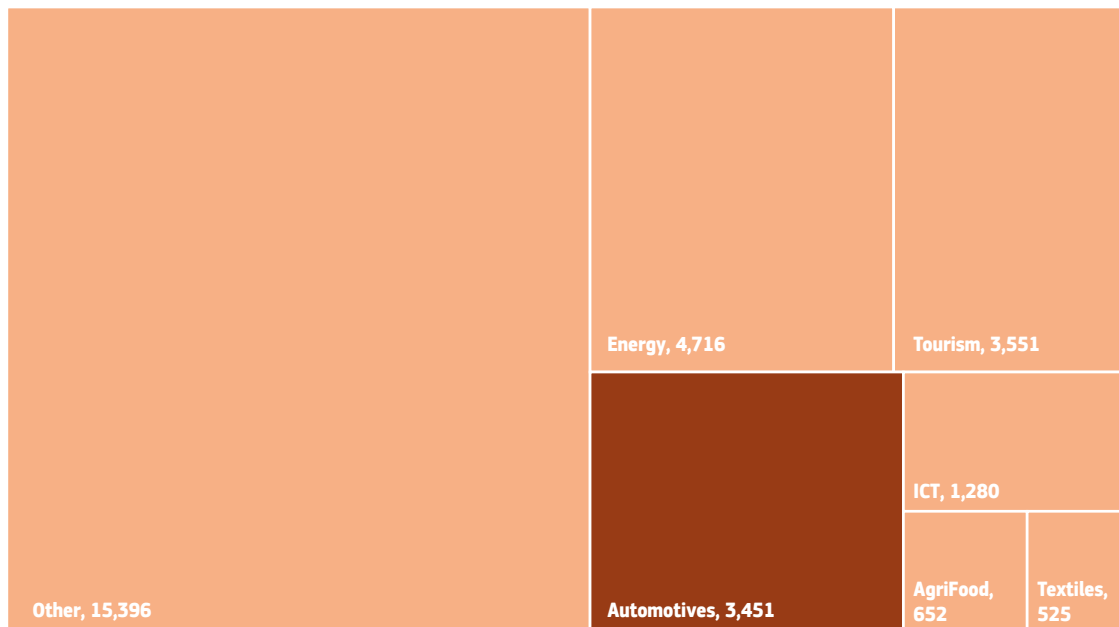
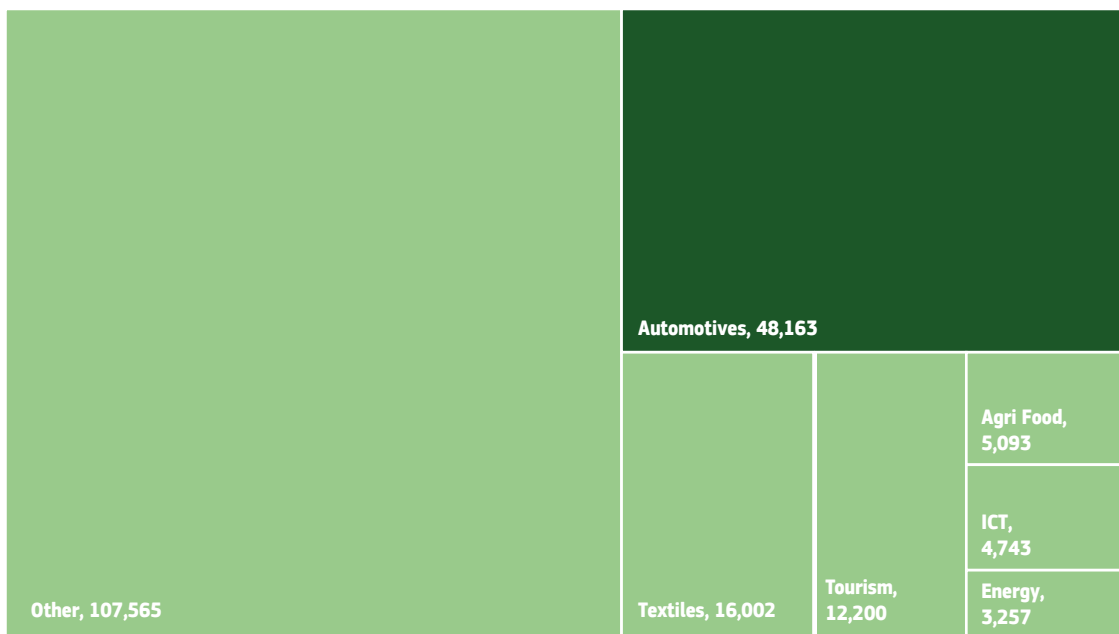
Sources: own calculations, using data from Orbis (accessed May 2021).

Table 4.4. Overview of companies in the automotive sector (in 2019)

Number of firms	Total assets (EUR)	Operating revenue/turnover (EUR)	Costs of employees (EUR)	Number of employees	Foreign owned
634	4,582,663,356	5,294,177,969	606,991,305	72,502	44%
Average assets per firm (EUR)	Average revenue per firm (EUR)	Average number of employees per firm	Average gross monthly salary (EUR)	Revenue per 1 EUR assets (EUR)	Revenue per worker (EUR)
7,228,1756	8,350,438	114	697	1.16	73,021

Source: Own calculations, using data from Orbis (accessed May 2021).

Figure 4.9. Share of automotive projects in all fDI projects

Capital investment (EUR million)**Employment** (number of people)

Sources: fDI markets database (accessed May 2021); own calculations.

Figure 4.10. Distribution of automotive projects by economies

Capital investment (EUR million)**Employment** (number of people)

Sources: *fDI markets database (accessed May 2021), own calculations.*

4.2.1.2 Patent data analysis

In the patent analysis we examined overlaps with other technology areas. With the help of a technology network we identified the largest technology areas and overlaps for the period 2000-2020 (see [Figure 4.11](#); for total numbers see Table C.7 in Appendix C.4.1). The larger the nodes, the more connections with other areas. The measure used to determine clusters is modularity. Here, nodes with strong connections to each other but few connections to others are grouped together. This enables the discovery of community structures. The most IPR-protected patent classes are in the cluster (orange) around patent class B60 (Vehicles in general) and especially its subclasses B60T (Vehicle brake controls) and B60G (Vehicle suspension arrangements) – see [Table 4.5](#).

A high degree of overlap with other areas can be seen in the patent network (see [Figure 4.11](#)). Patent classes F16D (Engineering – Couplings), H01M (Electrical elements – Processes) and C01B (Chemistry – Non-metallic elements) are represented in this cluster. The green cluster also consists mostly of patent class B60, in detail in the subclasses B60N (Seats) and B60R (Vehicle fittings/parts). There are notable overlaps with the areas H01Q (Electricity – Antennas), G01S (Instruments – Radio direction-findings) and G08B (Instruments – Signalling). It corresponds with another cluster, in which technologies from subclass B60W (Conjoint control of vehicle sub-units) are predominantly represented. Of particular interest is the cluster around the two patent classes B60L (Propulsion of electrically propelled vehicles), where there are strong overlaps in the technology areas around measuring instruments (G01P), and circuit arrangements (H02J). It is also worth noting that a larger interconnection was identified around the subclasses B63B 35 (Transporting – Vessels), B60K 16 (Transporting – Arrangements in connection with power supply) and F03D 9 (Engines/Pumps – Adaptations of wind motors for special use).

4.2.1.3 Scientific and research publications

The Scopus database – one of the central scientific citation databases with about 80 million documents – is used to evaluate scientific publications in this study. The period considered covers the years 2008-2020 and therefore includes the latest scientific developments. To analyse the share of the WB economies in all scientific publications in the different technologies, a global benchmark is applied in this publication analysis. A quantitative analysis sheds light on the ‘dynamic’ of a research field (value chain) and provides information about the impact of the WB economies as a whole and individually. At the country level, cooperation networks are mapped based on co-authorships of the publications identified in each of the corresponding research field of the value chain. These science maps show the extent of the interaction of the WB economies in an international context for each value chain. In addition, the integral actors of the WB economies in these cooperation networks can be determined.

In the Scopus database the documents are grouped in thematic ‘subject areas’, which are in turn subdivided into different ‘subject categories’. In order to conduct the analysis, publications in the category ‘Automotive Engineering’ are examined. In total, the database exhibits 177,514 hits for the period 2008-2020. For the WB economies, there is an increasing trend observable. In 2008 altogether 14 scientific documents were published; by 2016 this number had almost doubled (29 publications), and by 2020 this number had increased by more than 50%. Organisations from Serbia were involved in 261 publications cumulatively over the years, Bosnia and Herzegovina in 38, and North Macedonia in 26. Kosovo’s organisations contributed seven documents ([Figure 4.12](#)).

The previous analysis provides interesting findings and grants a holistic overview. However, the results are not yet meaningful enough, as absolute values are compared. Publications from Serbia, with around 7 million inhabitants, are weighted the same as publications from Montenegro with

620,000 inhabitants. Therefore, in the next step we control for size effects and put the publications in relation to 100,000 inhabitants (see [Figure 4.13](#)).

In 2008 global publication output per 100,000 inhabitants (0.19) was more than twice as high as output in the WB economies (0.07). In the following years the WB economies were able to catch up. In 2020 output per 100,000 inhabitants was almost the same (0.27 globally and 0.26 in the WB economies). Montenegro and Serbia played a key role in this catching-up process.

The science map ([Figure 4.14](#)) shows the international cooperation network of the WB economies in the period 2008–2020. The database consists of publications with the involvement of at least one WB economy. Each node represents one country, where the size reflects the number of publications in the respective country and the edges reflect the number of co-authored publications with another country. The location of a country on the map is

determined by the attraction to its research partners and the repulsion from countries without joint publications. The different colours mark the affiliation to a ‘narrower research cluster’.

The scientific network in the automotive value chain can be grouped into three main clusters with a total of 45 involved countries. For example, Serbia, Bosnia and Herzegovina, Montenegro and Italy are located in one cluster, North Macedonia, Slovenia, China and Turkey in the second, and the United Kingdom, Albania and Germany in the third cluster. The strongest link between two countries can be observed between Serbia and Bosnia and Herzegovina, which have 12 publications in common.

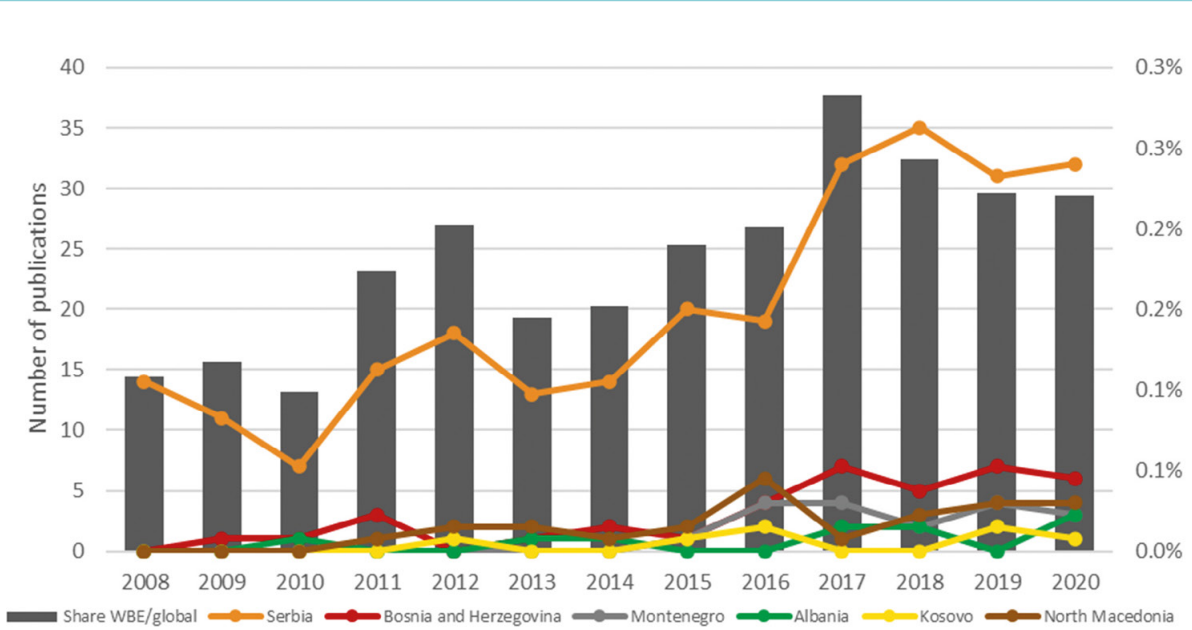
On the meso level ([Figure 4.15](#)), the most active organisation is the University of Belgrade (Serbia) with 144 scientific documents listed by Scopus. The University of Novi Sad (Serbia) ranks second (54 documents) and the University of Niš (Serbia) third (24).

Table 4.5. Patent network – most frequently featured subclasses ‘Automotive’

Subclass	Description	# Features
F02B	internal-combustion piston engines; combustion engines in general	21
B60R	Vehicles, vehicle fittings, or vehicle parts	15
B60K	Arrangement or mounting of propulsion units or of transmissions in vehicles; arrangement or mounting of plural diverse prime-movers in vehicles; auxiliary drives for vehicles; instrumentation or dashboards for vehicles; arrangements in connection with cooling, air intake, gas exhaust or fuel supply of propulsion units in vehicles	14
B60T	Vehicle brake control systems or parts thereof; brake control systems or parts thereof; arrangement of braking elements on vehicles in general; portable devices for preventing unwanted movement of vehicles; vehicle modifications to facilitate cooling of brakes	13
B60W	Conjoint control of vehicle sub-units of different type or different function; control systems specially adapted for hybrid vehicles; road vehicle drive control systems for purposes not related to the control of a particular sub-unit	13

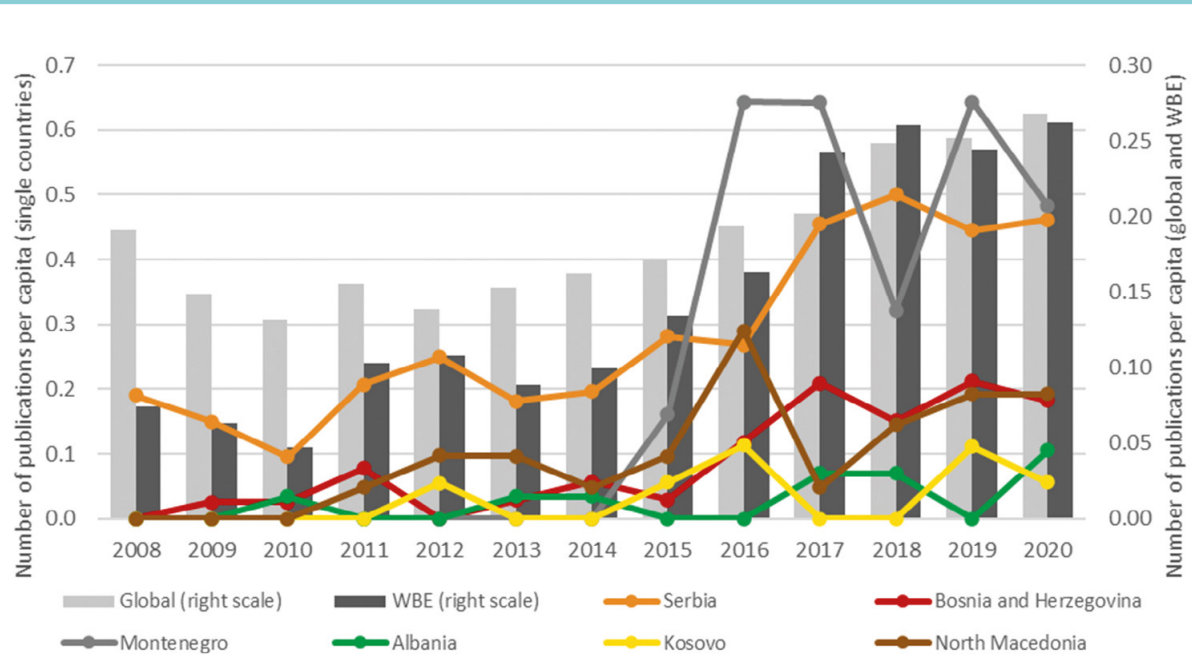
Source: *Economica*, 2020 (accessed March 2021).

Figure 4.12. Scientific publications 2008-2020 in the automotive sector



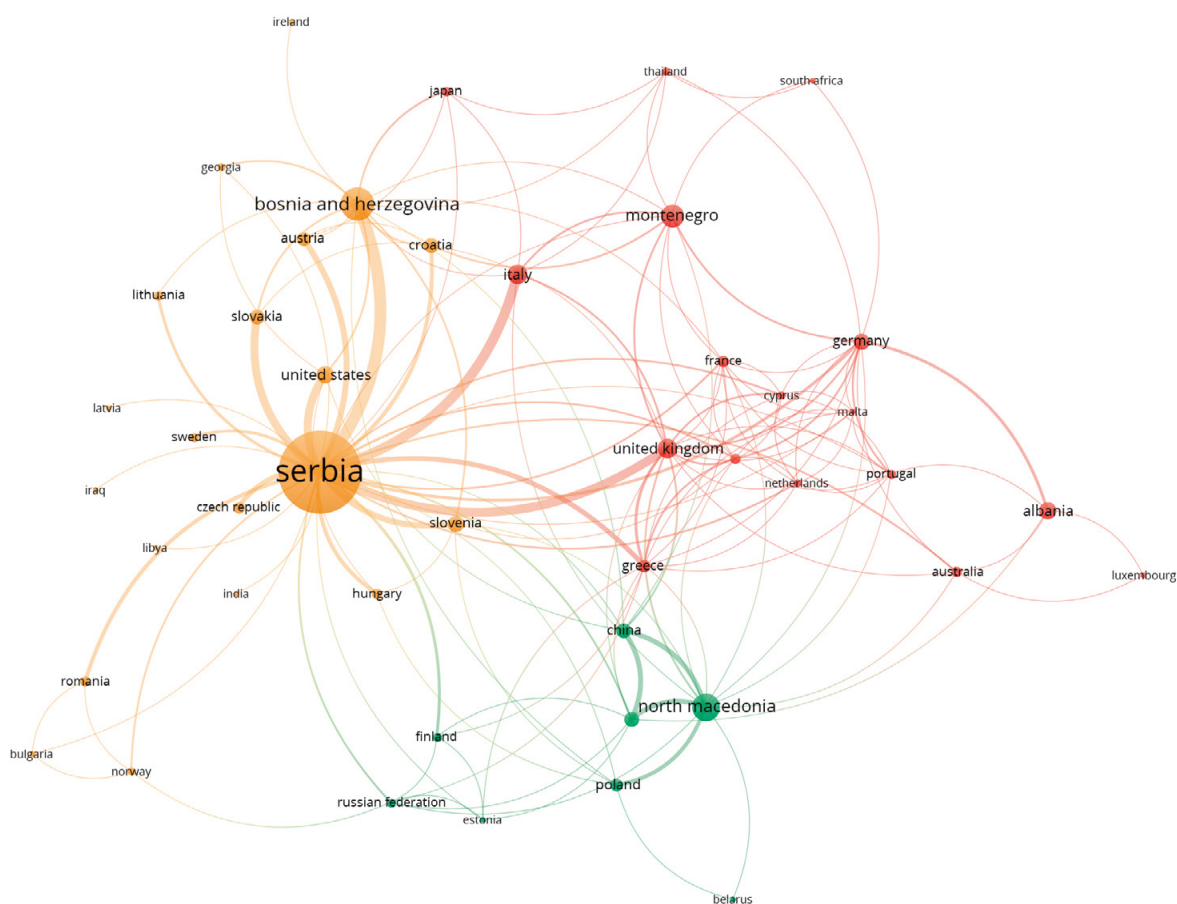
Note: WBE denote Western Balkan economies
 Sources: Scopus (accessed March 2021); own calculations.

Figure 4.13. Scientific publications per capita in the automotive sector



Note: WBE denote Western Balkan economies
 Sources: Scopus (accessed March 2021); own calculations.

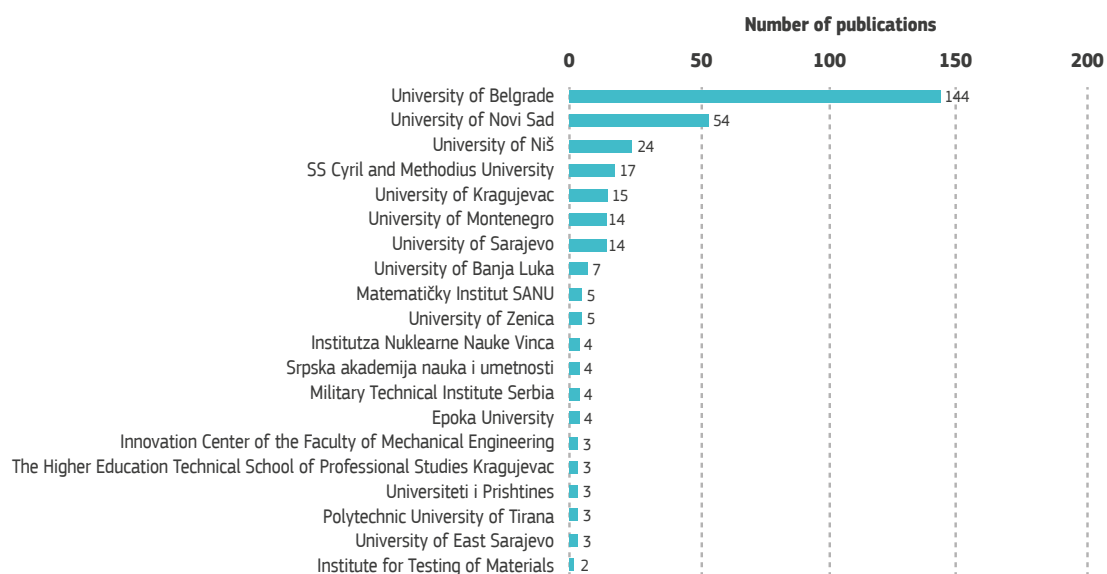
Figure 4.14. Cooperation network WB economies, 'Automotive', 2008-2020



Note: Nodes = Number of documents; Edges = Number of co-authored publications.

Sources: Scopus (accessed March 2021); own calculations.

Figure 4.15. Cooperation network WB economies, 'Automotive', 2008-2020



Sources: Scopus (accessed March 2021); own calculations.

4.2.1 Determining

In recent years the automotive industry has experienced a development boost in the WB region, specifically in Serbia, North Macedonia and Bosnia and Herzegovina. Thanks to a long tradition dating back to the time of the former Yugoslavia, a favourable geographical position (EU27 proximity), a completed transport infrastructure and a relatively skilled and low-wage labour force the automotive industry has been one of the development priorities of the WB economies, especially in terms of attracting foreign investment.

Like other developing countries, the key driving force was the inflow of foreign direct investment in the assembly and component production sectors, with the latter occupying the most valuable position in the region's automotive value chain. The expansion of activities of global assemblers and component manufacturers has had a key impact on the structure of the automotive industries in the WB economies, especially on the growing role and transformation of the component sectors.

The entry into the market of one of the world's leading multinational vehicle producers, Fiat Chrysler Automobiles (now Stellantis Serbia), marked the single largest brownfield investment in the region. With the use of subsidies and pre-existing infrastructure the company established a new plant on the site that had previously been the location of a large vehicle assembly plant belonging to Zastava Automobiles. However, despite the intensive globalisation of the automotive industry, Fiat's production has remained concentrated in its homeland, Italy, and the growth of car exports was followed by an increase in imports of parts and components from there. The established plant is mostly used to assemble parts imported from Italy sourced by multinational first-tier suppliers to re-export back, while the expected impact on the development of local suppliers is missing. This is due to strict quality and technical and delivery requirements, which local suppliers often find difficult to meet, but it is also attributable to high margins and a general lack of interest on the part of Fiat in developing long-term relationships with local companies.

Such practices of large multinational vehicle producers are not uncommon and have been recorded in most developing countries. The recent development of the WB region's automotive industry is based predominantly on the arrival of foreign component manufacturers. However, the value added remains moderate, since the basic local function is to assemble complex components imported from foreign companies' home countries.

4.2.2 Decomposing

4.2.2.1 Overview

With the exception of Albania, Kosovo and Montenegro, the WB economies have a considerable number of medium-technology manufacturing companies with the potential to increase the economic complexity and position of the region in the automotive GVC. A total of 12 stakeholders from the industry took part in our research. We received survey responses from four companies, interviewed one company, five people from business support organisations, and two representatives of scientific community¹⁹. Our survey results reveal that by size, length of time in business and orientation they are medium-sized to large, started operating in the period after the economic transition in the 2000s, and are completely export-oriented and integrated into the European vehicle production systems. The component sector's products, such as vehicles and machinery, make up a considerable share of the WB region's total exports and are among the most complex export products. Most of these companies, such as Schneider Electric, Dräxmaier, Van Hool, Johnson Control, Alloy Wheels etc., are foreign-owned and provide a wide range of vehicle parts and components, including some technologically advanced systems and solutions.

Also, there are many local, domestically owned component manufacturers which are involved in the global production systems by sourcing me-

(19) Methodological aspects of the survey and interviews including the questionnaire are reported in Appendix Section E.

dium-technology components for large vehicle producers abroad. Despite failing to engage in Fiat's supply chain as second- or third-tier suppliers, these companies have found their niches in foreign countries, where they act as respectable component suppliers. This confirms that some local manufactures have the capacity and competencies to meet the quality and technological standards of large vehicle producers.

The automotive component sector can be analysed by studying two groups of companies which are both active in the GVC. Component manufacturers typically produce medium-technology goods, but some are also engaged in the production of more complex, higher value-added products that require advanced technology and know-how.

The first group consists of foreign companies which are owned by Western vehicle and component manufactures. Some of these have set up operations to follow the original equipment manufacturers (OEMs) to the WB market. For example, Prevent, which is a joint venture with Volkswagen Sarajevo, supplies seat covers for Volkswagen, Renault and Peugeot models. Magneti Marelli and Johnson Control are Fiat's first-tier suppliers located in the modern supplier park (industrial zone) located near the Fiat plant in Kragujevac. Magna Seating is one of the global suppliers of seat components. Van Hool opened a manufacturing plant in North Macedonia to produce buses, industrial vehicles and touring coaches. Delphi Electronic Systems Macedonia is a US company which produces electronic control technologies for vehicle manufacturers across Europe. In addition to assembling, some companies export sales and marketing services to their mother companies (e.g. Bosch Serbia).

The second group consists of local companies, including SMEs, which act as major suppliers of metal and plastic components, machinery and equipment to world-renowned automotive producers. For example, Gomma Line is a domestically owned, completely export-oriented company, which is located in Kragujevac and supplies Russia and EU markets with moulded rubber products, brake hoses and rubber sealing profiles intended mostly for the automotive sector.

These component manufacturers are highly dependent on imports of raw materials and other inputs. However, trade within the region remains modest. The main trading partners include EU countries, particularly Italy, Germany and Central and East European countries as well as Turkey, the US and the Russian Federation.

The aftermarket sector (repair and maintenance, wholesale and retail of parts) also plays an important role in the automotive industry and is usually the easiest way for local companies to enter the automotive value chain. This is because when entering the markets of developing countries, multinational companies outsource distribution and retail activities first of all locally. For example, Nikom auto, located in Kragujevac (Serbia), is an authorised dealer and repairer for Fiat, Alfa Romeo, Fiat Professional and Jeep vehicles. The economy-based representation of the automotive value chain is given in [Box 4.1](#).

4.2.2.2 Value-added dynamics in the GVC, identifying types of linkages and relationships between different actors in the GVC

Given the high complexity of final products, the governance between different actors in the automotive value chain is hierarchical. Production and sales are largely concentrated in a limited number of companies. Assemblers are focused on building long-term relationships with a smaller number of global and first-tier suppliers, to which they transfer activities such as the design of complete solutions that require more advanced competencies and resources. Global and first-tier suppliers follow the assembler to new markets and manage the relationships with lower-tier suppliers. Lower levels in the supply chain require less complex technologies and know-how.

Our research results have provided insight into the dynamics of the relationships between the different actors in the WB automotive value chain. Within the value chain, different levels of cooperation exist between various actors. The intensity of cooperation is determined by the nature of activities that are mostly realised in the region, i.e. the assem-

bly of imported parts and the export of finished products. The production of foreign-owned companies is tailored to the specifications and quality demands of their mother companies abroad. As key suppliers of a particular product to the mother company they play an important role, although their share in the total value created in the GVC is not as large. First-tier suppliers produce directly for the assemblers and are required to possess capabilities to deliver complete solutions. By taking over complex tasks and processes, the relationship between assemblers and global component manufacturers has evolved. Second-tier suppliers are focused on first-tier suppliers, which set the design and quality standards for their production. Third-tier suppliers produce basic goods, and their relationship with other value-chain actors is less close. The position of smaller local suppliers is fragile, because they face the strict demands of companies upstream in the chain related to financial health,

production capacity, quality standards and certificates, flexibility to adapt to changes in the market, geographical proximity, capacity for innovation and the application of ICT in business operations. For local companies, this collaboration should allow for specialisation and spillover effects.

Interviews with representatives of supporting organisations in the region revealed that the cooperation between small local suppliers is stronger than that with foreign companies upstream in the value chain, as they face similar problems and constraints. However, the volume of trade and cooperation within the WB region is rather limited. Also, small businesses are generally more interested in maintaining relationships with supporting actors, while multinational assemblers and component manufacturers are rather closed systems that show little interest in cooperation with the local business environment.

Box 4.1. Economy-based representation of the automotive value chain

With the exception of Albania, Kosovo and Montenegro, the automotive industry in the Western Balkan economies has considerable potential. In recent decades the development of this industry in Serbia, Bosnia and Herzegovina and North Macedonia has been largely based on foreign investment, which has determined the structure of the value chains. The most important actors in the value chains in all three economies include foreign-owned companies playing the role of first- and second-tier suppliers, local companies acting as major suppliers to world-renowned producers, and aftermarket and supporting institutions. The first group of actors, i.e., companies owned by foreign vehicle and component manufactures, supplies global assemblers with a wide range of vehicle parts and components, including some technologically advanced systems and solutions. Local domestically owned component manufactures, including SMEs, supply world-famous automotive producers with metal and plastic components, machinery and equipment. Since multinational companies prefer to source aftermarket services locally, domestic companies performing these activities are an increasingly relevant group of participants in the value chains. Finally, supporting actors include governmental export and investment promotion and development agencies, chambers of commerce, local self-government units, business associations/clusters, academia, R&D institutions and others.

The GVC support activity network is assessed as moderately developed and rather similar in all three WB economies with reasonably developed automotive industries. The network consists of governmental export and investment promotion and development agencies, chambers of commerce, local self-government units, business associations/ clusters, academia, R&D institutions and others. However, the scope and intensity of cooperation with the automotive companies are different for each of these actors.

Despite the availability of education and scientific and research systems (for example, in Bosnia and Herzegovina there are 27 universities and six faculties of mechanical engineering), cooperation between the business sector, academia and R&D institutions is generally modest. However, there are some good examples of cooperation between academia and the business sector. For example, the Faculty of Mechanical Engineering in Belgrade can look back on a long tradition of cooperation with the business sector, not only through education and training tailored to their needs but also through providing services to companies, both at the faculty level and through organisational units, including accredited laboratories. The Faculty of Mechanical Engineering is already cooperating with companies in the automotive industry, both domestic and foreign (especially those with plants and development centres in Serbia, such as Robert Bosch, ZF, Brose, Cooper Standard, etc.). So far this cooperation has primarily involved the development and improvement of curricula in order to comply with the needs of these companies. As far as the participation of faculties in the development of new products in the automotive industry is concerned, it primarily refers to domestic manufacturers. In the coming years, with increasing technological complexity and the innovation of locally produced components, this cooperation between the business sector, academia and R&D institutions is expected to intensify.

In the automotive industry, perhaps more than in any other sector, clusters are a common form of association of actors engaged in different phases of the value chain, including related and supporting

industries. The Serbian automotive cluster acts as a central association for the flow of information in the sector. In addition to about 50 companies, the cluster brings together partnering institutions such as the Development Agency of Serbia, the Chamber of Commerce, the IT sector, the Vojvodina ICT Cluster, the Niš Cluster of Advanced Technologies and others. By providing support through networking, export promotion, business training and assistance in the application of quality standards the cluster plays an active supporting role in the automotive value chain. From the cluster perspective, the challenges brought about by the green economy will affect the sector in the near future. Also, digitalisation and robotics will become a prerequisite for the survival of local businesses in the automotive industry. Accordingly, it is important to establish closer cooperation with technical faculties, foreign partners and governments, which should provide funds for investments. As far as cooperation within the WB region is concerned, the 'mini-Schengen' area is expected to boost trade in the automotive component sector. Since the automotive clusters in North Macedonia and Bosnia and Herzegovina do not show significant activities, there is a need for coordinated action at the regional level. **Box 4.2** provides insight into the automotive industry's dynamic support.

4.2.2.3 Labour issues

Labour issues deserve special attention in our analysis of the possibilities that exist for the development of the automotive industry in the WB region. There are at least two reasons for that. First, the arrival of foreign vehicle and component producers is partially motivated by cheap labour. Their production processes in the WB region do not require professionals with sophisticated competencies and skills – they want a low-skilled workforce which assembles finished parts in factory halls. This seems to be a vicious circle, because only through increasing the technological complexity of processes and products and more value added will local skills be improved and spill-over effects achieved. Second, the labour market is changing in the direction of increasing migration

Box 4.2. Dynamic support of the automotive sector

Government agencies and institutions, such as chambers of commerce and investment promotion agencies, offer dynamic support activities aimed primarily at improving the business environment and attracting investment, but they are also there to promote the automotive industry through various programmes and initiatives. In their efforts these institutions are supported by international organisations such as the World Bank. Support activities include organised appearances at fairs, visits to foreign companies, organisation of business-to-business (B2B) meetings, assistance in finding partners, training in financial management and marketing, assistance in obtaining certificates, introducing quality standards, etc. Foreign companies need support in terms of improving the local physical infrastructure, tax regulation and administrative procedures, while local businesses need support to improve their technological and production capacity and to enter new markets.

One example of successful support is the Aftercare programme introduced by the Foreign Investment Promotion Agency of Bosnia and Herzegovina, which aims to provide post-investment support to foreign companies. Based on visits and conversations with foreign investors, knowledge is gained on the key constraints and obstacles to doing business in Bosnia and Herzegovina. Data collected in the field are used along with additional analysis of statistical indicators to submit recommendations to the Council of Ministers. Since 2013, in cooperation with the International Finance Cooperation, the Aftercare project has been expanded to include municipalities, cantons and entity institutions, which has improved the project itself. Within the programme a survey conducted during 2020 attempted to assess the impact of COVID-19 on business operations. Based on the collected data, it can be argued that most companies did not experience any major changes in their operations. About 97% of companies in the manufacturing industry pointed out that there had been no interruptions in their business activities, two companies said that they would relocate their business activities to Serbia, and only one company announced that it would be selling up.

Prior to the outbreak of the COVID-19 pandemic an outreach automotive campaign, funded by the World Bank, was launched covering Bosnia and Herzegovina, Serbia and North Macedonia. The aim was to attract investment from Germany and Austria, and the preliminary results showed that there is significant potential for investment in the region's automotive industry. German manufacturers, in particular, expressed interest in entering the market of Bosnia and Herzegovina. The project was not finalised because of the pandemic.

Another promising example is the City of Kragujevac (Serbia). Due to a long tradition in the automotive industry the local self-government unit is dedicated to attracting in-

vestments in the automotive sector through local infrastructure development and the provision of land on favourable terms. To support the integration of local companies into the automotive value chain, it provides subsidies for obtaining quality certificates and licenses, equipment procurement, appearances at fairs, export promotion, etc. However, large foreign-owned vehicle and component manufacturers in Kragujevac have little contact with the local community.

In North Macedonia, certain problems and demands of major foreign investors are dealt with via the Foreign Investment Council. Meetings are held on a regular basis between investors and the government's economic team to deal with any problems related to customs, taxes, regulatory barriers, etc. A mentoring programme, which provides a foreign consultant to a local company, has proven to be an effective support mechanism. Communication between local and foreign companies is carried out efficiently through the established portal.

to the EU27 and the unwillingness of the local labour force to work for low wages. This has led to a situation which is diametrically opposed to that of 20 years ago, when the unemployment rate was high. Today one of the biggest problems for the metal and automotive sectors is the lack of a skilled workforce.

Our survey results show that an average educational profile corresponds to the position (role) of companies and the activities they perform in the value chain. The level of education and required skills is directly determined by the complexity of the production process. Plant and machine operators are mostly involved in assembling the automotive components and parts, while professionals are engaged in IT support, marketing, sales, software development, etc. Companies which develop innovative products employ university-educated workers who possess metalworking, mechanical and electrical engineering skills.

The development of the automotive industry should be based on knowledge-intensive rather than labour-intensive activities. For this the involvement of local companies in the GVC is crucial – but that will be impossible without innovation and

process-engineering capability-building. The development of more complex, high technology-based products that meet quality and environmental standards depends on the availability of local resources, including labour skills. Large multinational companies should play a key role in this upgrading process of labour skills through spillover effects. In the meantime, what is needed is stronger involvement of the education system, government agencies, clusters and other support actors.

Another problem of the labour shortage is the declining interest in the educational profiles of the mechanical and related professions. This is confirmed by the growing number of vacancies in secondary vocational schools. The introduction of the concept of dual education is a possible solution to this problem.

The image of a happy worker on a production line in a factory hall, which typified the ideology of socialism, has been replaced by the idea of better jobs, challenging tasks, better working conditions and higher wages. Labour issues will have to be considered within the complex framework of the problems described above.

CHAPTER



Chapter 5. Energy value chain

The value chain analysed in this chapter includes the following industry sectors: electricity, gas, steam and air conditioning supply (NACE Rev. 2 D).

5.1 Overview

5.1.1 Overall trends and patterns

Figure 5.1 presents the shares of value added in the energy industry in industries A to N. The sector is relatively large, with shares ranging between 5% and 6% in Bosnia and Herzegovina, Montenegro, Serbia and Kosovo. The shares of the other economies are slightly smaller.

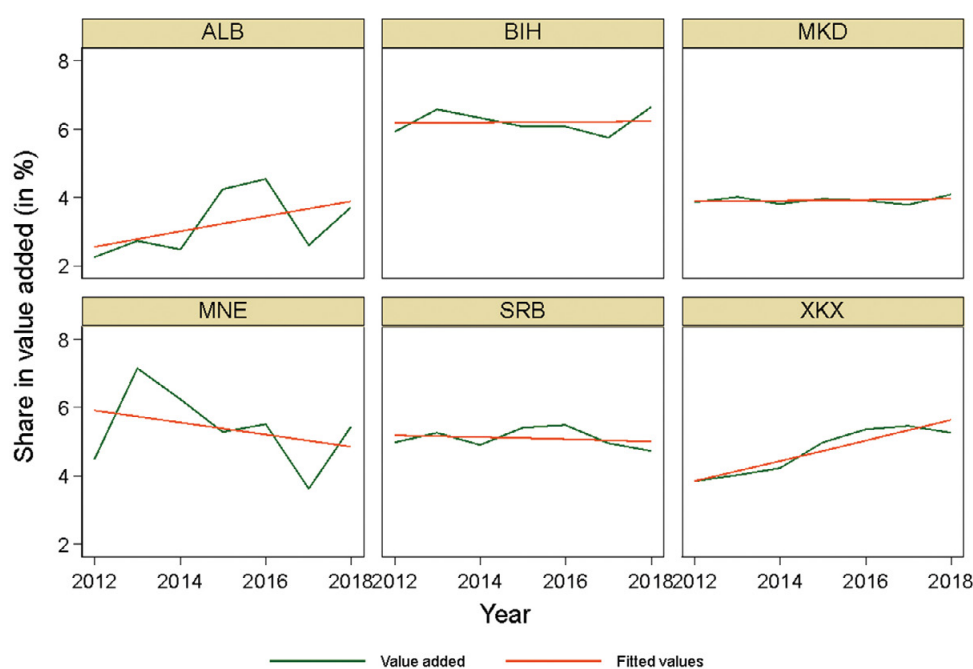
Employment levels, according to ILO data, show a declining trend over the period 2005-2019 in most economies, with the exception of Serbia (Figure 5.2).

Compared with the other industries analysed in this report, five of the six WB economies (the exception is North Macedonia) show strong revealed comparative advantages, in most cases even with an increasing trend, particularly so in North Macedonia and Albania (Figure 5.3).

Apart from Albania, the domestic content of exports²⁰ is on average about 70%. Compared with other industries of the selected value chains, the value-added content of the rest of the world is

(20) Using multi-country input-output tables allows to decompose gross exports into the contribution of domestically produced value added and value added produced in foreign countries which is imported via intermediary inputs.

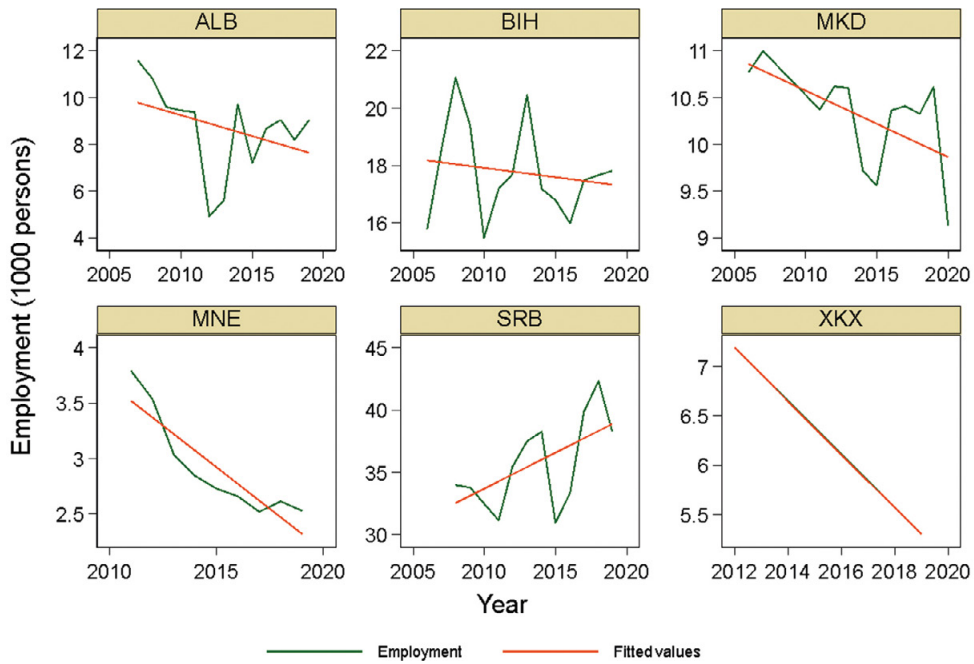
Figure 5.1. Value-added shares of the energy sector



Note: Fitted values are calculated as a linear trend.

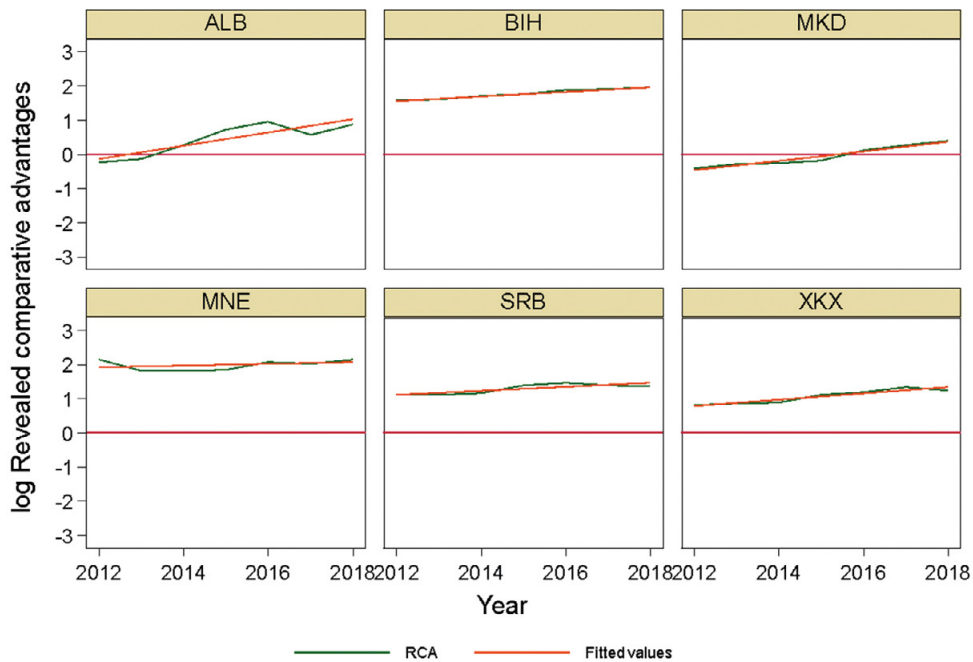
Source: wiiw MC IOD (Reiter and Stehrer, 2021); own calculations

Figure 5.2. Employment levels in the energy sector



Note: 1) Fitted values are calculated as a linear trend. 2) For Kosovo only data for 2012 and 2019 are available.
 Source: ILO (accessed March 2021); own calculations.

Figure 5.3. Revealed comparative advantages in the energy sector



Note: Fitted values are calculated as a linear trend.
 Source: wiiw MC IOD (Reiter and Stehrer, 2021); own calculations.

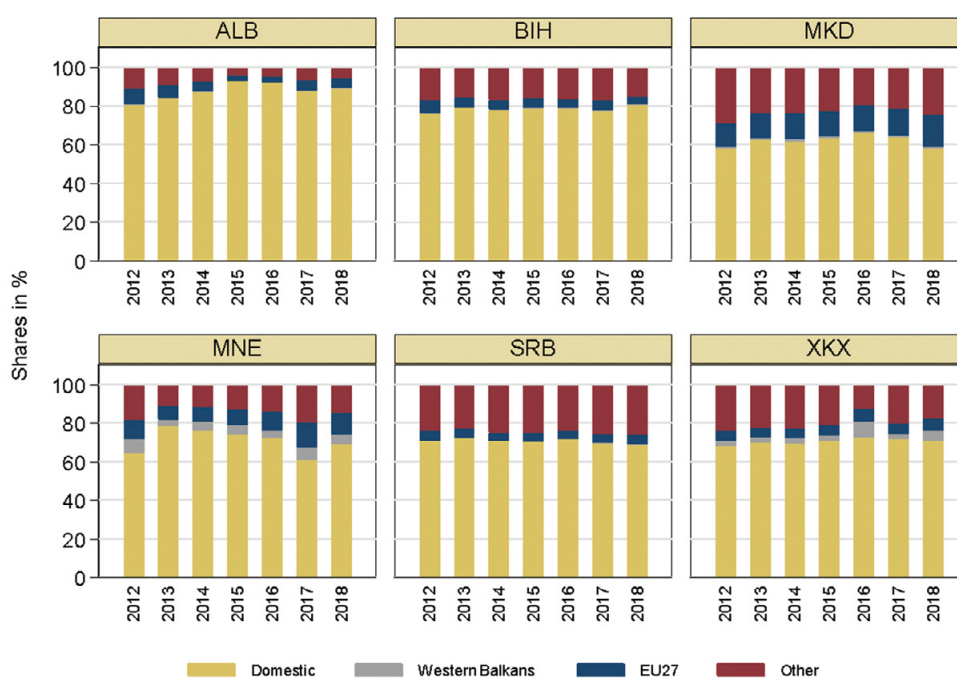
relatively larger (up to 20%). Backward linkages to the EU27 are significant only in North Macedonia.

Intra-WB backward linkages are very heterogeneous across the economies (Figure 5.5), ranging from around 4% in Montenegro and Kosovo to less than 0.5% in Albania and Bosnia and Herzegovina. Very small shares are documented for Serbia with only 0.2%.

The relative GVC position²¹ indicates comparatively strong forward linkages (Figure 5.6) in all economies. This is different from most of the other chosen sectors, where the backward linkages dominate. However, for this sector strong forward linkages are to be expected, as energy serves as an input in the production process of many industries.

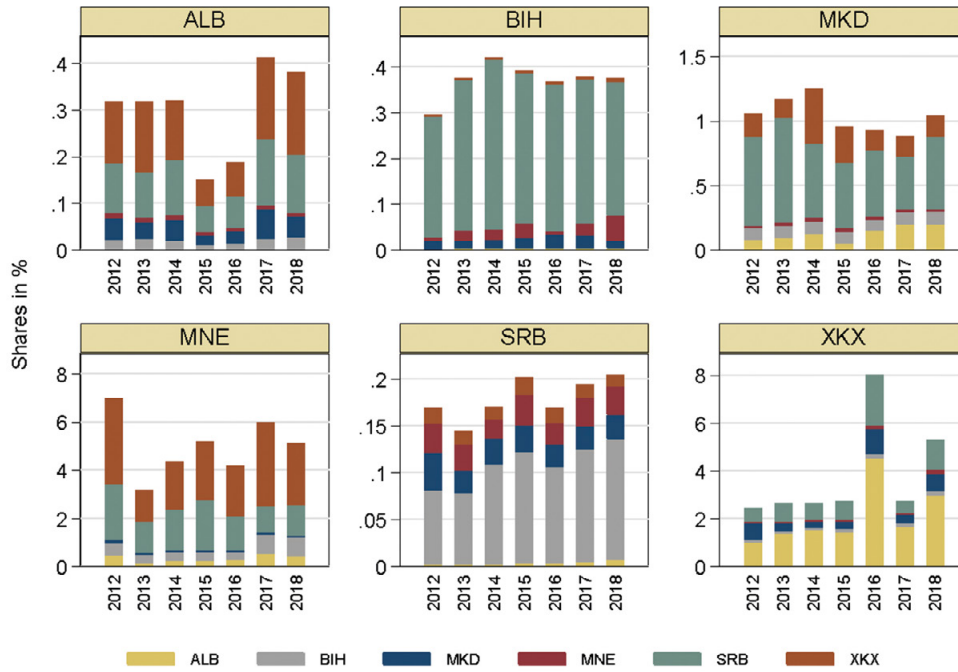
(21) The GVC position indicates whether the industry of a country has stronger forward (a country's value added in exports which goes into exports of other countries) or backward (the foreign value added of a country's gross exports of the country) linkages.

Figure 5.4. Value-added structure of gross exports in the energy sector



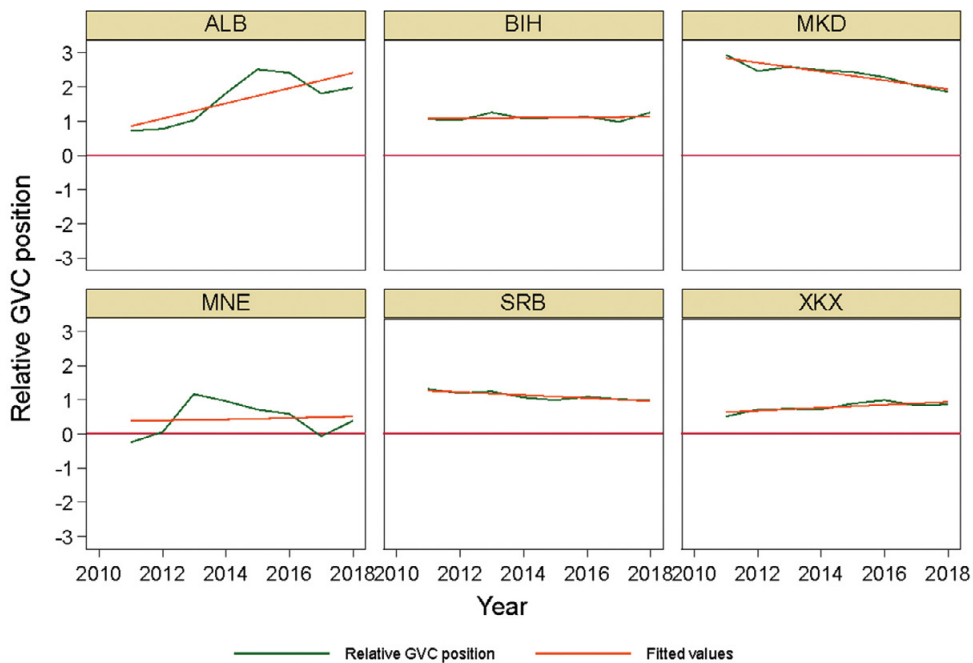
Sources: wiiw MC IOD (Reiter and Stehrer, 2021); own calculations.

Figure 5.5. Intra WB backward linkages in the energy sector



Sources: wiiw MC IOD (Reiter and Stehrer, 2021); own calculations.

Figure 5.6. Relative GVC position of the energy sector



Note: Fitted values are calculated as a linear trend.

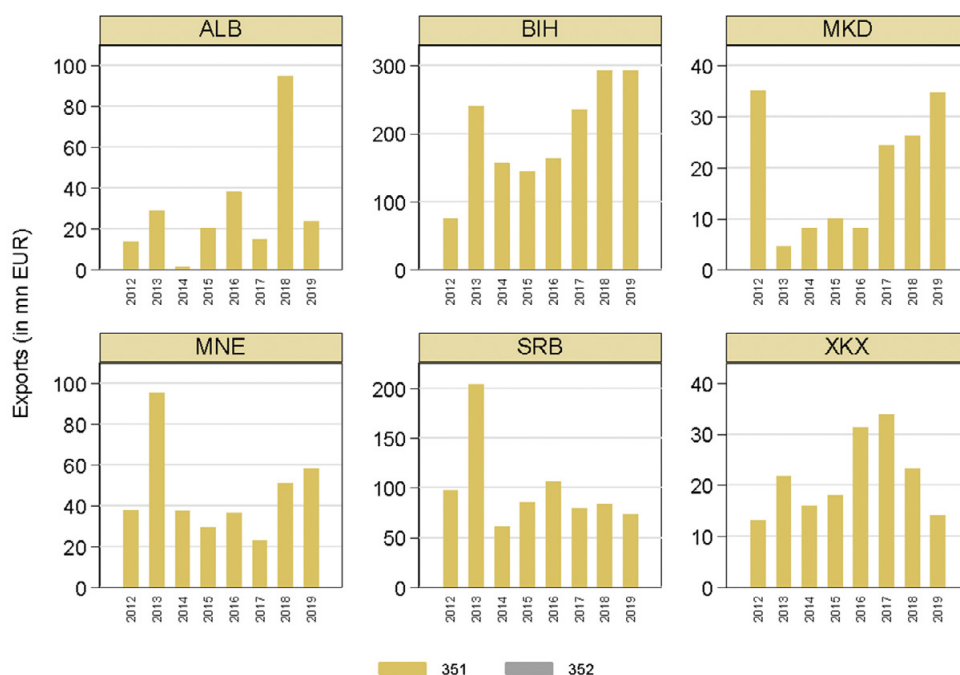
Sources: wiiw MC IOD (Reiter and Stehrer, 2021); own calculations.

5.1.1 Detailed patterns

Using detailed trade figures (Figure 5.7), one can see that exports are only composed of electric power generation, transmission and distribution (NACE 351).

This specialisation pattern is also confirmed by Eurostat's Structural Business Statistics (SBS) data (Table 5.1), which indicate a high share of employment, value added and persons employed in NACE D351 (Electric power generation, transmission and distribution).

Figure 5.7. Detailed trade structures (NACE 3-digit) of the energy sector



Note: 351 ... Electric power generation, transmission and distribution; 352 ... Manufacture of gas; distribution of gaseous fuels through mains; 353 ... Steam and air conditioning supply (n.a.)

Sources: EU Comtrade (accessed March 2021); own calculations.

Table 5.1. Detailed industry structure (D), 2019

NACE Rev. 2 code	Description	Levels			Shares in %		
		Bosnia and Herzegovina	North Macedonia	Serbia	Bosnia and Herzegovina	North Macedonia	Serbia
		Enterprises - number					
D	Electricity, gas, steam and air conditioning supply	186	211	781	100.0	100.0	100.0
D351	...Electric power generation, transmission and distribution	145		655	78.0		83.9
D352	...Manufacture of gas; distribution of gaseous fuels through mains			46			5.9
D353	...Steam and air conditioning supply		23	80		10.9	10.2
		Value added at factor cost – EUR million					
D	Electricity, gas, steam and air conditioning supply	653	286.7	1,474	100.0	100.0	100.0
D351	...Electric power generation, transmission and distribution	616		1,150	94.4		78.0
D352	...Manufacture of gas; distribution of gaseous fuels through mains			184			12.5
D353	...Steam and air conditioning supply			140			9.5
		Persons employed - number					
D	Electricity, gas, steam and air conditioning supply	18,377		39,601	100.0		100.0
D351	...Electric power generation, transmission and distribution	16,713		32,218	90.9		81.4
D352	...Manufacture of gas; distribution of gaseous fuels through mains		33	1,773			4.5
D353	...Steam and air conditioning supply			5,610			14.2

Sources: SBS Eurostat (accessed March 2021), own calculations.

5.2 Review of the energy value chains

5.2.1 Digging

5.2.1.1 Firm-level data analysis

The Orbis database has data on 2,798 companies from the Western Balkans operating in the energy sector. Their distribution by economies is shown in Figure 5.8. Half of the companies are from Serbia, while 22% are from North Macedonia. Kosovo and Bosnia and Herzegovina follow with 14% and 8%, respectively. Albania and Montenegro have fewer firms.

Of these 2,798 companies, financial data are available for 1,451 (Table 5.2). Their total assets amount to EUR 27 billion, and the operating revenues they generate are EUR 8.7bn annually, which is one of the highest figures for all the sectors reviewed. These companies employ 59,000 people, and half of them are foreign-owned.

The average company in the sector has assets of EUR 18 million and generates annual revenues of EUR 6 million, meaning that companies from this sector are usually big. The average number of employees per company is 41, which is the second-highest employment rate. The average gross salary per worker is EUR 1,533 per month, the highest level among all sectors. Each worker generates EUR 148,000 of revenues, making these companies the most productive. Each EUR 1 of assets generates 33 cents worth of revenues, which is among the lowest among the six sectors and is basically due to the high capital-intensive nature of the sector and the need for high investment.

Table D.4 in the Appendix lists the 30 biggest companies in the energy sector according to operating revenues. Most of the companies are public companies related to electricity. There are also previously public companies that have been privatised (e.g. EVN, operating in North Macedonia, owned by Austrian EVN). These companies are integrated into global value chains through exports and imports of electricity. Apart from the big electricity

companies there are also some smaller companies working with renewable energy, which is discussed in greater detail below.

The fDi Markets database lists 41 energy investment projects in the Western Balkan economies between 2015 and 2020. The total amount of the capital investment in these projects is EUR 4.7 billion, which is the highest amount recorded in the six sectors. On the other hand, the number of jobs of these projects is just 3,257, which is the smallest number in the six sectors. Thus, these projects are very capital-intensive (Figure 5.9).

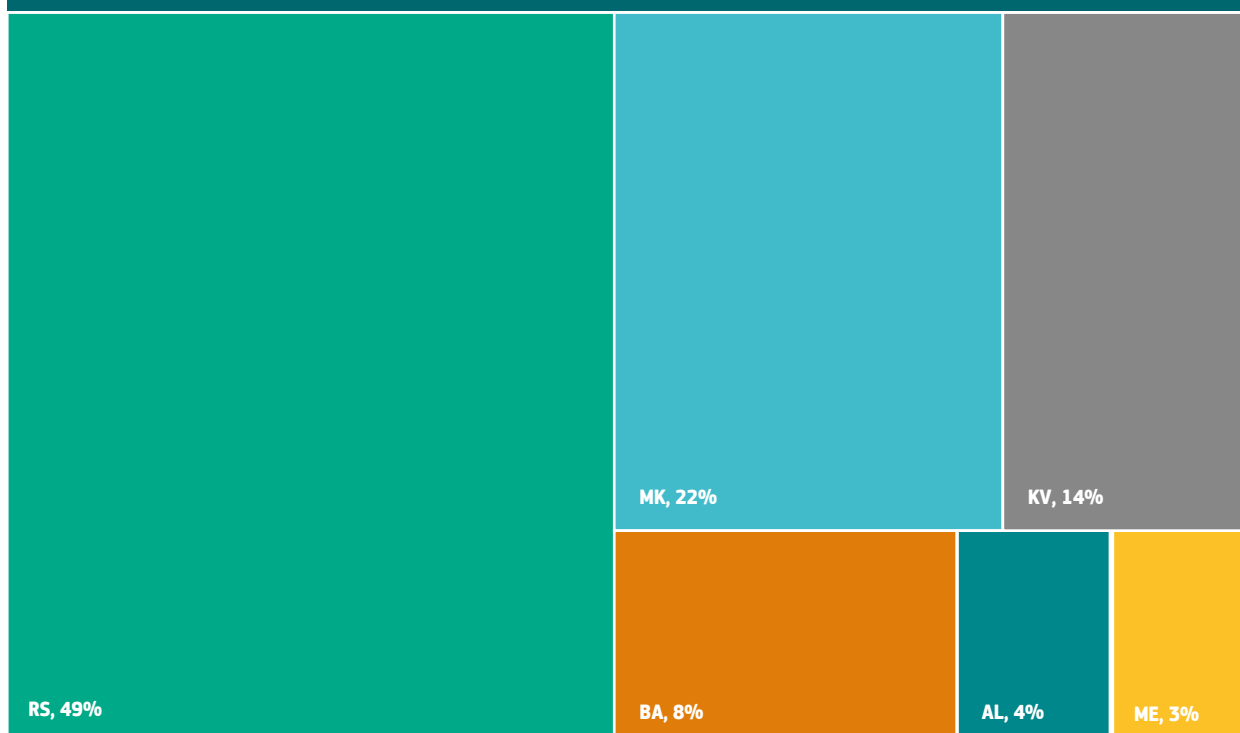
Most of the projects are located in Serbia, which accounts for 60% of the capital investment and 75% of employment. Bosnia and Herzegovina comes second with 31% of the capital investment and 19% of the jobs. Albania, Montenegro and Kosovo have fewer projects, while North Macedonia has none (Figure 5.10).

The projects are in general large, with an average investment of EUR 118 million and providing employment for 81 people. The biggest projects have investments in excess of EUR 100 million and employ more than 1,000 people. Most of the big projects are located in Serbia.

The biggest investment – in a waste-to-energy facility in Serbia's capital Belgrade – is coming from the consortium of Suez-Itchu-Marguerite. The plant will provide Belgrade with heat recovered from waste and will allow the city to close its previous landfill. The project is worth in total around EUR 350 million and will employ 130 high-skilled workers. The construction is still in progress.

There are several other big projects in the renewable energy sector, each of them worth more than EUR 150 million. The UK-based ETF Group is building a solar plant in Bosnia and Herzegovina, Germany's WDP Adria is investing in a wind park in Bosnia and Herzegovina, while Israel's Enlight Renewable Energy has opened a wind farm in Serbia.

Figure 5.8. Distribution of energy firms by WB economies



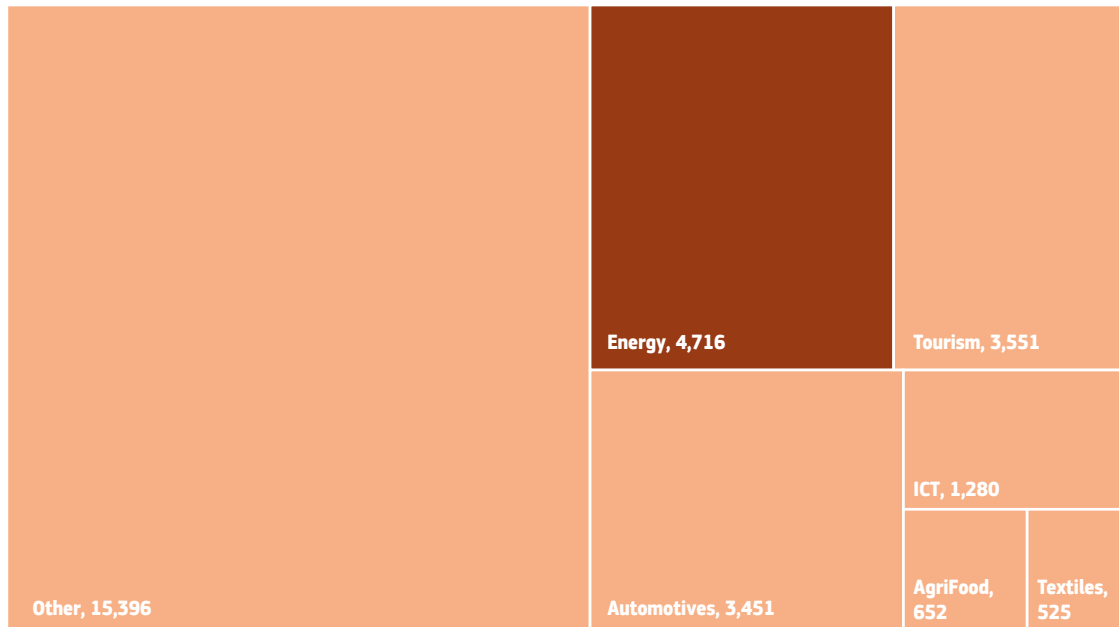
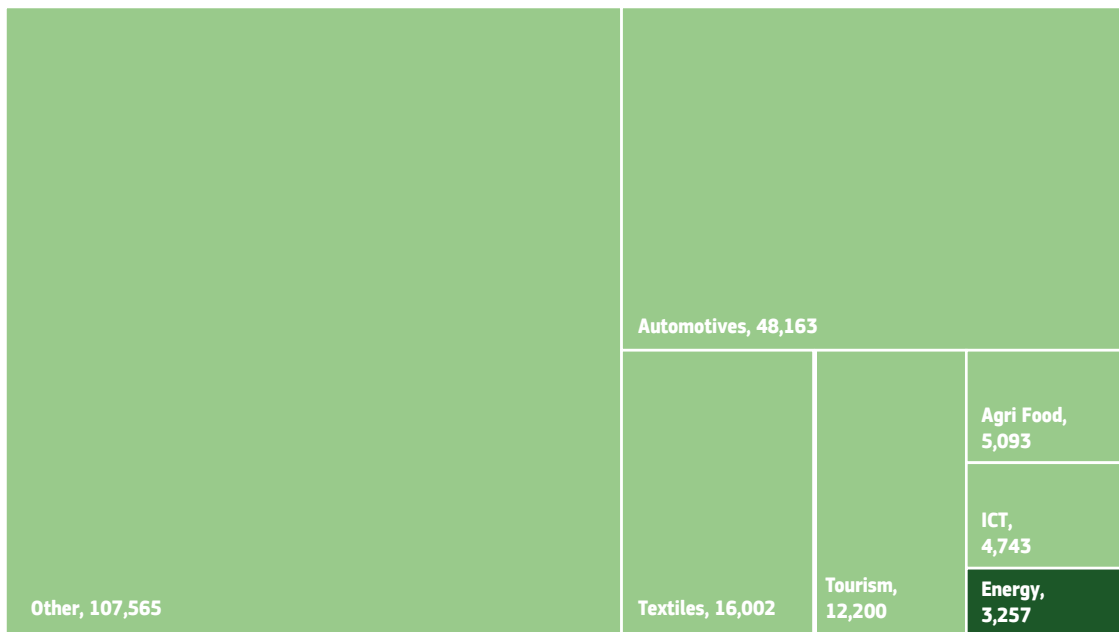
Sources: Own calculation, using data from Orbis (accessed May 2021).

Table 5.2. Overview of companies in the energy sector, 2019

Number of firms	Total assets (EUR)	Operating revenue/turnover (EUR)	Costs of employees (EUR)	Number of employees	Foreign owned
1,451	26,774,579,223	8,737,117,969	1,085,921,082	59,017	50%
Average assets per firm (EUR)	Average revenue per firm (EUR)	Average number of employees per firm	Average gross monthly salary (EUR)	Revenue per 1 EUR assets (EUR)	Revenue per worker (EUR)
18,452,500	6,021,445	41	1,533	0.33	148,043

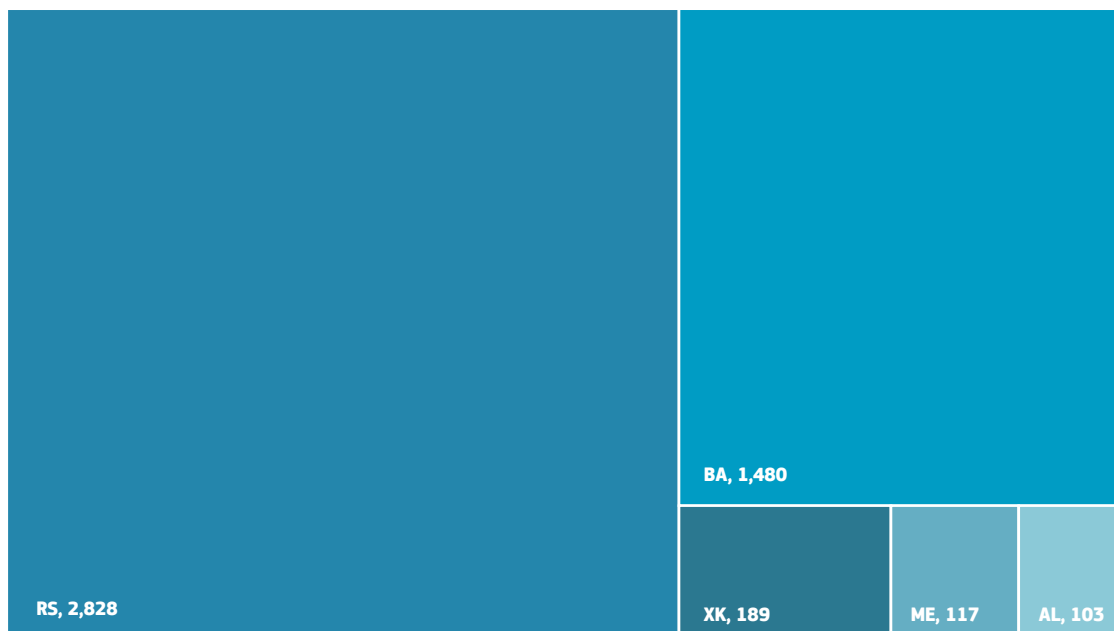
Source: Own calculations using data from Orbis.

Figure 5.9. Share of energy projects in all fDi projects

Capital investment (EUR million)**Employment** (number of people)

Sources: fDI Markets database (accessed May 2021); own calculations.

Figure 5.10. Distribution of the energy projects by economy

Capital investment (EUR million)**Employment** (number of people)

Sources: *fDI Markets database (accessed May 2021); own calculations.*

5.2.1.2 Patent data analysis

No patents were identified for this field (see Appendix [Table C.7](#)). For this reason, no technology network can be created.

5.2.1.3 Scientific and research publications

In the Scopus database the documents are grouped into thematic 'subject areas', which in turn are subdivided into different 'subject categories'. In order to conduct the analysis, publications in the subject area 'Energy' are examined. This subject area includes the following subject categories: 'General Energy', 'Energy (miscellaneous)', 'Energy Engineering and Power Technology', 'Fuel Technology', 'Nuclear Energy and Engineering', and 'Renewable Energy, Sustainability and the Environment'.

A query regarding the subject area 'Energy' in the period 2008-2020 yields 1,403,522 hits. Organisations from Serbia are involved in the publication of 3,788 documents, followed by Bosnia and Herzegovina with 607, North Macedonia with 438, Montenegro and Albania with 214 each and Kosovo with 41. Excluding double counts, the WB economies have a scientific publication output of 4,862 documents, which corresponds to a share of 0.35% in the global publication output over the observation period. From 2008 to 2012 this share increased rapidly from 0.21% to 0.45%. In the following years the share fell back to around 0.35% (with an outlier in 2016 of 0.44%) ([Figure 5.11](#)).

The previous analysis provides interesting findings and grants a holistic overview. However, the results are not yet meaningful enough as absolute values are compared. Publications from Serbia, with around 7 million inhabitants, are weighted the same as publications from Montenegro with 620,000 inhabitants. Therefore, in the next step we control for size effects and put the publications in relation to 100,000 inhabitants ([Figure 5.12](#)).

In 2008 global publication output per 100,000 inhabitants (0.90) was very similar to that from the WB economies (0.70). In the following years per-capita output in the WB economies grew fast-

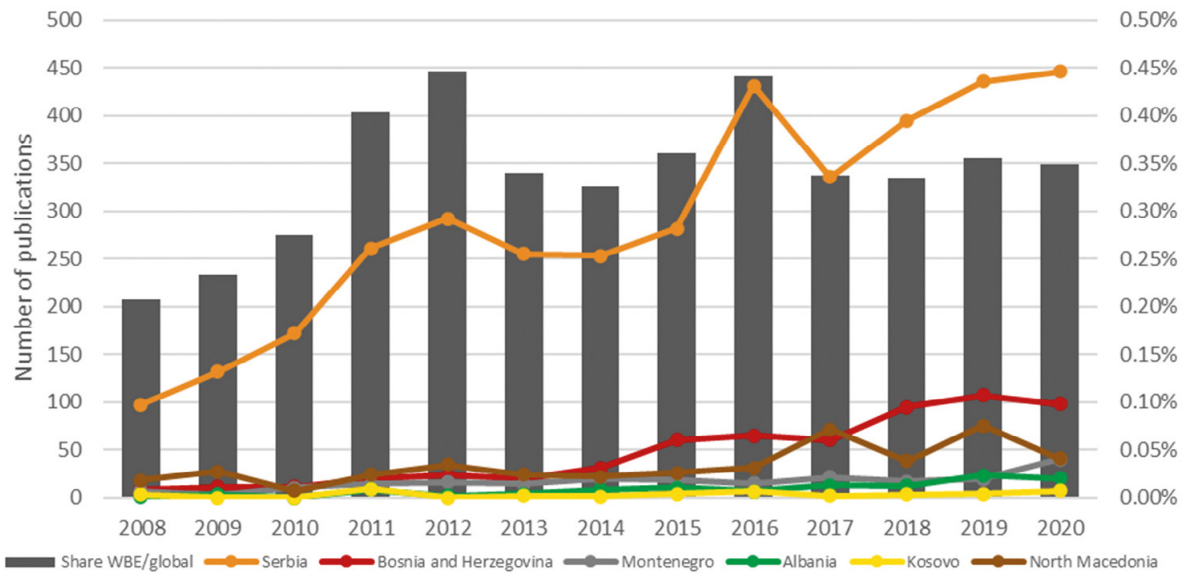
er than the global per-capita output. In 2020, 3.4 scientific documents were published per 100,000 inhabitants in the WB economies, compared with 2.2 publications worldwide. The most active economy was Serbia, and in 2020 Montenegro reached Serbia's per-capita output as well (6.4 per 100,000 inhabitants). Bosnia and Herzegovina (3.0), North Macedonia (2.0) were in the middle, with Albania (0.7) and Kosovo (0.4) bringing up the rear.

The science map ([Figure 5.13](#)) shows the international cooperation network of the WB economies in the period 2008-2020. The database consists of publications that involved at least one WB economy. Each node represents one country, with the size reflecting the number of publications in the respective country and the edges the number of co-authored publications with another country. The location of a country on the map is determined by the attraction to its research partners and the repulsion from countries without joint publications. The different colours mark the affiliation to a 'narrower research cluster'.

In the energy value chain the research network of the WB economies consists of four clusters with a total of 87 countries. There are two main clusters with 34 and 33 countries, respectively, and two small clusters with 10 countries each. Serbia, Bosnia and Herzegovina and Montenegro are grouped together with countries like the United States, Croatia, Slovenia, Russia and China in one cluster (orange). Albania is grouped together with countries like Italy, the United Kingdom and Spain in one cluster (red). North Macedonia is grouped in a cluster (green) together with Germany, Austria and Denmark.

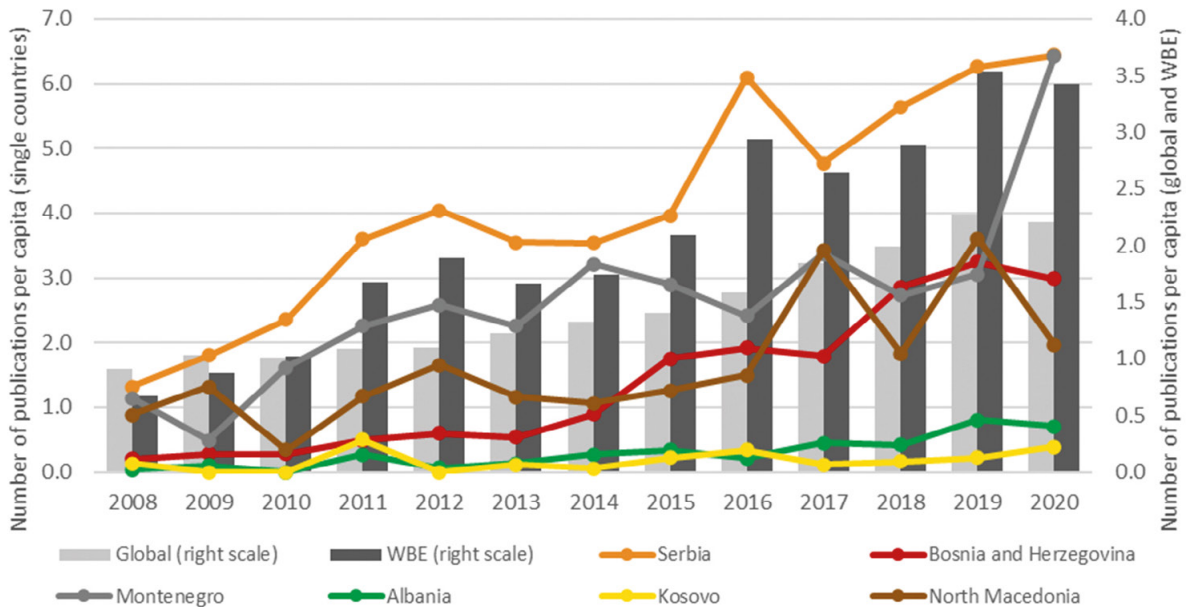
On the meso level ([Figure 5.14](#)), the top four organisations are located in Serbia. The ranking is led by the University of Belgrade (1,876 publications), ahead of the University of Novi Sad (768 publications), the University of Niš and the University of Kragujevac. In fifth place comes the SS Cyril and Methodius University of North Macedonia, followed by the University of Montenegro in sixth place and the University of Pristina in Kosovo's capital in eighth place.

Figure 5.11. Scientific publications 2008-2020 in 'Energy'



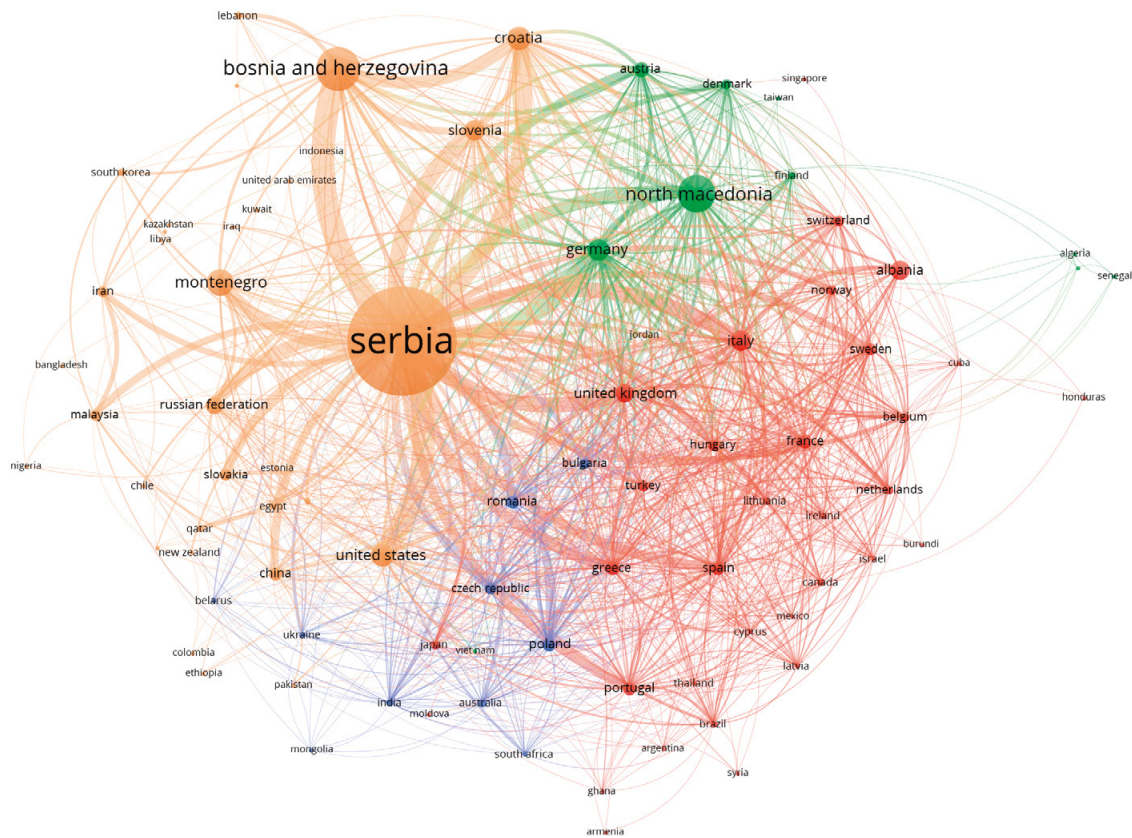
Note: WBE denote Western Balkan economies
 Sources: Scopus (accessed March 2021); own calculations.

Figure 5.12. Scientific publications per capita 2008-2020 in 'Energy'



Note: WBE denote Western Balkan economies
 Sources: Scopus (accessed March 2021); own calculations.

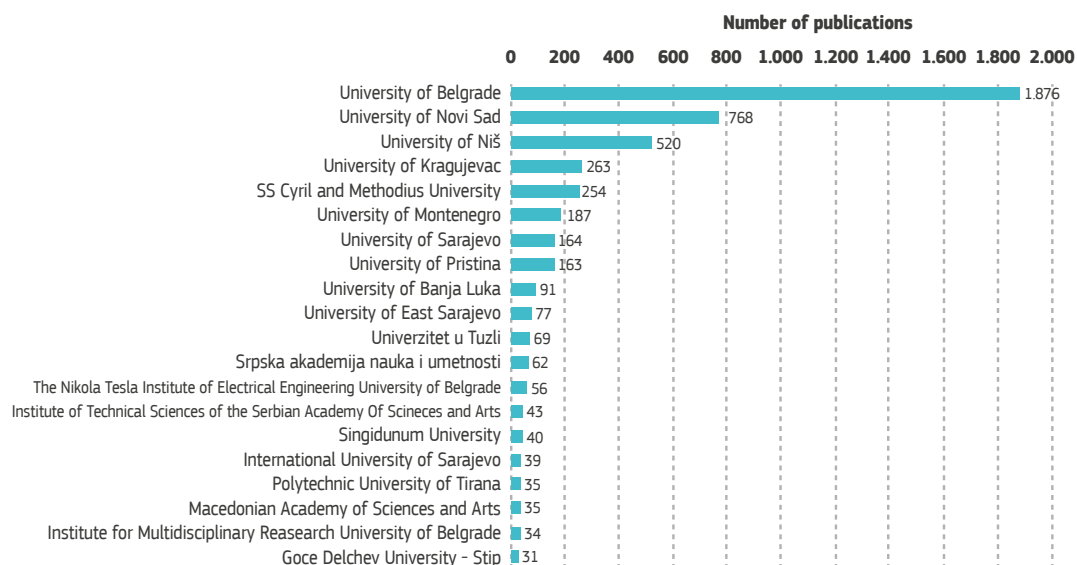
Figure 5.13. Cooperation network WB economies, 'Energy', 2008-2020



Note: Nodes = Number of documents; Edges = Number of co-authored publications.

Sources: Scopus (accessed March 2021); own calculations.

Figure 5.14. Active organisations* 'Energy'



Note: *with at least 10 documents.

Sources: Scopus (accessed March 2021); own calculations.

5.2.1 Determining

The energy sector is complex, with different participants and dimensions. According to the European Commission the sector 'comprises the production of electricity in large- and smaller-scale power plants; the power transport and distribution infrastructure'.²² End users in the energy sector include companies in private and public sectors and households. Electricity can be generated from non-renewable energy sources, which includes oil and petroleum products, gasoline, natural gas, diesel fuel and nuclear, or from renewable resources such as hydropower, wind, solar, biomass, geothermal and others. Energy sectors around the world are governed by special by-laws, which regulate local market specificities such as general delivery conditions, general rules applied in the electricity market, general rules applied to operators, transport and distribution systems, methodologies for determining the prices of access to network systems, the price of electricity for households and small customers, and connection costs to the system.

The energy sector in the WB region is characterised by former centralised monopolistic systems (replaced by the electricity market), which are in most cases state-controlled. According to the Western Balkans Investment Framework (WBIF),²³ the legacy of the former system includes an ageing infrastructure, limited energy efficiency and productivity, low levels of renewable energy production and limited market mechanisms. One of the priorities in the region is the promotion of renewable energy and the process of decarbonisation of local energy sectors. The largest companies in the sector are electricity producers and distributors, which are natural monopolists. There are a great number of traders active in the sector. In most WB economies the energy system includes a decentralised municipal district heating system.

(22) European Commission (2015), *Blending in the energy sector - Tools and Methods Series. Reference Document No. 19*, (retrieved on 28 March 2021).

(23) <https://wbif.eu/sectors/energy>

All WB economies have signed the Energy Community Treaty,²⁴ according to which they agree to implement the EU's *acquis communautaire* on electricity, gas, the environment, competition and renewables in order to realise the objectives of the treaty and create a regional gas and electricity market within Southeast Europe (SEE) capable of attracting investment.

Depending on the weather, countries can create surpluses or deficits in their electricity production. In the case of surpluses caused by favourable weather conditions they are in a position to export electric energy, in other cases they are forced to import. Trade in the electricity market is contracted in advance. There are two types of transactions. The first includes an annual advance contract following bilateral negotiations with neighbouring distributors or final consumers, the second is related to the electricity market, where the trade is contracted a day in advance.

5.2.2 Decomposing

5.2.2.1 Overview

In view of the diversity of the participants in the energy sector, we have tried to cover as many companies operating in the different fields as possible. We conducted two interviews and received four surveys, including from companies in Serbia, North Macedonia and Bosnia and Herzegovina. In addition, we had one meeting with the representative of the support organisation and one interview with a representative from the scientific community. We did not manage to get answers from big electricity producers and distributors, monopolistic companies, in the region. Also, we contacted companies that produce electricity from renewable resources, such as wind power, hydropower, solar energy and biomass. Producers of electricity from wind power and hydropower did not want to participate in the research, but we managed to obtain answers from companies that use solar energy and biomass to

(24) <https://www.energy-community.org/legal/treaty.html>

produce electricity. Also, we managed to obtain answers from companies that are operating in the field of energy efficiency, electrical fitting, design and production of electronic products²⁵.

As we noticed from our interviews and surveys (see Appendix Section E), companies that produce electricity from renewables, such as wind power, waterpower or biomass, are not included in the GVC. They have a specific plant construction procedure, with procurement of the necessary machines, equipment and installations from firms that are mostly located in EU Member States, where Germany and Austria are leaders. The construction of the plants is performed by local companies, while the installation of the equipment and its maintenance and overhaul is entrusted to the equipment manufacturer. After the construction period the plant starts with the production of electricity, which is distributed to the national operator. Because of the very nature of the business, these companies are not included in GVCs. However, in our surveys and interviews we discovered that several private, highly innovative companies have already established cooperation in the region and are included in the GVC, bringing high value added to the chain. We believe that there is innovation and scientific potential in this area. Also, we have identified several companies dealing with energy efficiency, electrical fitting, design and production of electronic products that are not in the GVC but have the potential to be included. The economy-based representation of energy value chain is given in [Box 5.1](#).

5.2.2.2 Value-added dynamics in the GVC, identifying types of linkages and relationships between different actors in the GVC

Value chains in the energy sector are complex and follow multiple paths, with different actors taking part in the process. The value chain in the energy sector is usually subdivided, with several actors

involved in the distribution channels. The main actors include importers of raw materials, producers of subcomponents, assemblers, companies developing final solutions, and retail. The final products are sold to commercial retailers, households, enterprises or the public sector.

Considering the limited scope of GVCs in the region, only two surveyed companies claimed that they are integrated into global value chains, that is they are part of the network of companies headed by a mother firm, where the different stages of the production process could be located across different countries. According to the survey results, these companies are established after the transition in the early 2000s; they are still small enterprises with between 11 and 50 employees, have dominant ownership of local residents and a high level of export activities. Companies integrated in the global value chains are highly dependent on imports of raw materials and other inputs, with a considerable proportion of raw materials (from 30% up to 50%) coming from the WB region. They operate as local subcontractors engaged in the production operations, mostly for firms from EU Member States and China, have developed forward linkages, assembling final products but also offering final integrated solutions.

Other surveyed companies not integrated into global value chains have on average been in business for more than 30 years and are small companies. They are primarily owned by local residents, and while some of them do not engage in export activities, the average percentage of exports in total production of the surveyed companies is about 5%.

Across the WB region there are several sectoral associations operating across different sectors, such as biomass, renewable energy, green energy and wind energy. However, they are rather small and attract only a relatively limited number of local participants. Despite the presence of these associations and clusters, according to our surveys and interviews they do not play a major role in the sector and bring no benefits or advantages. As a member of an association, companies can obtain general information or can

(25) Methodological aspects of the survey and interviews including the questionnaire are reported in the Appendix Section E.

be matched with similar companies, but associations do not contribute to inclusion in the GVC. Majority of respondents stated that they were not members of any associations.

The position and share of surveyed companies in the GVC vary. According to estimates by respondents, their share in the total value of the GVC ranges from medium (between 5% and 15%) to

a large share of more than 15%. However, their prospects look good, as the position of surveyed companies in the GVC has been upgraded in recent years, and they are satisfied with their progress so far.

Surveyed companies have identified suppliers and research institutions as the most important actors in their local value chain. Suppliers of raw mate-

Box 5.1. Economy-based representation of the energy value chain

Albania generates most of its electricity from hydropower, making its production highly dependent on weather conditions. The country has the potential for alternative renewables such as photovoltaic and wind plants. Although it has outstanding sun irradiation in most of its territory, there are just a few photovoltaic power plants installed. The wind potential is also strong, but so far the country has developed no wind farm projects.

Ownership of Bosnia and Herzegovina's energy potential is in the hands of two entities – the Federation of Bosnia and Herzegovina and Republika Srpska. Bosnia and Herzegovina generates part of its electricity from thermal power plants and the remainder from renewable sources, where hydropower predominates. The technical potential for renewable energy is huge, particularly in solar photovoltaic energy. So far plants using solar photovoltaic and wind energy have been built only sporadically.

During the past couple of years Montenegro has been producing more than 60% of its electricity from renewable energy sources, mainly hydropower (Piva and Perucica hydropower plants). Additionally, Montenegro has wind farms and is developing a large solar plant.

The electric power-generation capacity of North Macedonia consists mainly of two thermal power plants, which produce around 70% of the country's electricity, as well as a number of hydropower plants with varying capacities. Along with this, North Macedonia has installed several solar energy capacities and a wind park.

The generation of electric power in Kosovo relies on thermal power plants, together with a big hydropower plant with unregulated legal status and several small plants. It has one wind farm installed and several others in the pipeline.

Serbia has the most diverse generation of electricity. It produces the majority of its energy from thermal power plants (over 60%) and hydropower plants. Other renewable sources account for less than 2%, but they are diversified and include wind parks, solar plants and biomass facilities.

rials are important participants in the local value chain for several reasons. It is projected that the deployment of solar photovoltaic (PV) technologies would accelerate, resulting in an increase in the consumption of raw materials required to create photovoltaic panels. WB economies lack raw material base for the production of PV technologies (such as wafer-based crystalline silicon (c-Si), single-crystalline or multi-crystalline silicon or cadmium telluride (CdTe), copper indium gallium diselenide (CIGS) and amorphous silicon (a-Si) for more advance technologies) and heavily depend on imports.

Currently they import raw materials mainly from EU Member States (but due to the large demand, forecasts are that there will be a shortage of raw material in EU market in next decades, Carrara Set al.,2020) and China but also from regional WB economies. Respondents' firms identified support from research institutions as very important. While some of them think they receive enough support in their country, others consider the research support to be limited, so that they are forced to cooperate with research institutions from the region (North Macedonia and Montenegro, for example). The major role of research institutions is the improvement of industry competitiveness through R&D&I and the expansion of existing market demand through upgrading and expanding production capacities. Cooperation between research institutions and companies can include quality testing, the improvement of existing products/services and the development of new ones, the identification of project potential and project development, regulatory support, support in the construction process and the integration of electric facilities. There are a number of educational institutions and study programmes in the region, as well as scientific and research organisations which could support local companies. Consistent with our findings related to scientific mapping, scientific support is strongest in Serbia, where the top four organisations are located. Even though these organisations are situated in Serbia, they act regionally and provide support to all business entities in the region. The ranking is led by the University of Belgrade and

the School of Electrical Engineering, followed by the Faculty of Technical Sciences in Novi Sad with a large number of spin-off companies.

Within the energy sector, regional cooperation is rated as very good, where, according to the surveyed companies, regional value chains have already been established (for details, see [Box 5.2](#)). The level of cooperation between major GVC actors is rated as excellent.

During the interviews and surveys we discovered that companies consider that there is room for improving their position in the GVC, and their future plans include a scaling-up of their operations along the GVC. However, they consider the following factors to act as key bottlenecks in the GVC:

- lack of skilled workers, (i.e. frequent migration of workers to other companies),
- lack of financing and lack of quality systems, and
- lack of research support.

We found that the lack of skilled workers is most pronounced in Serbia, while North Macedonian companies are facing problems with product quality standards and a lack of research support. Along with this, companies identify the following factors that constrain their activities in the GVC:

- complicated customs procedures for certain types of inputs,
- tariffs and trade regulations,
- technical facilities for standards compliance, and
- unfair competition from companies with lower quality standards.

During the interviews and surveys we noted that the lack of adequate legislation is also one of the major problems for companies in the energy sector across the region. Current legislation in the WB is recognised to be a limiting factor, also because small energy producers (such as households and small companies producing energy from solar power) cannot be included in the trading and distribution system.

Some of the constraints identified in the research include the lack of 'big players' – big multinational companies that develop and implement projects in the field of renewable energy – and the lack

of capacity at the local self-government level. We discovered these claims during our interviews with representatives of the scientific community.

Box 5.2. Strong regional cooperation in the sector

The ecosystem of solar power has individual segments starting from raw materials – needed for the process of production and development of equipment and modules such as monocrystalline and polycrystalline photovoltaic (PV) solar modules and photovoltaic thermal modules – all the way to the engineering, design, installation and operation stage. The value chain consists of the production/ manufacturing process (polysilicon, wafers, cells, modules, mounting and tracking systems, electrical components, etc.) and the provision of services (project development, wholesale distribution, design, engineering, construction, maintenance, etc.).

During the interviews and surveys we identified a high level of cooperation in the region between private, highly innovative companies in the manufacturing process and the provision of services. The actors in the regional value chain are vertically integrated, where module manufacturers extend their coverage of the value chain while highly specialised companies provide the more service-oriented downstream segment. All companies in the value chain produce complex, higher value-added products or services requiring advanced technology and know-how.

One company from North Macedonia is a high-tech producer and developer of monocrystalline and polycrystalline PV solar modules and PV thermal modules. The company is the biggest regional producer of PV modules. It imports raw materials from state-of-the-art producers around the world, which guarantees the highest quality of the final product. Along with this the company cooperates with local firms in the field of solar energy utilisation. The company is focused on R&D&I and as such has established the Centre for Research and Innovation in the field of solar energy with a series of programmes. The centre focuses on the improvement of new technologies and the generation of new ideas in several areas. The company exports predominantly goods to Serbia, Montenegro, Kosovo, Romania, Poland and Bulgaria and has established regional offices.

The next segment of the value chain includes a Serbian company, which acts as an integrator and offers the design and construction of different solar solutions ranging from power plants, storage systems and lighting systems to electric-vehicle charging systems and the manufacture of heating and process systems, mostly based on products imported from the North Macedonian company. They provide technical and service support solutions to companies in Serbia as well as Bosnia and Herzegovina, Montenegro and North

Macedonia, but also to other partners operating in Southeast Europe. Both companies co-operate in the regional value chain with the scientific community. This was confirmed during our interviews with companies and representatives of the scientific community.

Besides relatively modest installed capacities in solar energy in the region, there is also considerable value creation in the sector. Production facilities are set up together with the required skills and knowledge. Value creation varies according to the different segments of the value chain of solar energy. In manufacturing, value is created in the manufacture of subcomponents and the assembly of parts, but also in the sourcing of reliable suppliers of raw material. In the segment of services, the bulk of the value is created by employees' knowledge of specialised activities such as resource assessment and feasibility studies, but also during the process of installation and operation. The presence of other industries and big companies can facilitate the development of a solar sector, especially big companies that want to be independent when it comes to electricity consumption.

5.2.2.3 Labour issues

As mentioned earlier, the lack of a skilled workforce is a problem for most of the companies surveyed. On average, the educational attainment of a typical worker employed in respondents' companies is a secondary education degree, but they consider employees with a college/ university degree to be vital for the process. The companies we surveyed said that they employed workers with the following skills:

- assisting and caring,
- working with computers, and
- management skills.

Apart from the lack of skilled workers, surveyed companies considered lack of educational attainment to be a somewhat important labour constraint. Although they can find employees with college and university degrees in engineering, after a couple of years of employment they tend to leave the county or start working for other companies (foreign investments) located in the country that can offer better working conditions (higher salaries) because they get state subsidies for hir-

ing new workers. We saw these patterns most often in Serbia. Respondent companies consider that the country in which they are located provides only partially enough workers with the kind of education and skills they require. For this reason, companies must organise internal training to improve the qualifications of their employees.

The background is a teal color with a pattern of overlapping circles of varying shades. A white outline map of Europe is visible, with the number '6' overlaid on the right side. The number '6' is a large, stylized teal shape. In the top right corner, there is a teal rectangular box containing the word 'CHAPTER' in white capital letters.

CHAPTER

Chapter 6. Tourism value chain

The tourism value chain includes accommodation and food service activities (which is an industry according to the NACE Revision 2 classification).

6.1 Overview

6.1.1 Overall trends and patterns

The share of the tourism sector in total value added varies between 1% in Kosovo and just above 10% in Montenegro (Figure 6.1). In all economies with the exception of Bosnia and Herzegovina these shares have shown a slight upward trend since 2012.

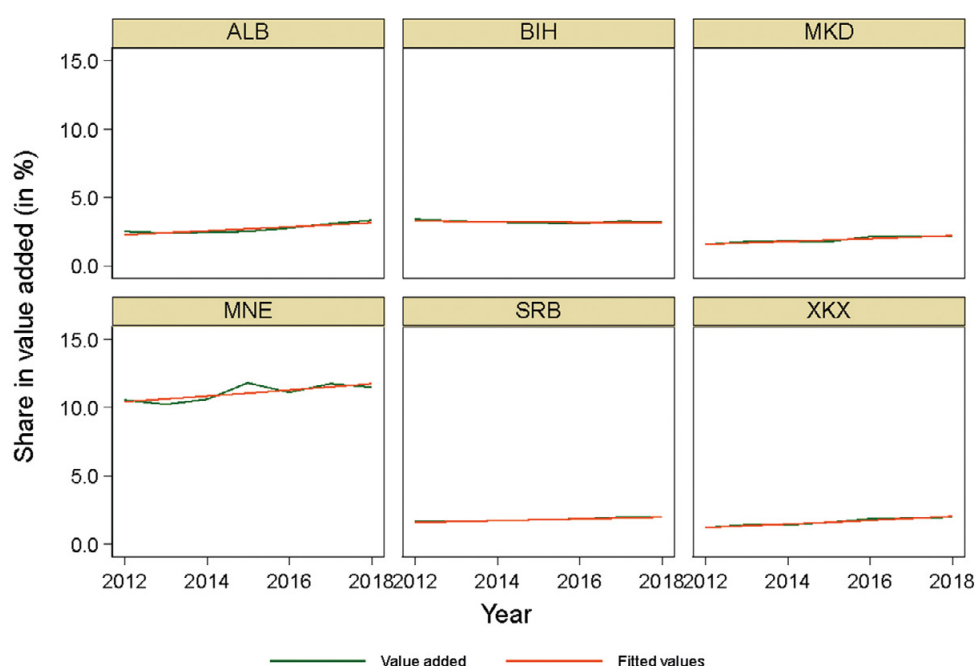
According to ILO data, employment in the tourism sector is increasing in all the Western Balkan economies (Figure 6.2).

Albania and Montenegro have a revealed comparative advantage in this sector, which is to be expected because they are tourist destinations. The other economies do not have this advantage, but their prospects are improving (Figure 6.3).

Considering the value-added structure of gross exports²⁶ of the tourism sectors of the six economies (Figure 6.4), one finds that the domestic value added accounts for around 80% in all of them. The foreign value added of exports consists of both the EU27 and the rest-of-world, while the share of the Western Balkans is mostly small.

(26) Using multi-country input-output tables allows to decompose gross exports into the contribution of domestically produced value added and value added produced in foreign countries that is imported via intermediary inputs.

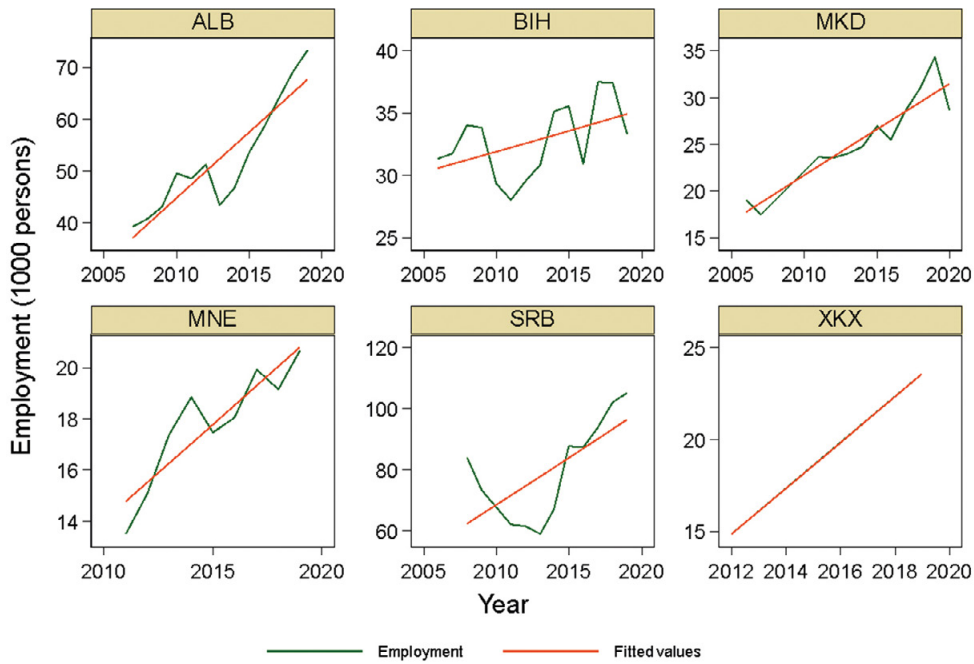
Figure 6.1. Value added shares of the tourism sector



Note: Fitted values are calculated as a linear trend.

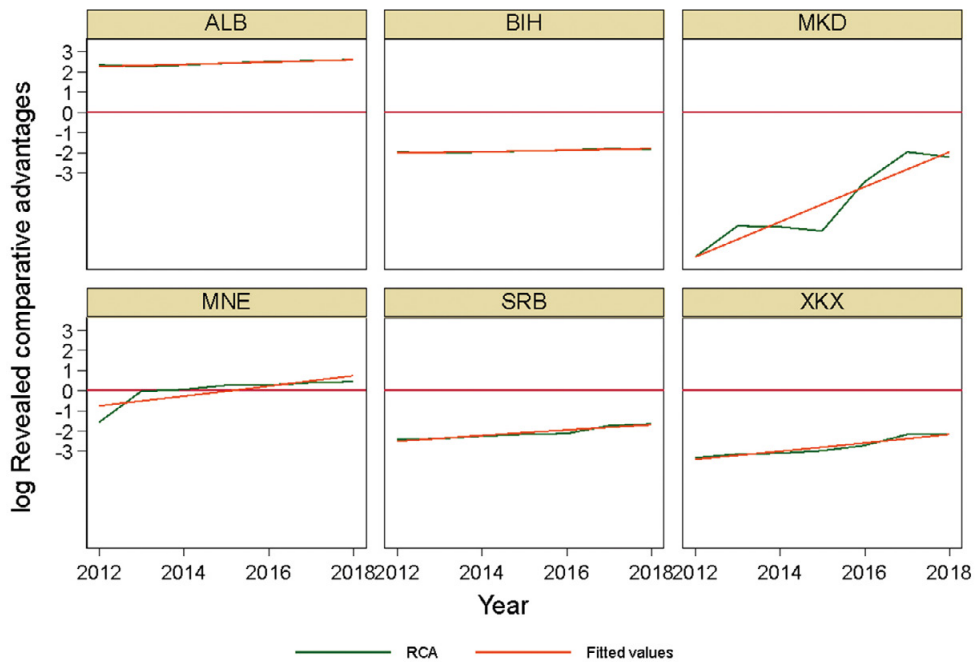
Source: wiiw MC IOD (Reiter and Stehrer, 2021); own calculations.

Figure 6.2. Employment levels in the tourism sector



Note: 1) Fitted values are calculated as a linear trend. 2) For Kosovo only data for 2012 and 2019 are available.
 Source: ILO (accessed March 2021); own calculations.

Figure 6.3. Revealed comparative advantages in the tourism sector



Note: Fitted values are calculated as a linear trend.
 Source: wiiw MC IOD (Reiter and Stehrer, 2021); own calculations.

The backward linkages with the other WB economies, measured through the WB value-added content of exports, are relatively small in all the economies, except in Montenegro, where they reach around 5% (Figure 6.5). In all cases linkages are dominated by the biggest economy in the region, Serbia.

In terms of the relative GVC position²⁷ (Figure 6.6) – indicating whether the industry of a country has stronger forward or backward linkages – the for-

ward linkages are in most cases stronger. The only exception is Albania, which is characterised by relatively stronger backward linkages.

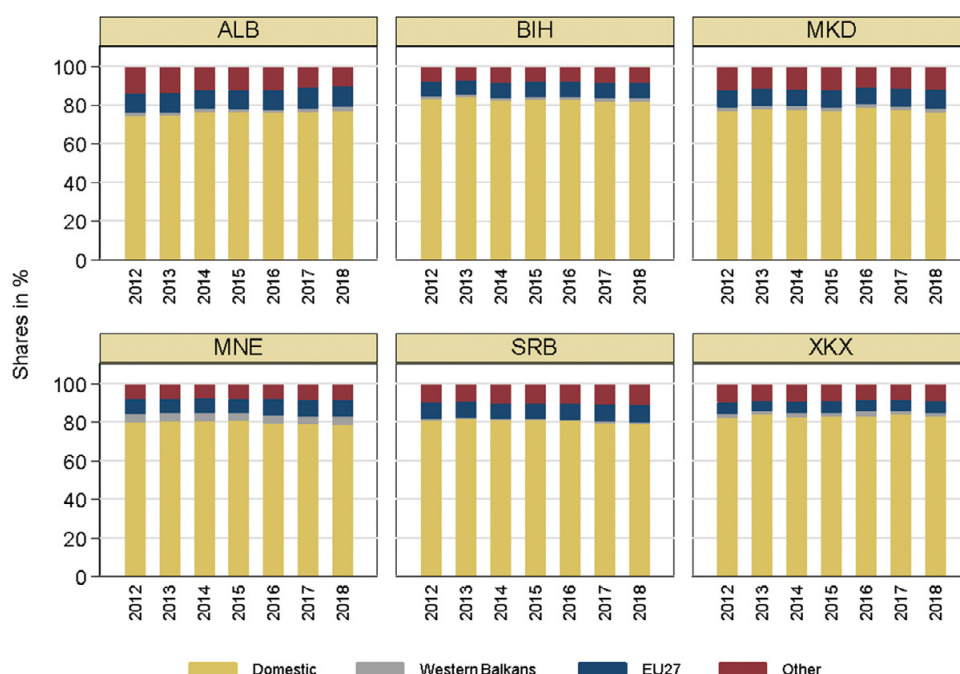
6.1.1 Detailed patterns

The industry structure is dominated by food and beverage service activities in all the economies for which there are data available (Table 6.1).²⁸

(27) The GVC position indicates whether the industry of a country has stronger forward (a country's value added in exports, which goes into exports of other countries) or backward (the foreign value added of a country's gross exports of the country) linkages.

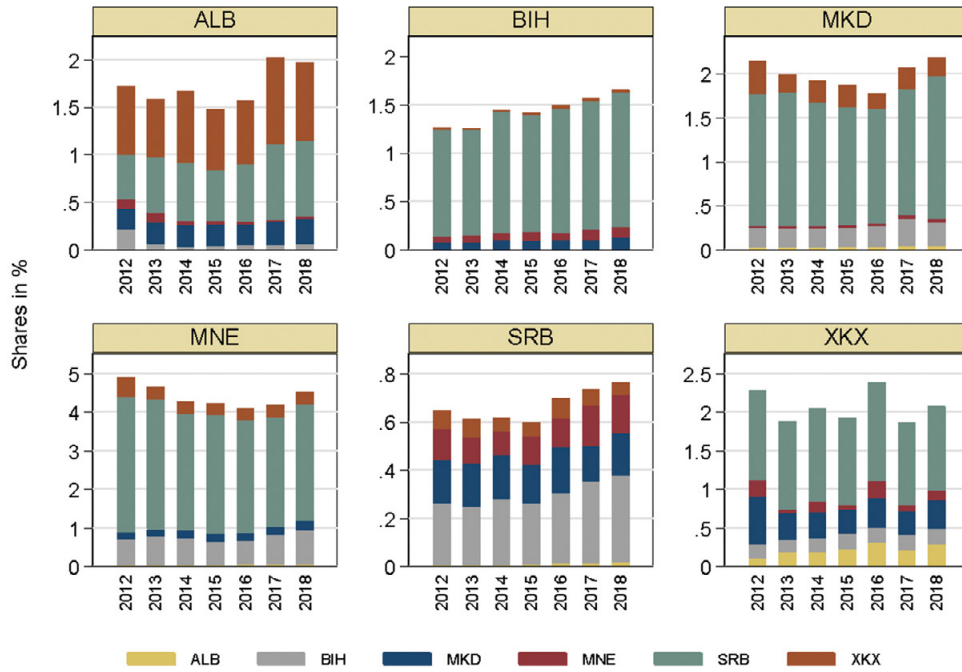
(28) The detailed trade data that are available for goods trade are not available for services.

Figure 6.4. Value-added structure of gross exports in the tourism sector



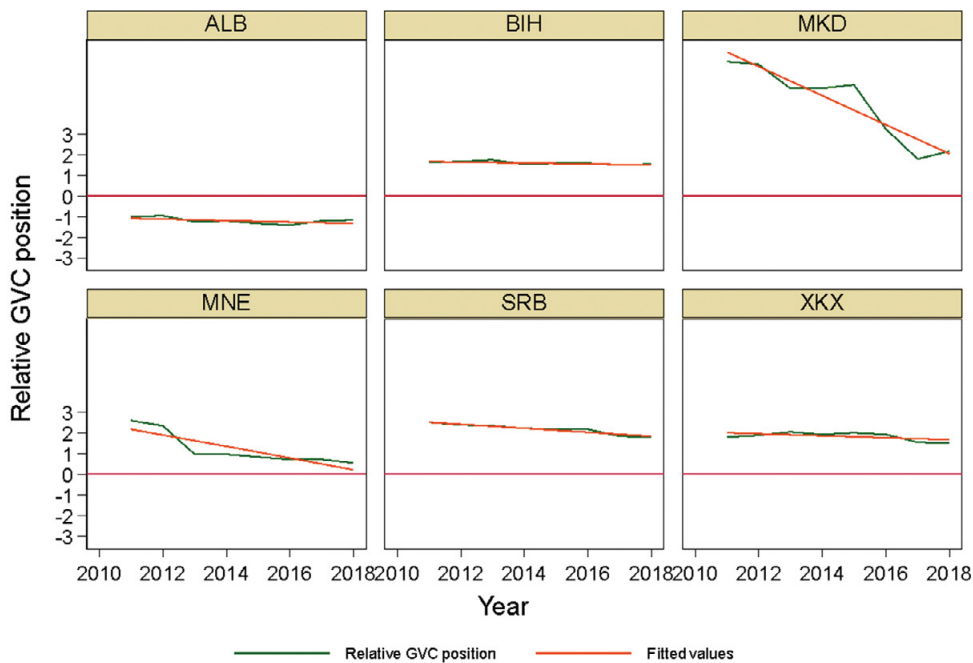
Sources: wiiw MC IOD (Reiter and Stehrer, 2021); own calculations.

Figure 6.5. Intra-WB backward linkages in the tourism sector



Sources: wiiw MC IOD (Reiter and Stehrer, 2021); own calculation.

Figure 6.6. Relative GVC position in the tourism sector



Note: Fitted values are calculated as a linear trend.

Sources: wiiw MC IOD (Reiter and Stehrer, 2021); own calculations.

Table 6.1. Detailed industry structure (Tourism, I), 2019

NACE Rev. 2 code	Description	Levels			Shares in %		
		Bosnia and Herzegovina	North Macedonia	Serbia	Bosnia and Herzegovina	North Macedonia	Serbia
		Enterprises - number					
I		10,578	4,438	3,414	100.0	100.0	100.0
I55	Accommodation	690	352	840	6.5	7.9	24.6
I56	Food and beverage service activities	9,888	4,086	2,574	93.5	92.1	75.4
		Value added at factor cost – EUR million					
I		257	107	223	100.0	100.0	100.0
I55	Accommodation	72	33	97	28.0	31.2	43.3
I56	Food and beverage service activities	185	74	126	72.0	68.8	56.7
		Persons employed - number					
I		35,977	23,258	30,534	100.0	100.0	100.0
I55	Accommodation	6,319	4,480	9,819	17.6	19.3	32.2
I56	Food and beverage service activities	29,658	18,778	20,715	82.4	80.7	67.8

Sources: SBS Eurostat (accessed March 2021), own calculations.

6.2 Review of the tourism value chain

6.2.1 Digging

6.2.1.1 Firm-level data analysis

The Orbis database has data on 122,084 companies from the WB operating in the tourism sector. The majority of these are cafes and bars. Their distribution by economies is shown in [Figure 6.7](#). Serbia, as the biggest economy in the region, has the most entities - 35%, with Albania, as a big tourist destination, following with 30%. Kosovo and North Macedonia have 17% and 13% of the firms, respectively, while Montenegro, despite being a tourist destination, has just 4% of the entities, which is due to the bigger size of the firms operating there.

Of these 122,084 companies, financial data are available for 26,027 ([Table 6.2](#)). They have total assets of EUR 4.7 billion and generate annual operating revenues of EUR 2.2 billion, which is one of the smallest figures recorded in the six sectors. These companies employ 97,000 people, which is the third-highest figure and makes this sector very labour-intensive. The companies are mainly domestically owned (59%).

The average company in the tourism sector has assets of EUR 179,000, generates annual revenues of EUR 86,000 and employs four people, meaning that these companies are predominantly small. The average gross salary is EUR 447 per month, the second-lowest level in the six sectors. One worker generates EUR 23,000 of annual revenues, which is the second-lowest level of productivity. Each EUR 1 of investment in assets yields annual revenues of 48 cents, which is again the second-lowest figure. In general, therefore, companies in the tourism sector are small and labour-intensive, with low wages and low levels of productivity.

[Table D.5](#) in the Appendix lists the 30 largest companies in this sector according to operating revenues. Most of them are big hotels with several hundred or even thousands of employees. Some

of them are part of big multinational companies, but the majority is domestically owned (59%).

The fDi Market database lists 17 projects in the tourism sector in the Western Balkan economies over the period 2015-2020. The total capital investment in these projects is EUR 3.6 billion, providing employment for 12,200 people. Most of the projects are in Montenegro, accounting for 86% of capital investment and 75% of employment. North Macedonia comes second, while Albania, despite being a tourist destination, comes third ([Figure 6.8](#) and [Figure 6.9](#)).

The individual projects – usually major hotel resorts – are generally large, with an average investment of EUR 209 million and employment for 718 people. The biggest project is the Portonovi resort in Montenegro, which is an investment of the Azerbaijani State Oil Company SOCAR. The investment is worth EUR 700 million and is expected to employ 3,000 people when fully operational. There are several other similar resort projects with investments exceeding EUR 200 million.

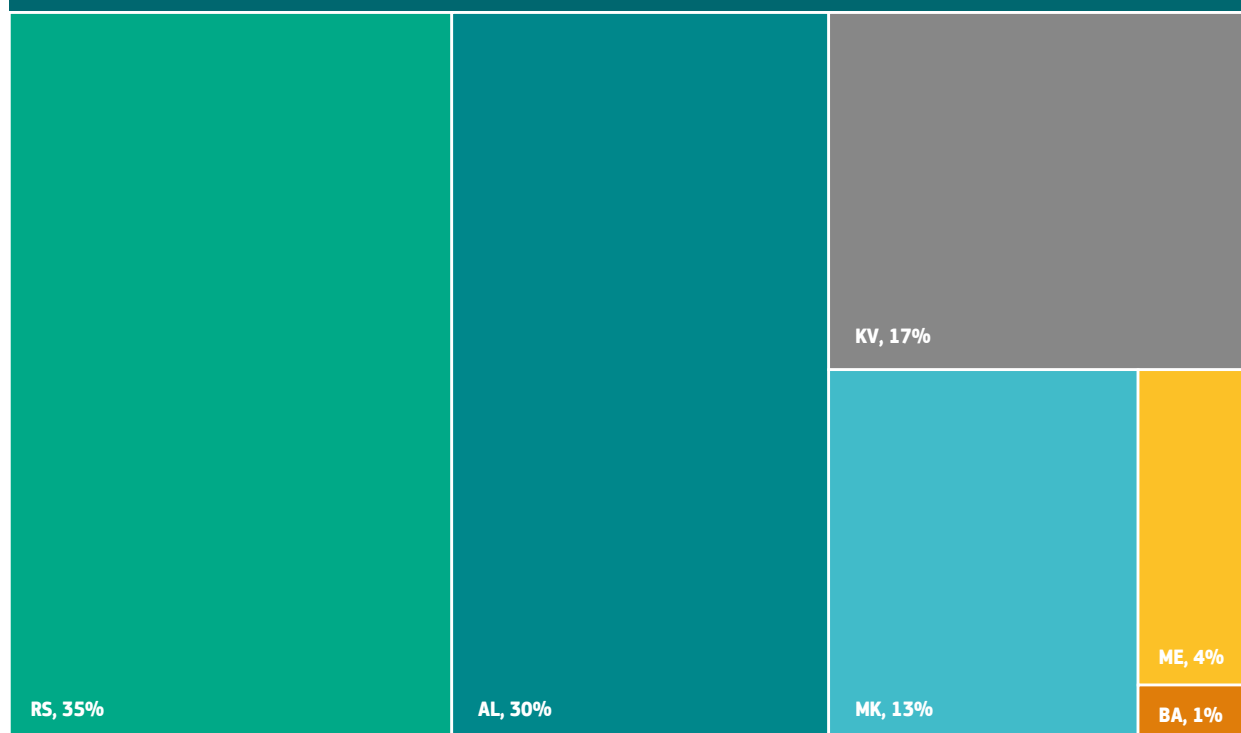
6.2.1.2 Patent data analysis

No patents were identified for this field (see Appendix [Table C.7](#)). For this reason, no technology network could be created.

6.2.1.3 Scientific and research publications

In the Scopus database the documents are grouped in thematic 'subject areas', which in turn are subdivided into different 'subject categories'. In order to conduct our analysis, publications in the subject category 'Tourism, Leisure and Hospitality Management' are examined. The database contains a total of 53,028 scientific documents on the subject category for the period 2008-2020. The most active are organisations from Serbia with 253 publications, followed by Montenegro with 37. Over the period under review the database documents a steep rise in output. Whereas in 2008 not a single document was published in the WB economies, the scientific output increased year on

Figure 6.7. Distribution of tourism firms by WB economies, 2019



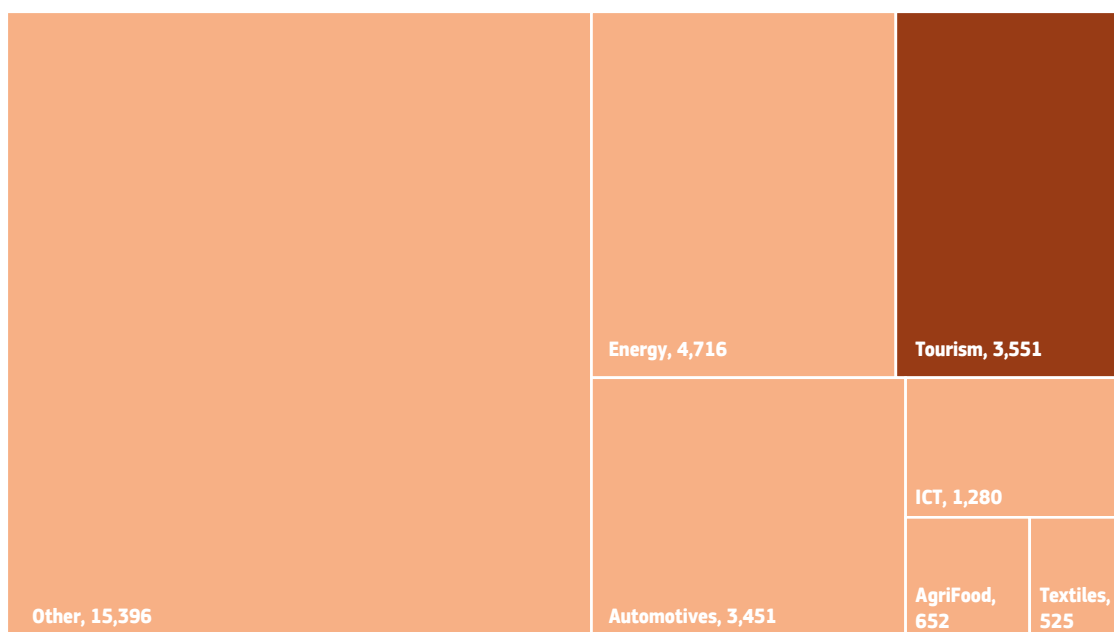
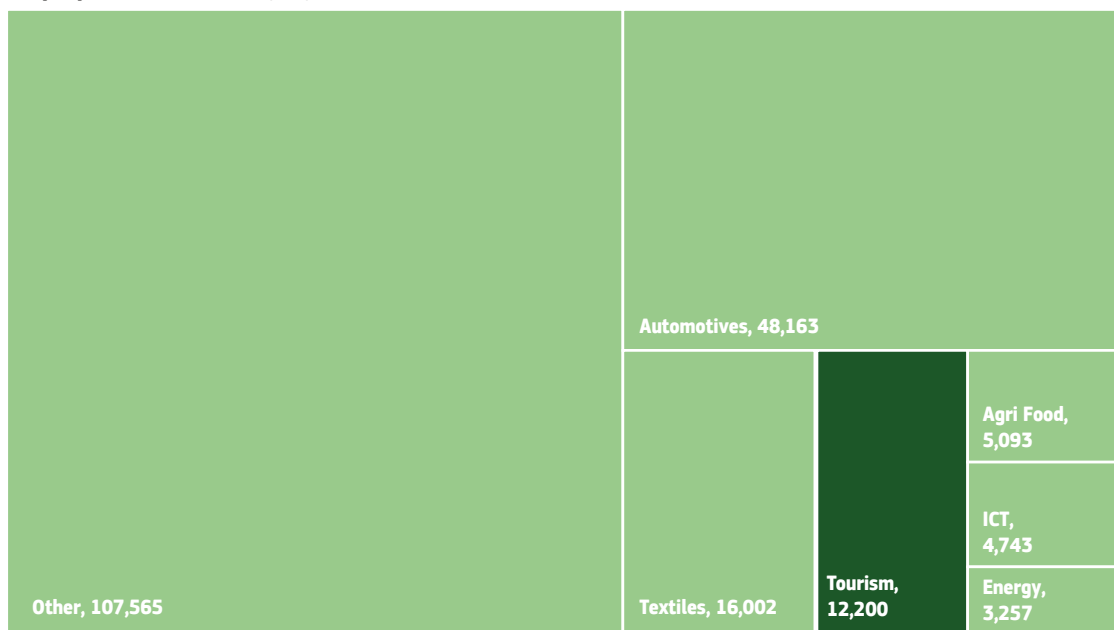
Sources: own calculations, using data from Orbis (accessed May 2021).

Table 6.2. Overview of companies in the tourism sector, 2019

Number of firms	Total assets (EUR)	Operating revenue/turnover (EUR)	Costs of employees (EUR)	Number of employees	Foreign owned
26,027	4,650,229,338	2,248,676,604	522,351,502	97,363	41%
Average assets per firm (EUR)	Average revenue per firm (EUR)	Average number of employees per firm	Average gross monthly salary (EUR)	Revenue per 1 EUR assets (EUR)	Revenue per worker (EUR)
178,670	86,398	4	447	0.48	23,096

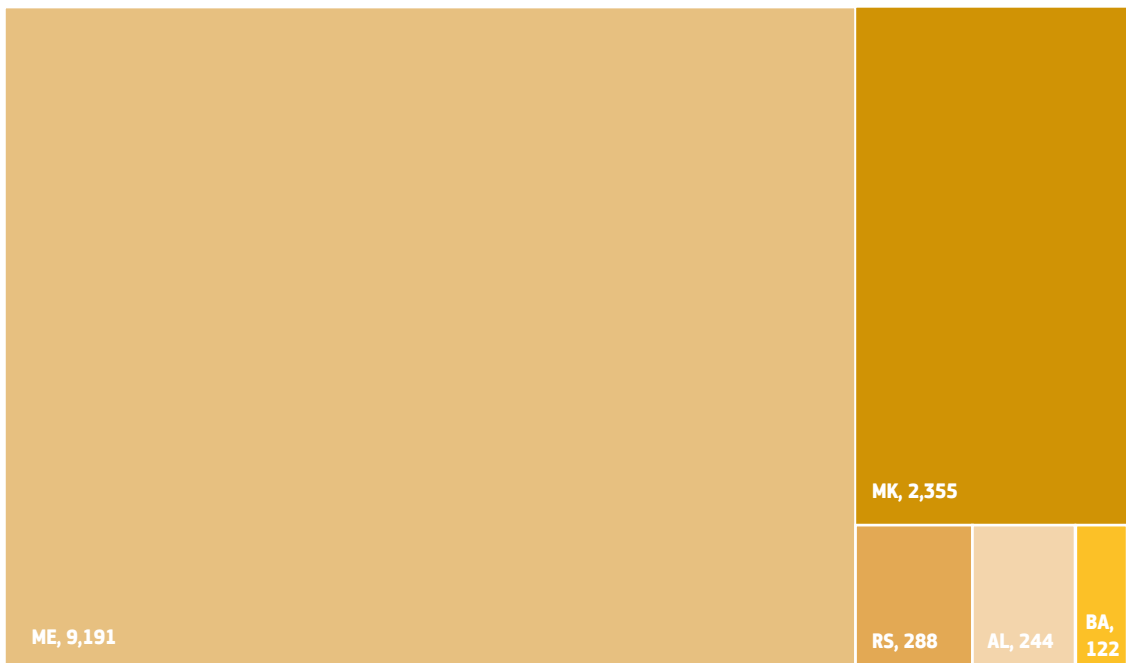
Source: own calculations using data from Orbis (accessed May 2021).

Figure 6.8. Share of tourism projects in all fDi projects

Capital investment (EUR million)**Employment** (number of people)

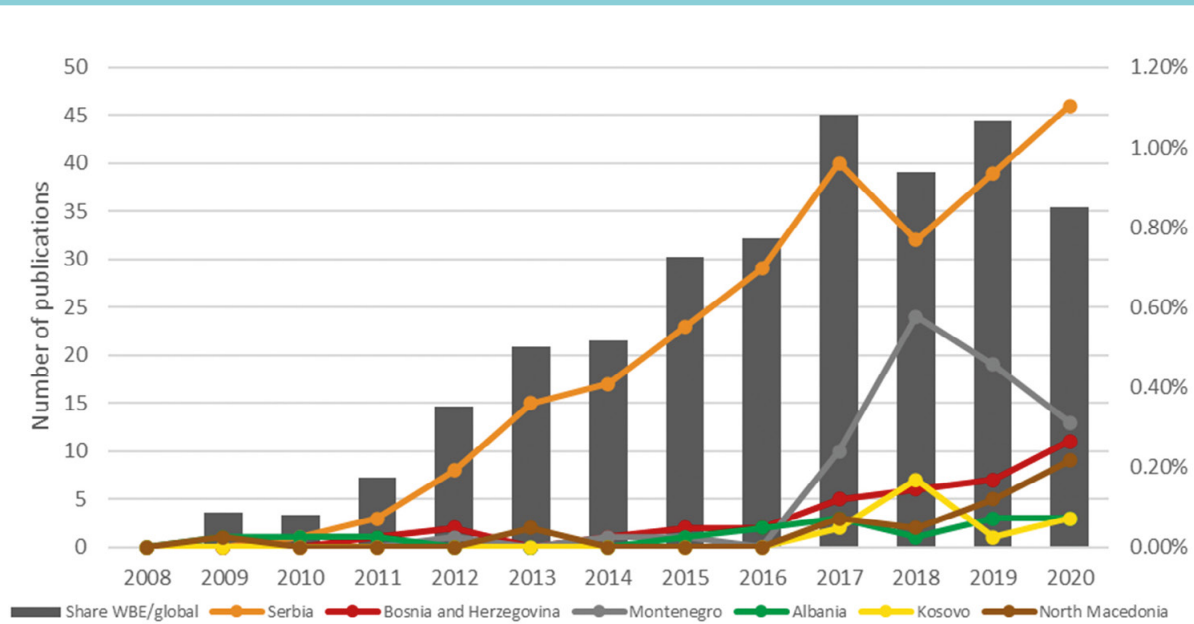
Sources: fDI markets database (accessed May 2021); own calculations.

Figure 6.9. Distribution of tourism projects by country

Capital investment (EUR million)**Employment** (number of people)

Sources: *fDI markets database (accessed May 2021); own calculations.*

Figure 6.10. Scientific publications, dynamic 2008-2020 in Tourism



Note: WBE denote Western Balkan economies
 Sources: Scopus (accessed March 2021); own calculations.

year until 2017, when the number of publications reached 45, which means a share of 1.08% of the global publication output. This dynamic is mainly driven by organisations from Serbia (see [Figure 6.10](#)).

Our analysis provides interesting findings and gives a holistic overview. However, the results are not yet meaningful enough, as absolute values are compared. Publications from Serbia, with around 7 million inhabitants, are weighted the same as publications from Montenegro with 620,000 inhabitants. Therefore, in the next step, we control for size effects and put the publications in relation to 100,000 inhabitants ([Figure 6.11](#)).

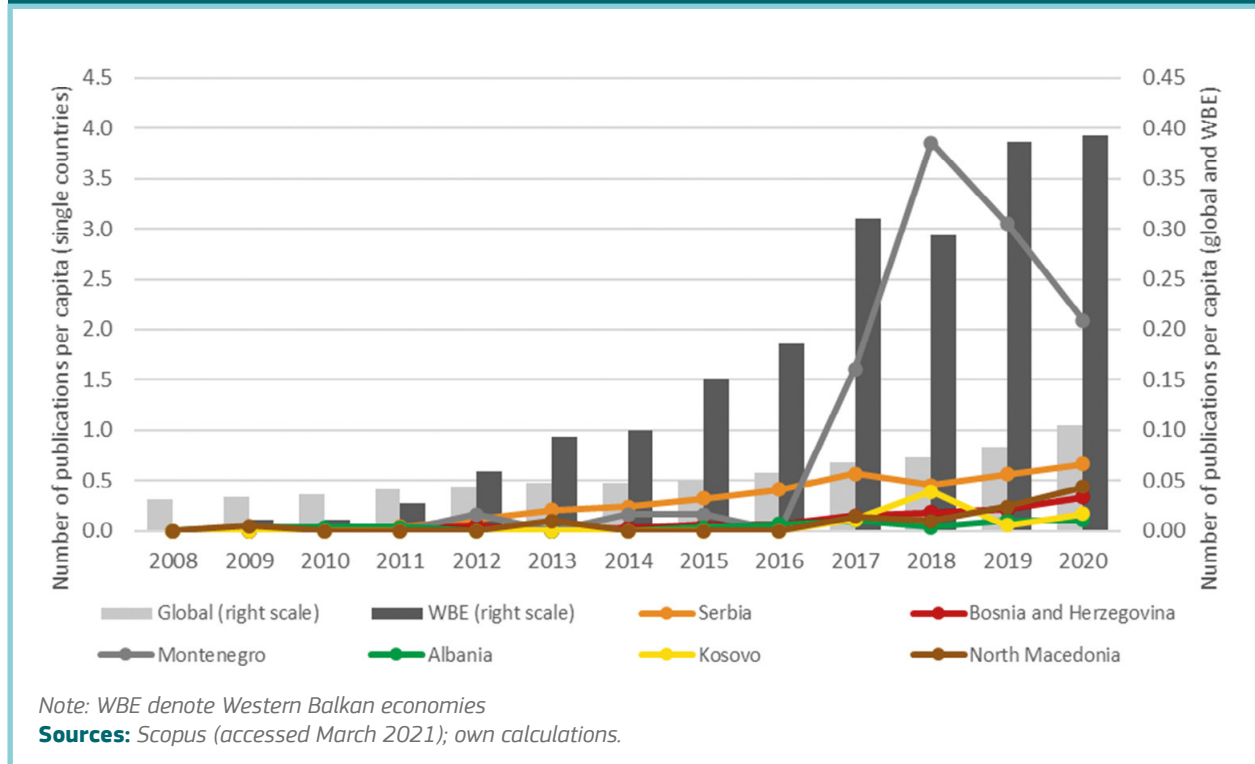
Controlled for population effects, an extraordinary publication dynamic can be observed for the WB economies. At the beginning of this period, in 2010, 0.04 documents per 100,000 inhabitants were published globally in the tourism value chain. In the WB economies this number was just 0.01. However, two years later, in 2012, the WB economies recorded a higher per-capita output than the global average. In 2020 the publication output of

the WB economies was almost four times higher than the global output. At the economy level, the most active contributor is Montenegro with 2.1 scientific documents per 100,000 inhabitants.

The science map ([Figure 6.12](#)) shows the international cooperation network of the WB economies in the period 2008-2020. The database consists of publications produced with the involvement of at least one WB economy. Each node represents one country, where the size reflects the number of publications in the respective country and the edges the number of co-authored publications with another country. The location of a country on the map is determined by the attraction to its research partners and the repulsion from countries without joint publications. The different colours mark the affiliation to a 'narrower research cluster'.

A total of 40 countries are included in the scientific cooperation network of the WB economies. Serbia's organisations cooperate with 33 of them. Serbia and Montenegro have the strongest connections (18 common documents), but despite this they are not in the same cluster. This is because Montene-

Figure 6.11. Scientific publications, dynamic 2008-2020, per-capita, Tourism



gro's joint publications with North Macedonia and Bosnia and Herzegovina are 'pulling' the country away from Serbia, resulting in an own cluster.

On the meso level (Figure 6.13), the most active organisation is the University of Novi Sad (Serbia) with 129 publications in the tourism value chain. It is followed by the University of Montenegro and then the universities of Belgrade, Kragujevac and Sarajevo (all Serbia).

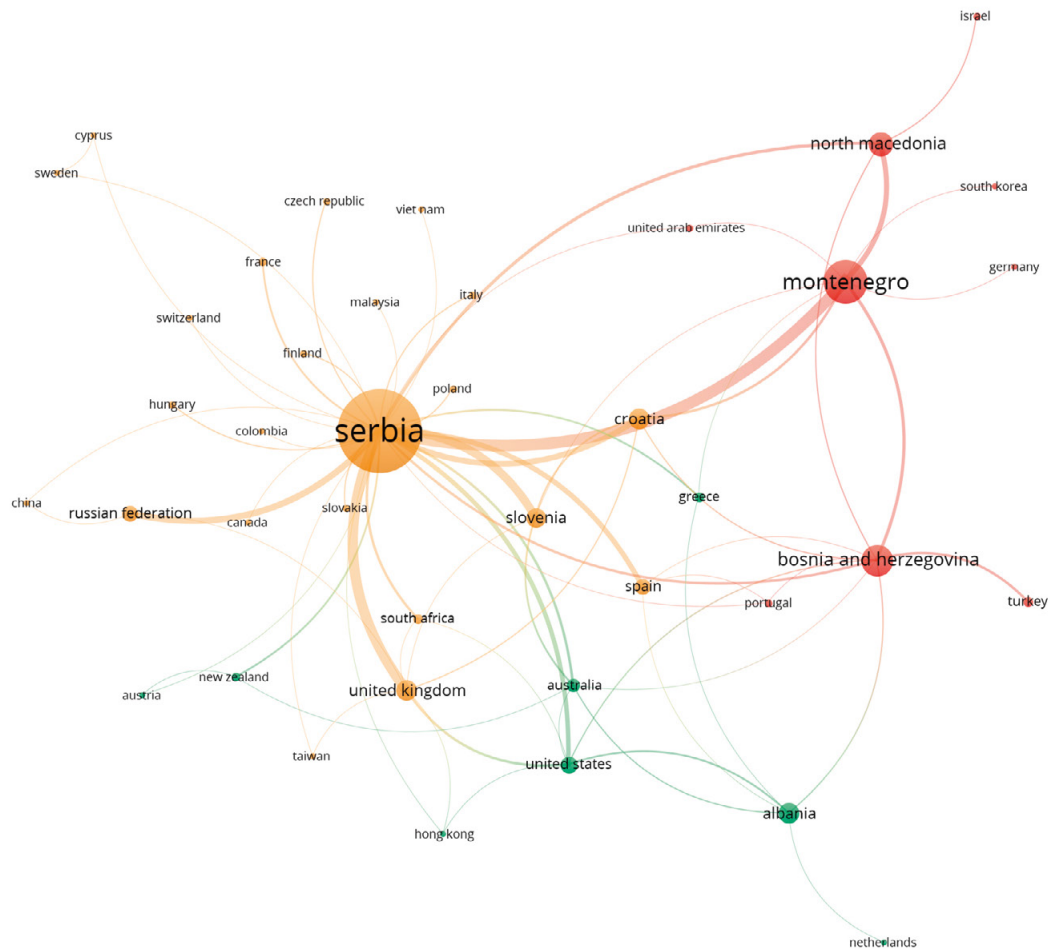
6.2.1 Determining

This research was carried out in extremely difficult and challenging circumstances for the tourism sector and related activities such as transport, accommodation, catering, entertainment, recreation, etc., which were the sectors most severely affected by the COVID-19 pandemic. Interviewing value chain participants was hard, because many of them had temporarily or permanently closed their businesses. Hotel complexes in coastal areas were closed due to the off-season, while many participants were unavailable as a result of government measures to combat the effects of the pandemic.

In most economies, tourism is one of the most dynamic service industries and revenue generators. It is also one of the fastest-growing sectors of the global economy. Most economies rely on tourism for their economic growth, including the economies of the Western Balkans, which invest in tourism and consider it to be a key sector for their development. Over the past decade national governments have taken several initiatives, such as reviews of strategic tourism plans, tourism communication campaigns and the creation of national tourism brands. In the transition process of the Western Balkan economies from centrally planned systems to market economies and their accession to the EU tourism is considered an important segment of the economy, whose functioning should be placed in a new economic environment. That is why tourism is often seen as one of the important sectors of economic progress.

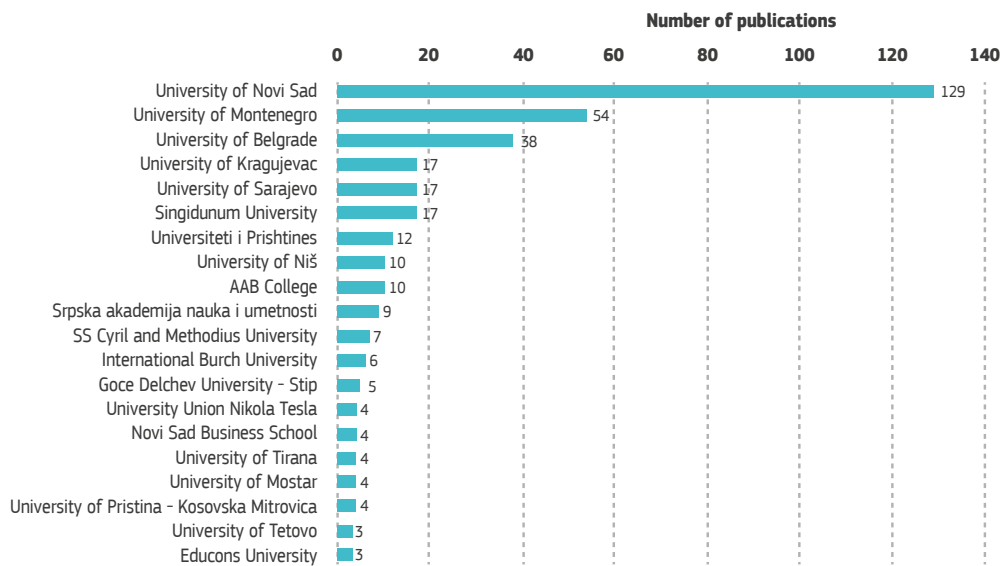
Because of the nature of the sector itself, the tourism value chain is diversified and consists of many closely interconnected actors and activities engaged in the realisation of a unique tourist ex-

Figure 6.12. Co-operation network WB economies, Tourism, 2008-2020



Note: Nodes = Number of documents; Edges = Number of co-authored publications.
Sources: Scopus (accessed March 2021); own calculations

Figure 6.13. Active organisations, 2008-2020, in the tourism value chain



Sources: Scopus (accessed March 2021); own calculations.

perience. The nature and type of activities that take place along the value chain is highly heterogeneous. Accordingly, the chain involves actors ranging from large multinational companies to small local restaurants and service providers. The contribution of each actor, regardless of its size, is significant and plays a part in the success and performance of the entire chain.

The main actors in the tourism value chain are the tourist arrangement organisers, transport and accommodation providers, producers of food and beverages, and providers of services and optional and supporting activities.

Tourist arrangement organisers are tour operators, travel agencies and online services. Travel agencies are still the most represented organisation to arrange trips in the WB, with online services becoming increasingly important. The most widely used means of transport in the WB are passenger vehicles, buses, planes and the railway.

Accommodation includes hotels, apartments, youth hostels and family accommodation. Apartments owned by families and individuals are a very common type of accommodation at tourist destinations in the WB region. Lately, short rentals through an online service provider have taken precedence over other types of accommodation due to the ease of booking and lower prices. A trend observed in city tourism is the use of apartments and flats rather than hotel accommodation, which is not only more expensive but also offers less flexibility. However, the preference in terms of accommodation depends a lot on the age of the tourist. While younger guests are more inclined to organise trips online, older people still prefer to use the services of a travel agent or operator and to stay in a hotel.

The food and beverage sector includes a large number of actors ranging from producers to restaurants, night clubs, fast-food services, cafes, bars, bakeries, etc. Among these actors are branches of large multinational companies but also small local ones. It is difficult to say which is more important, because in their own way they all meet the increasingly demanding needs of visitors during their holidays. The WB region is known es-

pecially for its excellent food and quality drinks, so this part of the value chain is extremely important for improving the overall tourist offer.

Optional activities are all the activities that enhance the tourist experience, such as shopping, recreation, entertainment, excursions and visits to cultural, natural, historical and urban sites. Shopping opportunities have been significantly improved since the opening of the region and the arrival of foreign multinational companies. Support services include banking, information and security services, cleaning, maintenance, etc.

6.2.2 Decomposing

6.2.2.1 Overview

The WB region is rich in natural, cultural, historical and other destinations that are attractive to local and foreign tourists, which is why the tourism sector is a development opportunity for all economies of the WB. Their common experience clearly shows that despite the historical and cultural heritage the primary goal is to achieve a harmonised regional tourism development as an important factor in achieving a sustainable regional development. Tourism is a strategically important sector, which is why special attention should be paid to investments.

The tourism sector was severely hit by the COVID-19 crisis. Despite our best effort to include as many as possible from the sector as possible, we were only able to secure a limited number of participants. Six companies responded to the survey, and we interviewed two companies, two representatives from business support organisations, and a member of the scientific community²⁹.

The average period of operating in business of the surveyed companies is 20 years, whereby no company is in the business for less than 10 years and no longer than 30 years. The results indicate

(29) Methodological aspects of the survey and interviews including the questionnaire are reported in Appendix Section E.

maturity and experience, which is especially important in a value chain that is complex in terms of the number and type of activities.

Supported by a large in number of actors, the tourism value chain includes enterprises of all sizes, which are represented at all stages of the value chain. Size is determined by the role that actors play in the value chain. Accordingly, hotels generally employ a larger number of people, while local restaurants are often family-run. Also, airlines or multinational car rental companies are hard to compare with a small family bike-rental business. Our survey includes micro and small and medium-sized enterprises.

Most of the participants in the value chain are in foreign or domestic private ownership. This is a re-

sult of the increase in the number of micro, small and medium-sized enterprises in various activities along the chain, but also of the process of privatisation of large hotel complexes in the most important tourist destinations.

Travel agencies are engaged in both domestic and foreign tourism. Arrangements from abroad make up between 20% and 85% of the total services provided. Travel agencies and hotels mostly provide accommodation and food and beverage services, as well as youth summer trips, work and travel programmes, skiing, tour packages through the Balkans for foreign tourists (B2B), excursions (B2C), team building for groups (B2C), travel and tourism services, ticketing services, corporate travel, etc. Excursions and team-building services are mostly used by domestic tourists.

Box 6.1. Economy-based representation of the tourism value chain

Owing to its richness in natural, cultural and historical sites, the tourism sector has significant development potential in the Western Balkan region. Tourism has experienced significant expansion in the WB in the last two decades. The inflow of foreign investment and improvements to their tourism offers have made the WB economies an attractive destination for foreign tourists. The structure of tourism value chains does not differ much between individual economies. They are highly diversified and include a large number of interconnected actors, who are engaged in creating a unique tourist experience.

The actors range from large multinational companies to small, local restaurants and service providers. The main actors in the tourism value chain include tourist arrangement organisers, transport providers, accommodation, food and beverages production and services, providers of optional activities, providers of support services and supporting organisations. Travel agencies are still the most common tourist arrangement organisers in all six economies, but online services are gaining in importance. Passenger vehicles, buses, planes and railways are the most commonly used means of transport. In terms of accommodation, hotels are partially losing in importance compared with apartments owned by families and individuals, and particularly short rentals through an online service provider. The main cause of such a trend is lower prices and greater flexibility.

The food and beverage sector is served by a large number of value chain actors, including producers, restaurants, night clubs, fast food providers, cafes, bars, bakeries, shops, etc.

The share of arrangements by WB economies in the total tourism offer is between 15% and 20%. Having more tourists from the region requires cooperation and networking, but also higher competitiveness of the value chain. The economy-based representation of tourism value chain is given in *Box 6.1*.

6.2.2.2 Value-added dynamics in the GVC, identifying types of linkages and relationships between different actors in the GVC

All surveyed travel agencies are members of an association, cluster or business network, while hotels report no such memberships. All travel agencies from Serbia are members of National Association of Travel Agencies of Serbia (YUTA).

Also, they are members of the Association of Tourist Agencies of Serbia, the Danube tourism cluster Istar 21, the association for developing tourism Visit Vojvodina, the Danube Competence Centre, the Association of Receptive Agencies, the International Air Transport Association, the European Tourist Bus Association (ETOA), the Albanian Turkish Chamber of Commerce, the Union Chamber of Commerce Albania, etc.

The majority of the surveyed travel agencies act as subcontractors in the GVC. Most of them cooperate with other agencies in the WB. The level of cooperation with GVC actors is assessed as excellent. The position of companies has been upgraded in recent years, and they plan to continue to develop their business operations.

They are heterogeneous in size, with ownership ranging from branches of large multinational companies to small, locally owned coffee shops. It is important to point out that all these actors are equally important and contribute to creating an offer that meets the demanding needs of modern tourists. This is particularly relevant considering that the Western Balkan region is known for its rich gastronomic offer and exciting nightlife. The availability of optional activities – such as shopping, recreation, entertainment, excursions and visits to cultural, natural, historical and urban sites – has been enhanced by the acceptance of the highest standards and practices and the arrival of multinational companies.

Support services include information, banking, security, cleaning, maintenance, etc. Key supporting organisations are national associations of travel agencies, national tourism organisations, chambers of commerce, clusters and the like. Spa, winter, food and rural tourism as well as agritourism are all available in Serbia. Macedonia's tourism sector is centred on rural and national park tourism, wine tourism and winter tourism, but it is currently lacking in infrastructure and promotion. The mountains are Bosnia and Herzegovina's most valuable tourist attraction, and winter tourism has been growing rapidly in recent years. The developed coastlines of Montenegro and Albania provide a diverse range of tourist attractions for the summer season. Although Kosovo's tourism industry is suffering as a result of its volatile political climate, it has a lot of room for growth, especially given its rich history and cultural sites.

The tourism value chain is laterally supported by many organisations and associations which aim to systematically improve business conditions and connect heterogeneous actors to meet the needs of increasingly demanding tourists more efficiently.

Support activities are primarily focused on providing a minimum standard of business for agencies, especially in the obligation to comply with the general conditions of travel, proposing measures to the government to overcome the consequences of the financial crisis and encouraging the quality of the tourist offer, tourism development projects, etc.

The ministries in charge of tourism have an important role to play in creating the framework for the sector's development. In particular, they are engaged in activities such as infrastructure, education, training in tourism and promotion projects, support to tourists, support to travel agencies, and support to the catering and tourism industry to mitigate business difficulties caused by the COVID-19 pandemic, etc.

For example, the Ministry of Trade, Tourism and Telecommunications of the Republic of Serbia is the national partner in the implementation of the project 'EU for cultural heritage and tourism' (#EU-forYOU), which is focused on the development of tourism as a significant opportunity for the economic development of eastern Serbia and the Lower Danube area.

Key actors providing support to the GVC are national associations of travel agencies, national tourism organisations, economic chambers, clusters and the like. Some are members of international organisations such as the European Travel Commission.

The European Tourist Bus Association (ETOA) represents the interests of tour operators, wholesalers, destination management companies and agents to create a business environment in which European tourism can develop.

The International Air Transport Association (IATA) represents around 290 airlines in 120 countries and carries 82% of the world's air traffic.

The Tourism Organisation of Serbia (TOS) is engaged in promoting the country in domestic and foreign markets and performing communication and advertising activities.

Cluster Istar 21 is actively engaged in promoting cooperation and developing tourism in the Danube region. Also, it provides training for employees in the tourism industry, creates tourism products and promotes and advertises the region as a single tourism product in domestic and foreign markets.

An interview with a representative of the scientific community in Serbia revealed that cooperation between academia and the tourism sector is not systemic. Scientific and professional discussion on relevant topics in the field of tourism is mainly conducted at scientific conferences organised by public and private faculties. Also, there are examples of faculty engagement in developing tourism development strategies. However, a greater contribution to the creation of policy documents comes from private consulting firms.

One example from Montenegro indicates that the tourism sector expects great results from its cooperation with academic partners, as illustrated by field research conducted by the Faculty of Business and Tourism in Budva on the topic 'The role of science and education in Montenegro'.

Our survey results reveal that there is a need for professional practices in tourism-type educational institutions and that there is a high degree of satisfaction with the cooperation between the tourism sector and the scientific community. This cooperation includes teaching according to special modules, such as presentation and communication skills, sales management, agency staff, reception staff, etc., and organising scientific conferences and round tables. Parallel to this, we noticed that there is a visible lack of education for middle-management professionals in the Montenegrin education system. This claim is not verified in other economies.

6.2.2.3 Labour issues

Tourism is a service activity, and human resources are of great importance for the success of every tourist destination in all its segments. Working in tourism requires the development of different skills and learning systems in order to maintain and improve the quality of service. An organisation's workforce is arguably its greatest asset, and tourism and hospitality is an extremely labour-intensive industry. It is widely accepted that high labour fluctuation and business expenses and a lack of skilled workers are avoidable consequences that affect the tourism sector's competitiveness, productivity and service quality and make recruiting and retaining employees more expensive. That is why it is extremely important to employ qualified staff or a sustainable workforce.

Since tourism consists of several segments, it offers employment opportunities to many people, regardless of their level of education. The companies which participated in our research said that university education is the average educational attainment level of the people they employ. Employees are typically managers and service and sales workers (including waiters, etc.). Skills that workers possess mostly include communication, collaboration and creativity skills, management skills, handling and moving, assisting and caring, working with computers and cleaning, among others. In the opinion of our respondents, the country in which they operate provides only partially the occupations and skills of employees that they need. Key labour constraints primarily include wages and labour regulations, emigration, labour discipline, lack of skilled staff, etc.

One major problem for the tourism sector are the non-standard working conditions. This includes temporary employment, part-time work, agency work and disguised employment, all of which contribute significantly to disruptions that manifest themselves in labour shortages. When it comes to national tourism, the problem may be the employment of foreign labour, which automatically limits job opportunities for the local population.

The global economic crisis has had an impact on working conditions and employment in the Western Balkan economies, including inadequate pay and job insecurity. It is very important to strive for equitable wages, working conditions that are free from discrimination and exploitation, the creation of jobs that are stable, permanent and full-time and provide fair salaries and benefits, and to ensure and enforce relevant labour regulations that reflect basic human rights.

CHAPTER



Chapter 7. IT value chain

The industry and value chain considered here comprises information technology (IT) and other information services corresponding to NACE Rev. 2 JC.

7.1 Overview of the IT value chain

7.1.1 Overall trends and patterns

The IT industry accounts for almost 3% of value added in Serbia and almost 2% in Bosnia and Herzegovina and North Macedonia, but for only around 1% in Montenegro and Kosovo as a percentage of industries A to N (Figure 7.1). In all economies (with the exception of Montenegro) the shares are increasing.

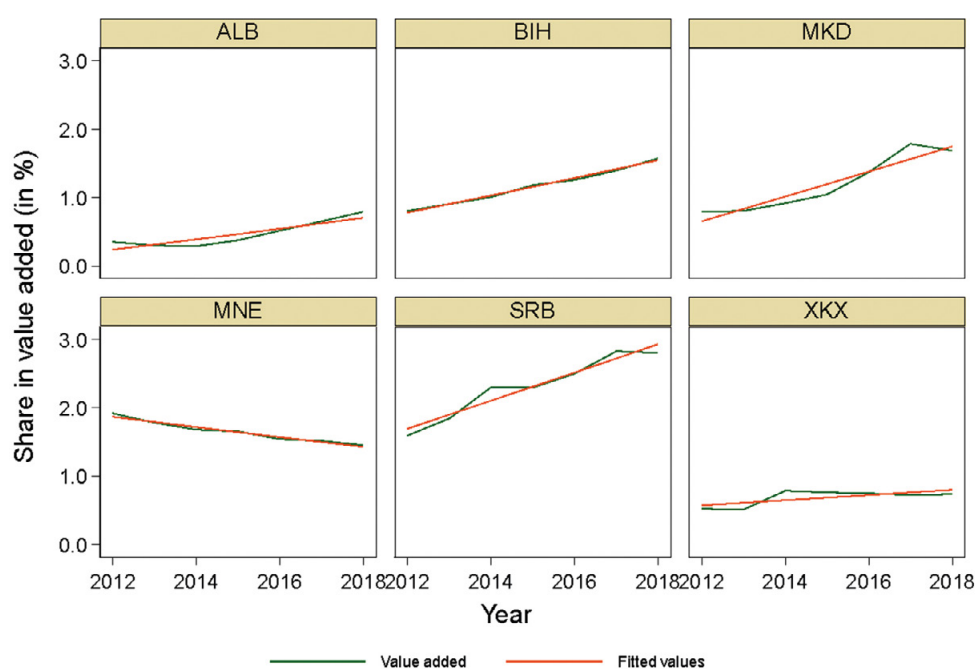
According to ILO data, employment in the IT sector is increasing in all WB economies with the exception of Montenegro, where employment has remained more or less stable over the past years (Figure 7.2).

Data for Serbia and North Macedonia indicate a slight revealed comparative advantage with an increasing trend. Such a trend can also be seen for Bosnia and Herzegovina and Albania, albeit from a lower level. The trends for Montenegro and Kosovo are negative (Figure 7.3).

Considering the value-added structure of the economies' gross exports³⁰ (Figure 7.4), one finds that the domestic content is generally high at

(30) Using multi-country input-output tables allows to decompose gross exports into the contribution of domestically produced value added and value added produced in foreign countries that are imported via intermediary inputs

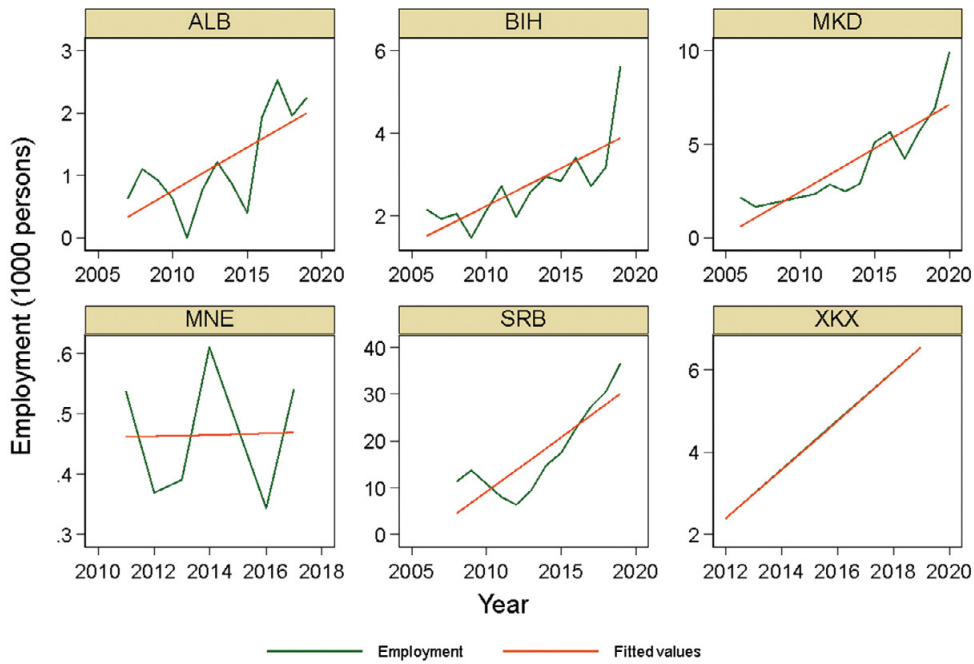
Figure 7.1. Value added shares of the IT sector



Note: Fitted values are calculated as a linear trend.

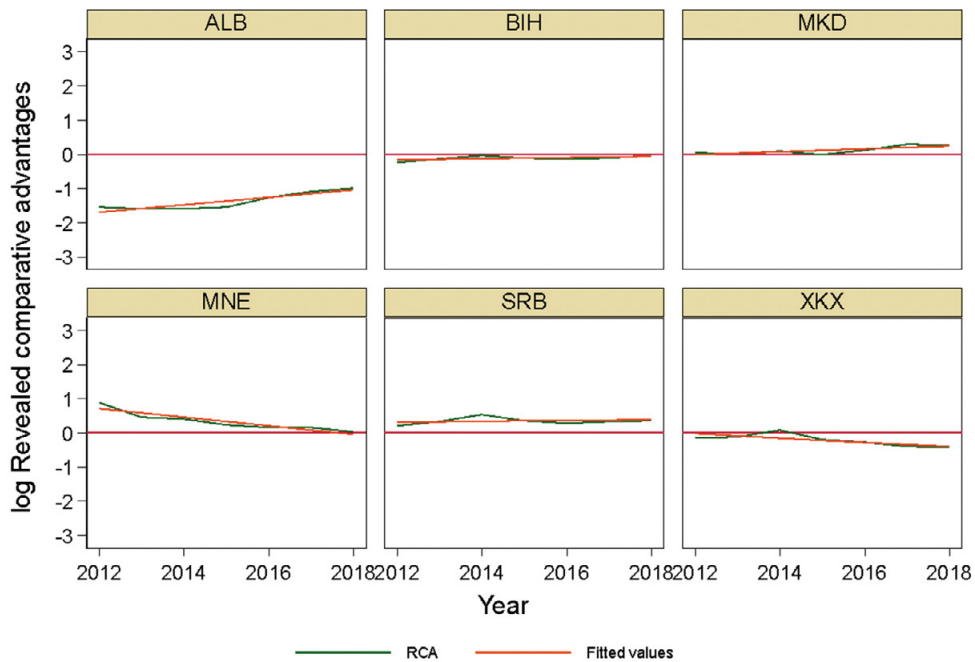
Source: wiiw MC IOD (Reiter and Stehrer, 2021); own calculations.

Figure 7.2. Employment levels in the tourism sector



Note: 1) Fitted values are calculated as a linear trend. 2) For Kosovo only data for 2012 and 2019 are available.
 Source: ILO (accessed March 2021); own calculations.

Figure 7.3. Revealed comparative advantages of the IT sector



Note: Fitted values are calculated as a linear trend.
 Source: wiiw MC IOD (Reiter and Stehrer, 2021); own calculations.

about 80% on average. Backward linkages to the EU27 account for about 5-10% of gross exports.

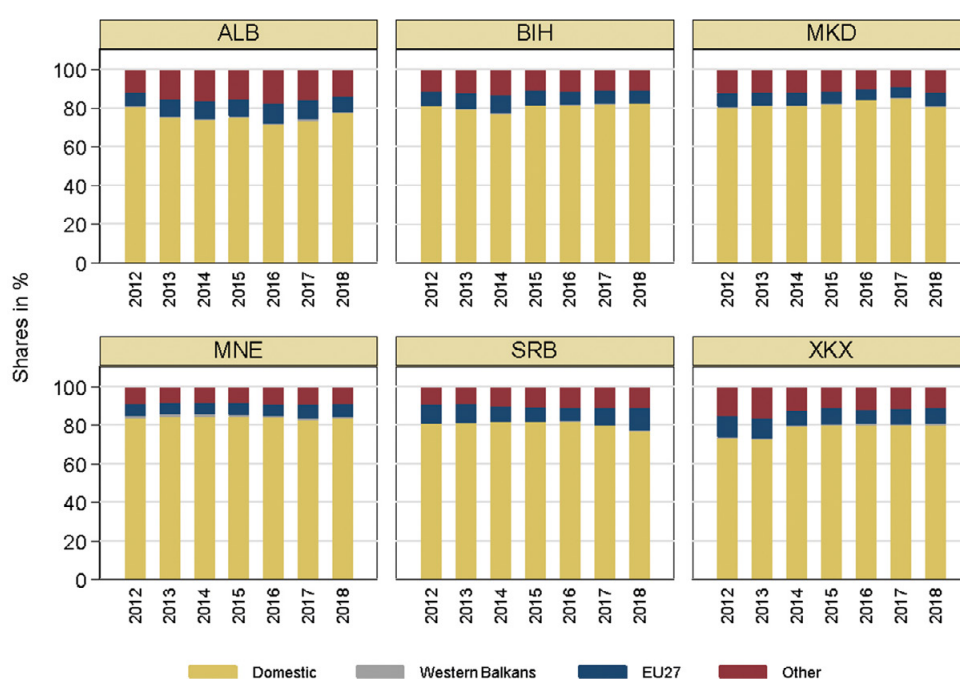
Backward linkages (in terms of the value-added content of exports) with the other Western Balkan economies are relatively weak and amount to less than 1% for all economies (Figure 7.5). Even lower shares are documented for Bosnia and Herzegovina, North Macedonia and Serbia. However, the data indicate that the sector is relatively strongly forward-linked (Figure 7.6), as the relative GVC position indicator³¹ is positive and in some cases even increasing.

7.1.2 Detailed patterns

There are no detailed trade data available for the IT services industry. The economies for which SBS data are available (Bosnia and Herzegovina, North Macedonia and Serbia) show larger shares in computer programming, consultancy and related activities (NACE J62) and within J63 (Information service activities) in data processing, hosting and related activities; web portals (NACE J631).

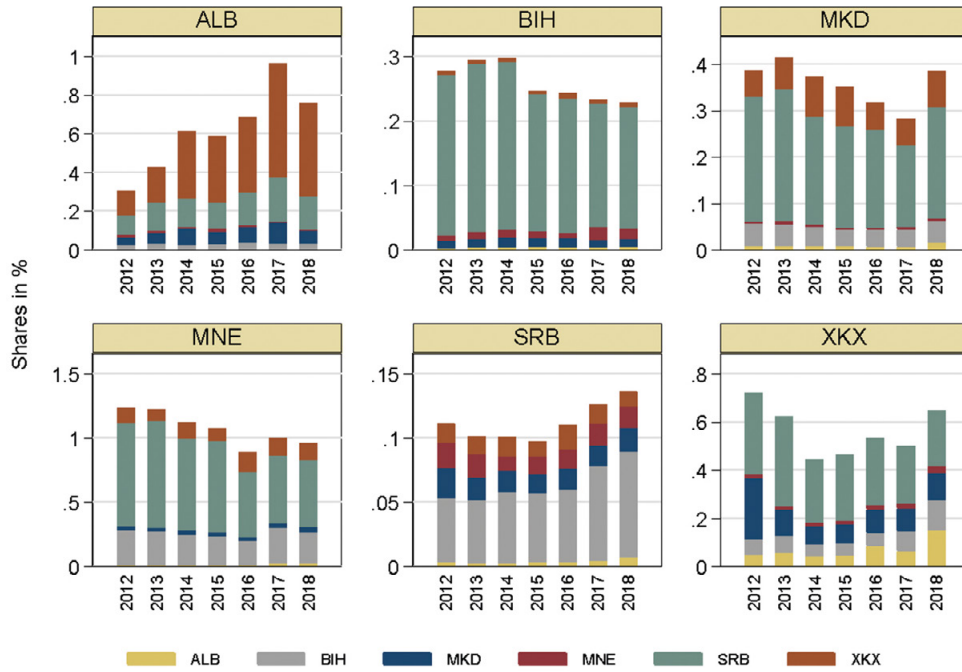
(31) The GVC position indicates whether the industry of a country has stronger forward (a country's value added in exports which goes into exports of other countries) or backward (the foreign value added of a country's gross exports of the country) linkages.

Figure 7.4. Value added structure of gross exports in the IT sector



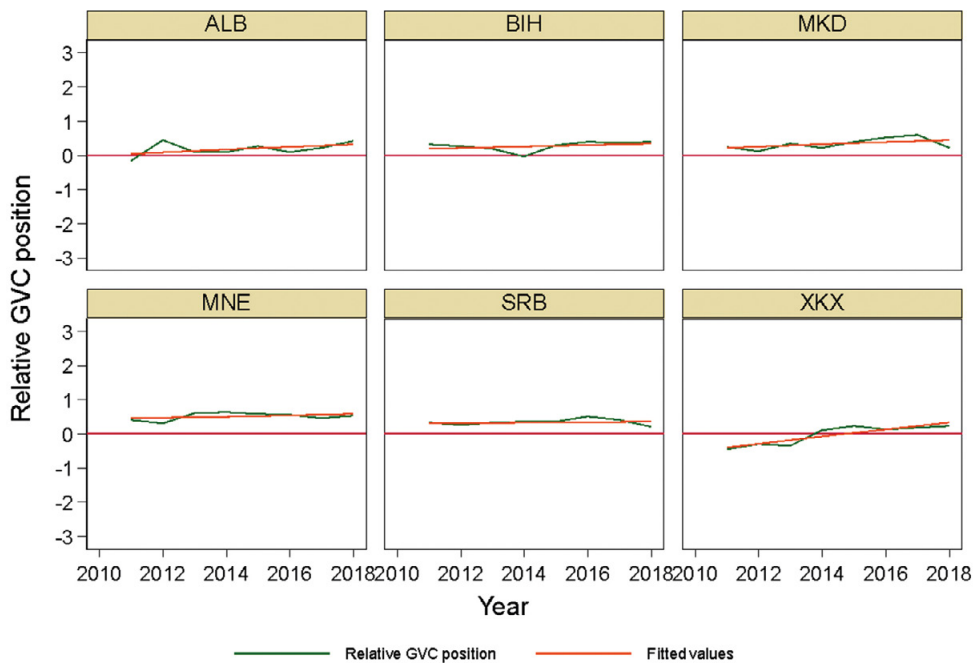
Sources: wiiw MC IOD (Reiter and Stehrer, 2021); own calculations.

Figure 7.5. Intra-WB backward linkages in the IT sector



Sources: wiiw MC IOD (Reiter and Stehrer, 2021); own calculations.

Figure 7.6. Relative GVC position in the IT sector



Note: Fitted values are calculated as a linear trend.

Sources: wiiw MC IOD (Reiter and Stehrer, 2021); own calculations.

Table 7.1. Detailed industry structure (IT, NACE JC), 2019

NACE Code	Description	Levels			Shares in %		
		Bosnia and Herzegovina	North Macedonia	Serbia	Bosnia and Herzegovina	North Macedonia	Serbia
		Enterprises - number					
JC		1,004	1,165	2,777	100.0	100.0	100.0
J62	Computer programming, consultancy and related activities	828	934	2,449	82.5	80.2	88.2
J63	Information service activities	176	231	328	17.5	19.8	11.8
		Value added at factor cost – EUR million					
JC		168	158	600	100.0	100.0	100.0
J62	Computer programming, consultancy and related activities	143	131	563	85.0	83.4	93.8
J63	Information service activities	25	26	38	15.0	16.6	6.2
		Persons employed - number					
JC		7,338	8,316	24,448	100.0	100.0	100.0
J62	Computer programming, consultancy and related activities	5,947	6,974	22,112	81.0	83.9	90.4
J63	Information service activities	1,391	1,342	2,336	19.0	16.1	9.6

Sources: SBS Eurostat (accessed March 2021), own calculations.

Table 7.2. Detailed industry structure of J63 (Information service activities), 2019

NACE Code	Description	Levels			Shares in %		
		Bosnia and Herzegovina	North Macedonia	Serbia	Bosnia and Herzegovina	North Macedonia	Serbia
		Enterprises - number					
J63	Information service activities	176	231	328	100.0	100.0	100.0
J631	Data processing, hosting and related activities; web portals	127	179	283	72.2	77.5	86.3
J639	Other information service activities	49	52	45	27.8	22.5	13.7
		Value added at factor cost – EUR million					
J63	Information service activities	25.3	26	37.5	100.0	100.0	100.0
J631	Data processing, hosting and related activities; web portals	14.5		35.2	57.3		93.9
J639	Other information service activities	10.8		2.3	42.7		6.1
		Persons employed - number					
J63	Information service activities	1,391	1,342	2,336	100.0	100.0	100.0
J631	Data processing, hosting and related activities; web portals	1,027	1,139	2,023	73.8	84.9	86.6
J639	Other information service activities	364	203	313	26.2	15.1	13.4

Sources: SBS Eurostat (accessed March 2021), own calculations.

7.2 Review of the IT value chain

7.2.1 Digging

7.2.1.1 Firm-level data analysis

The Orbis database has data on 21,060 companies from the WB operating in the IT sector. Their distribution by economies is shown in [Figure 7.7](#). Most of them are based in Serbia (57%), while Kosovo is second with 22% and North Macedonia is third with 14%. The others have fewer companies.

Of these 21,060 companies, financial data are available for 7,070 ([Table 7.3](#)). They have total assets of EUR 9 billion and generate annual operating revenues of EUR 5.8 billion, making this the third-biggest of the value chains reviewed here. The companies employ a total of 70,000 people, which is the second-lowest level, and are mainly domestically owned (55%).

The average company in the sector has assets of EUR 1.2 million and generates annual revenues of EUR 815,000, meaning that companies from this sector are moderately big. The average gross salary per worker is EUR 1,488 per month, the second-highest level of all the sectors reviewed. Each worker generates EUR 83,000 of revenues, making this the second-most productive sector, while each EUR 1 of investment in assets yields annual revenues of 62 cents, which is average.

[Table D.6](#) in the Appendix shows the biggest 30 companies in the sector according to operating revenues. Most of them are telecommunications companies, and many are part of a multinational group.

The fDi Market database lists 66 IT projects in the Western Balkan economies for the period 2015–2020. The total amount of the capital investment of these projects is EUR 1.3 billion, offering employment to 4,743 people ([Figure 7.8](#)).

Most of the projects are in Serbia, although the dominance is not as big as in the other sectors – 60% of the capital investment and 50% of the employment. North Macedonia is big in IT, with 20% of the capital investment and 24% of the

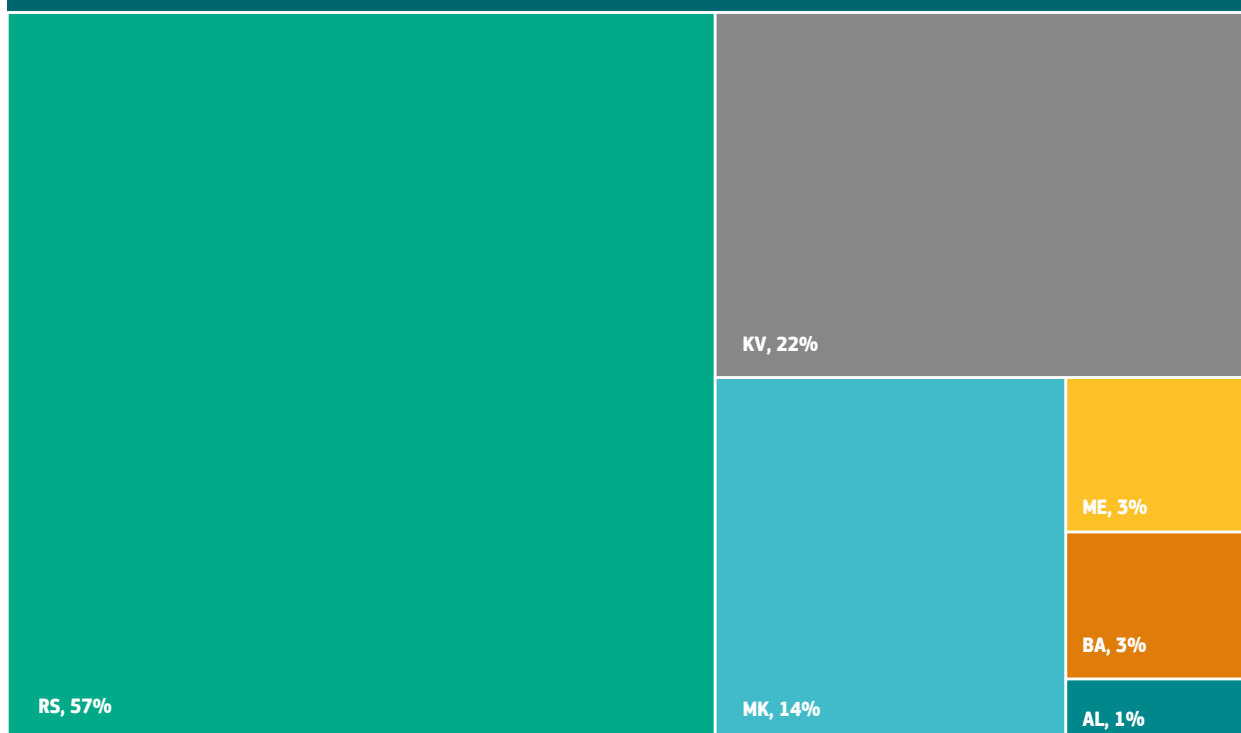
employment, while Bosnia and Herzegovina comes third ([Figure 7.9](#)).

The IT investment projects are generally small, both in terms of the average investment (EUR 19 million) and in terms of jobs created (72 people per project), but the biggest projects are worth several tens of millions of euros and employ around 100 people. Some of them are in telecommunications, e.g. the investments by Norway's Telenor in both Serbia and Montenegro, but there are also IT investments, such as the investment by Germany's Intertec in North Macedonia (EUR 35 million), the investment by China's Huawei in a data centre in Serbia (EUR 80 million), the investment by Croatia's Infobib in Bosnia and Herzegovina (EUR 60 million), etc.

7.2.1.2 Patent data analysis

One part of our patent analysis was the examination of overlaps with other technology areas. With the help of a technology network the largest technology areas and overlaps were identified for the period 2000–2020 (see [Figure 7.10](#); for total numbers see [Table C.7](#) in [Appendix C.4.1](#)). The larger the nodes, the more connections with other areas. The measure used to determine clusters is modularity. Here, nodes with strong connections to each other but few connections to others are grouped together. This enables the discovery of community structures. IT technologies are all to be found in section G (physics), and in addition the majority of technologies from patents of the WB economies can be found in subclass G06Q (data processing systems | G06 (computing; calculating; counting)). These subclasses are also the most frequently featured in the clusters (see [Table 7.4](#)). One level down, i.e. in the subgroups, G06Q10 (Administration; Management) clearly dominates, followed by G06Q50 (Systems/methods for specific business sectors) and G06Q20 (Payment architectures). The most IPR-protected cluster (orange) shows a strong connection to the classes H02J (Systems for supplying, distributing or storing electric energy | H02 Generation, conversion, or distribution of electric power) and H04L

Figure 7.7. Distribution of companies in IT by WB economies, in 2019



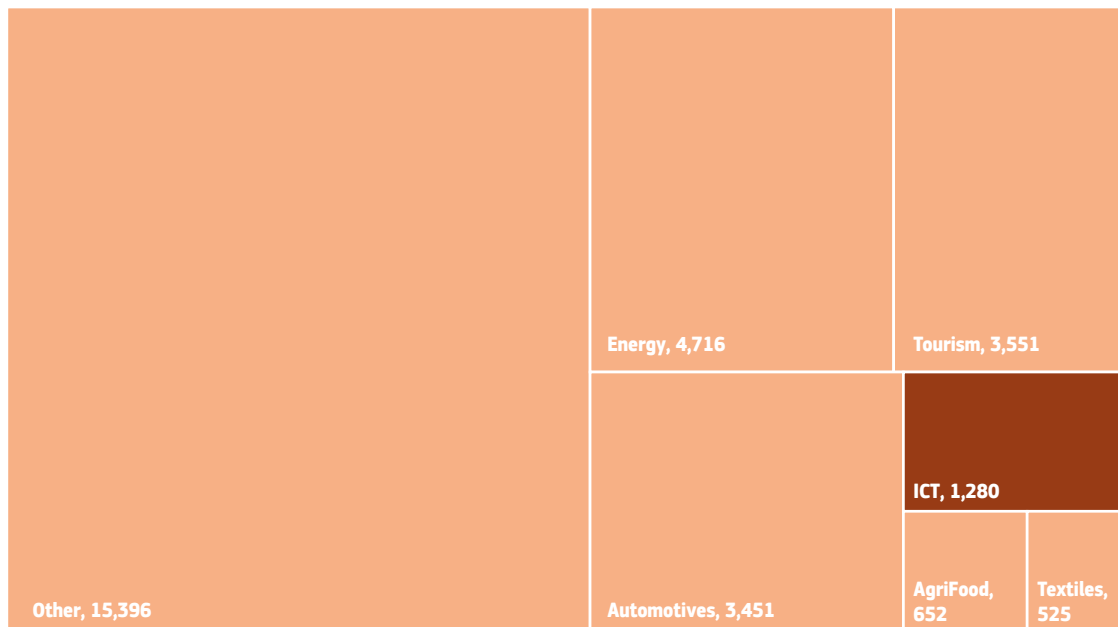
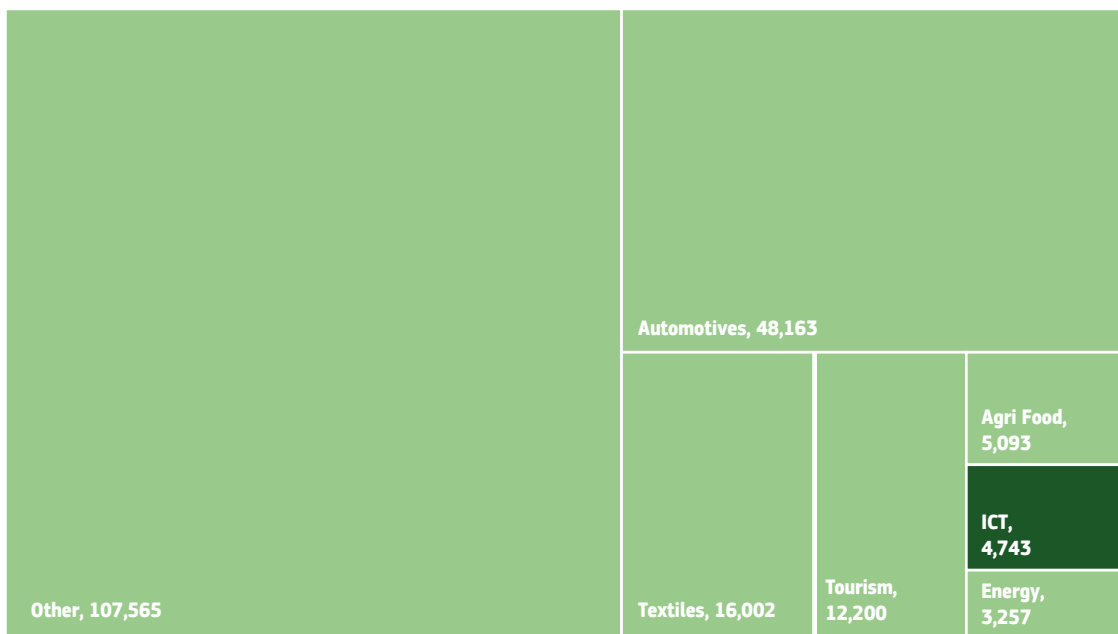
Sources: own calculations using data from Orbis (accessed May 2021).

Table 7.3. Overview of companies in the IT sector, 2019

Number of firms	Total assets (EUR)	Operating revenue/turnover (EUR)	Costs of employees (EUR)	Number of employees	Foreign owned
7,070	9,304,727,464	5,763,837,227	1,244,094,408	69,635	45%
Average assets per firm (EUR)	Average revenue per firm (EUR)	Average number of employees per firm	Average gross monthly salary (EUR)	Revenue per 1 EUR assets (EUR)	Revenue per worker (EUR)
1,316,086	815,253	10	1,488	0.62	82,772

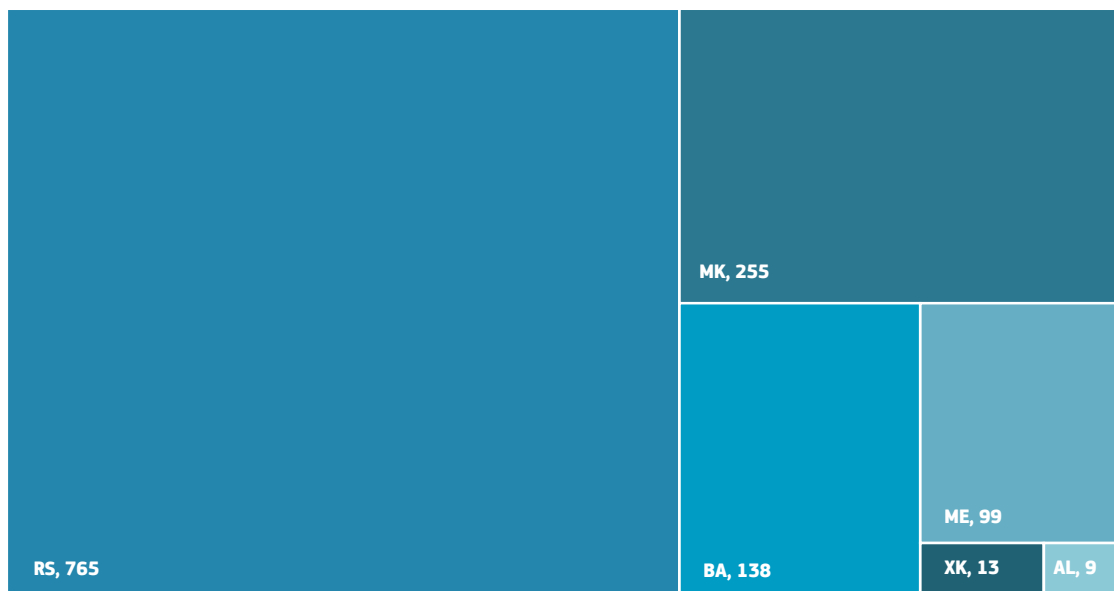
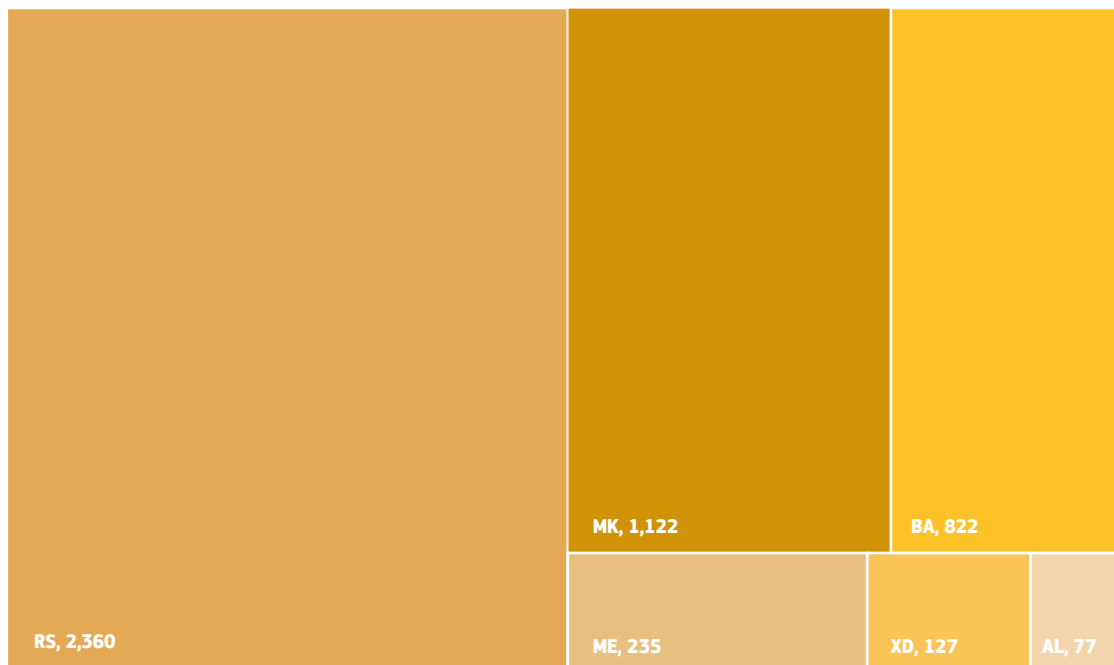
Source: own calculations using data from Orbis (accessed May 2021).

Figure 7.8. Share of IT projects in all fDi projects

Capital investment (EUR million)**Employment** (number of people)

Sources: fDI Markets database (accessed May 2021); own calculations.

Figure 7.9. Distribution of the IT projects by economies

Capital investment (EUR million)**Employment** (number of people)

Sources: *fDI Markets database (accessed May 2021); own calculations.*

(Transmission of digital information | H04 Electric communication techniques). The overall picture shows that almost all technological overlaps with other technological areas can be found within the subclasses H02 (Generation, conversion or distribution of electric power) and H04 (Electric communication technique).

7.2.1.3 Scientific and research publications

In the Scopus database the documents are grouped in thematic 'subject areas', which in turn are subdivided into different 'subject categories'. In order to conduct the analysis, publications in the subject categories 'Computer Networks and Communications', 'Information Systems' and 'Signal Processing' are examined. Worldwide, 1,735,222 documents are assigned to these three subject categories for the period 2008-2020. Of these, 0.5% are attributable to the WB economies. The most active country is Serbia with 5,178 documents, followed by Bosnia and Herzegovina with 1,656 publications, and North Macedonia with 1,170. The graph shows that the WB economies' share of the global scientific publication output is driven by the performance of Serbia. However, Bosnia and Herzegovina's surge in growth over the past three years is remarkable. Between 2011 and 2017 its publication output fluctuated at around 100 documents per year, but then it almost tripled. This is also reflected in the overall performance of the WB economies (see [Figure 7.11](#)).

The above analysis provides interesting findings and gives a holistic overview. However, the results are not yet meaningful enough, as absolute values are compared. Publications from Serbia, with around 7 million inhabitants, are weighted the same as publications from Montenegro with 620,000 inhabitants. Therefore, in the next step, we control for size effects and place the publications in relation to 100,000 inhabitants ([Figure 7.12](#)).

In 2008 the global publication output per 100,000 inhabitants (1.3) was a little higher than that of the WB economies (1.1), but this changed in the

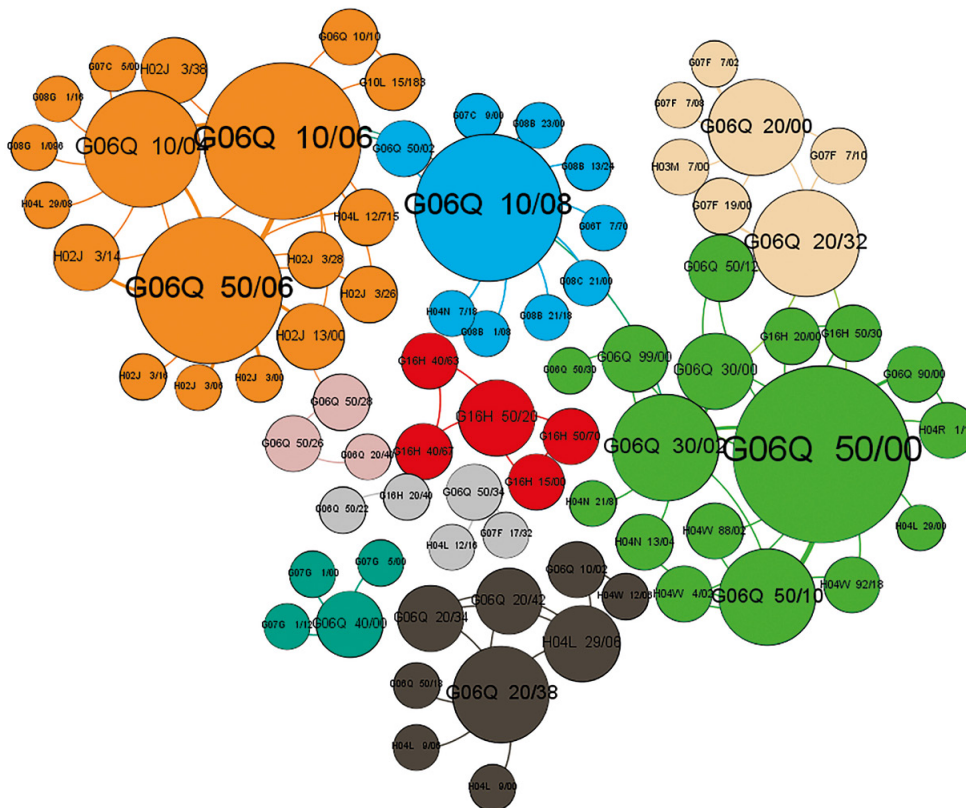
following years, as the per-capita output of the WB economies became higher than the global average. At the economy level, Montenegro recorded the highest output with 11.9 per 100,000 inhabitants in 2020.

The science map ([Figure 7.13](#)) shows the international cooperation network of the WB economies in the time span 2008-2020. The database consists of publications with the involvement of at least one WB economy. Each node represents one country, where the size reflects the number of publications in the respective country and the edges reflect the number of co-authored publications with another country. The location of a country on the map is determined by the attraction to its research partners and the repulsion from countries without joint publications. The different colours mark the affiliation to a 'narrower research cluster'.

The research network comprises 110 countries from around the world. The science map shows that the countries are grouped into three clusters. All the WB economies are part of the major cluster (red), as there are strong cooperation links between these actors. The strongest link can be observed between Serbia and the United States, with 236 common documents. It is worth noting that the top three partners of Albania are not part of the WB economies but are Japan, Spain and Austria.

On the meso level ([Figure 7.14](#)), the most active organisation is the University of Belgrade with a total of 1,439 publications listed by Scopus. The University of Novi Sad is ranked second, with 1,373 documents, and the SS Cyril and Methodius University comes third (738 documents).

Figure 7.10. Patent network in IT



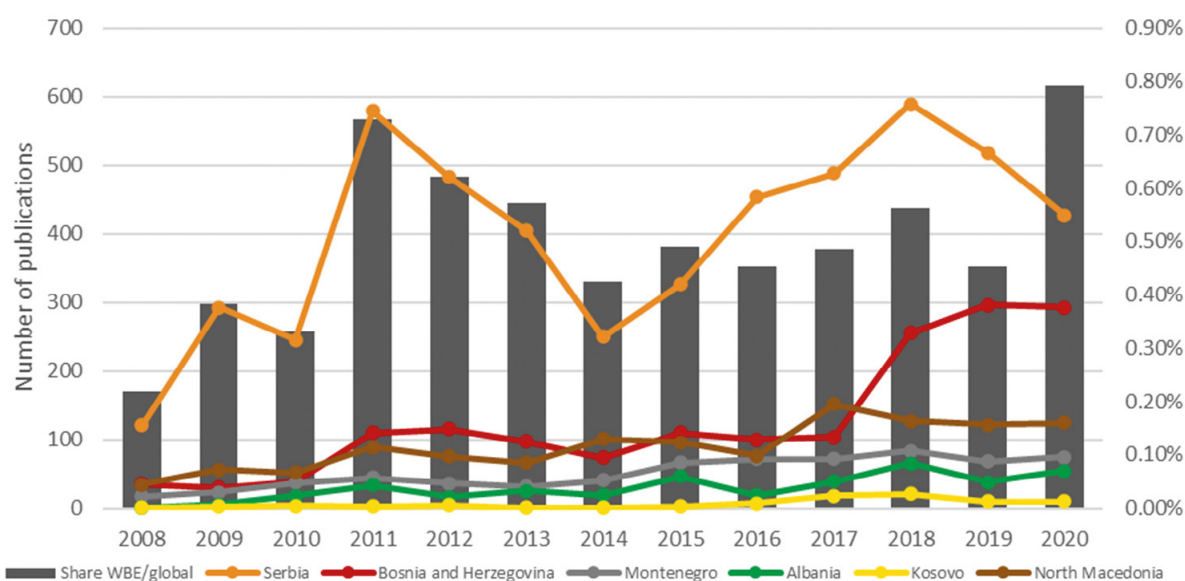
Sources: *Economica, 2020 (accessed March 2021).*

Table 7.4. Patent network – Most frequently featured subclasses IT

Subclass	Description	# Features
G06Q	Data processing systems or methods, specially adapted for administrative, commercial, financial, managerial, supervisory or forecasting purposes; systems or methods specially adapted for administrative, commercial, financial, managerial, supervisory or forecasting purposes, not otherwise provided for	27
H02J	Circuit arrangements or systems for supplying or distributing electric power; systems for storing electric energy	8
G16H	Healthcare informatics, i.e. information and communication technology [ICT] specially adapted for the handling or processing of medical or healthcare data	8
H04L	Transmission of digital information, e.g. telegraphic communication	7
G07F	Coin-freed or like apparatus	5

Source: *Economica, 2020 (accessed March 2021).*

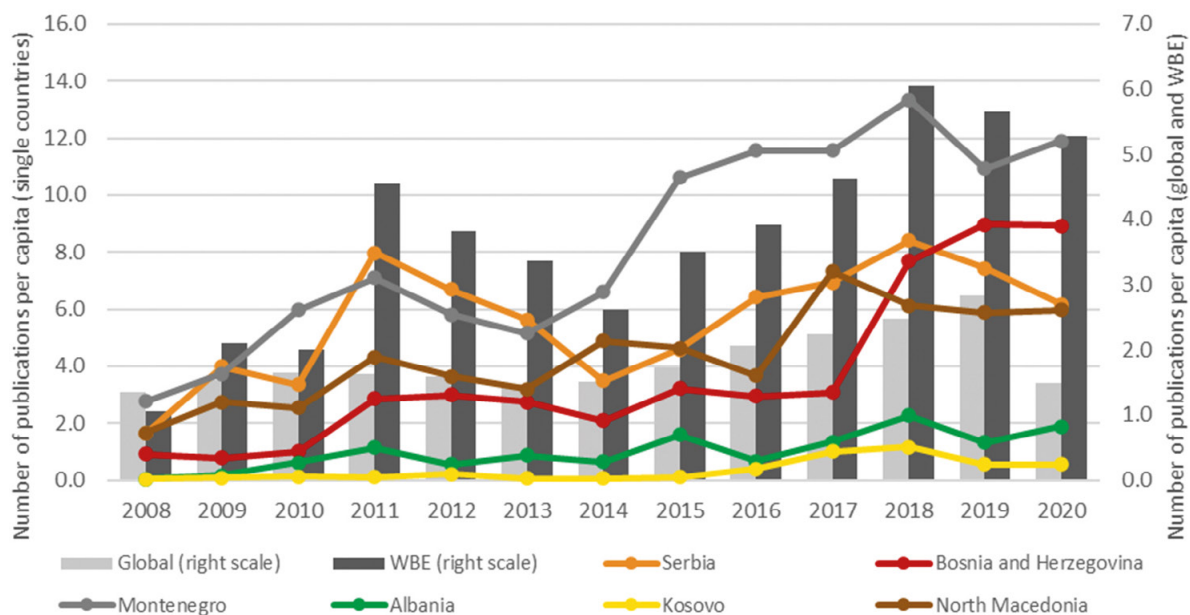
Figure 7.11. Scientific publications in IT, 2008-2020



Note: WBE denote Western Balkan economies

Sources: Scopus (accessed March 2021); own calculations.

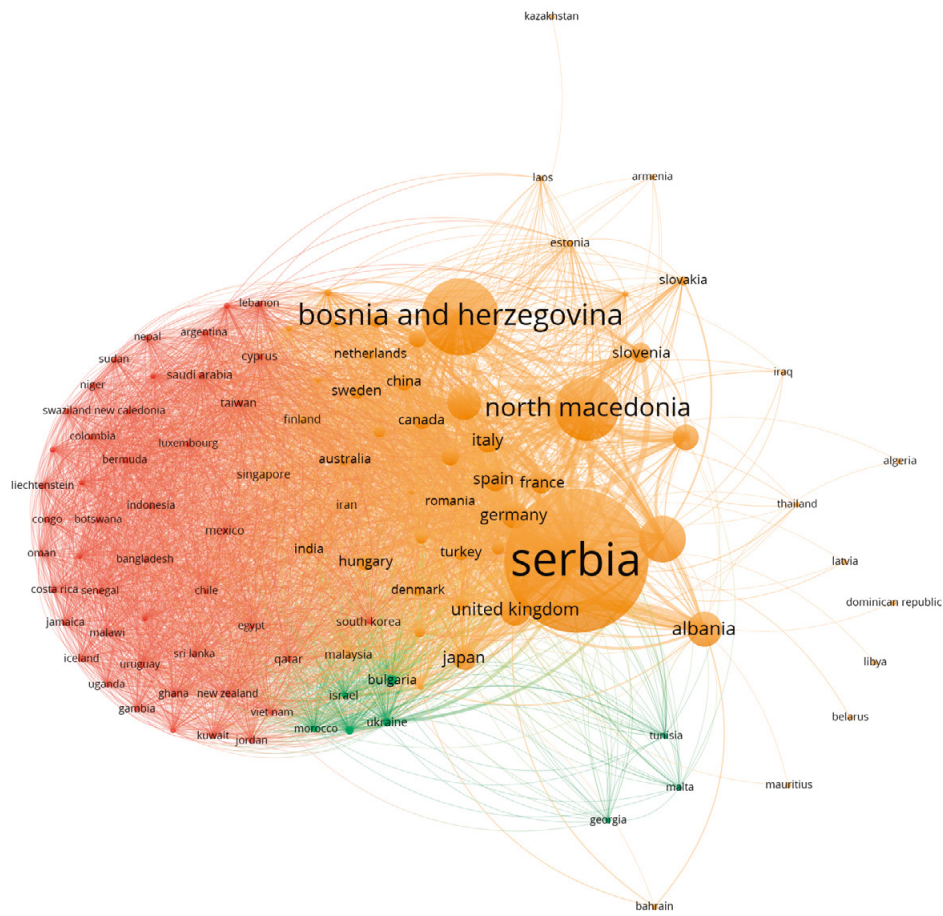
Figure 7.12. Scientific publications per capita in IT, 2008-2020



Note: WBE denote Western Balkan economies

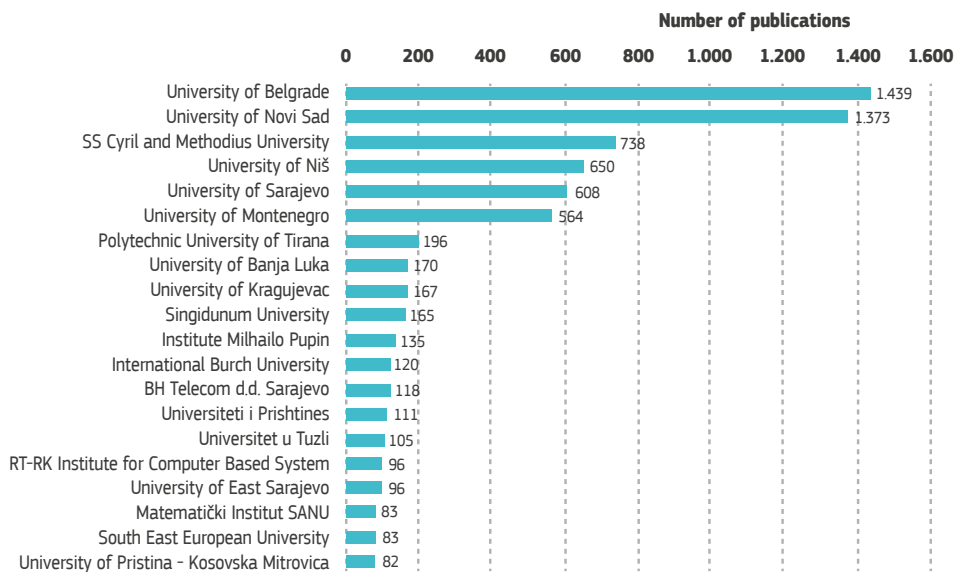
Sources: Scopus (accessed March 2021); own calculations.

Figure 7.13. Cooperation network WB economies in IT, 2008-2020



Note: Nodes = Number of documents; Edges = Number of co-authored publications.
 Sources: Scopus (accessed March 2021); own calculations.

Figure 7.14. Active organisations in IT, 2008-2020



Sources: Scopus (accessed March 2021); own calculations.

7.2.1 Determining

According to Eurostat, the IT sector is composed of the manufacturing and services sectors, whose main activity is linked to the development, production, commercialisation and intensive use of new technology. It includes IT manufacturing (IT hardware and IT software) and IT services. The IT sector is considered to be one of the keys to global economic growth contributing to technological progress and productivity growth.

The use of technology is rising in the WB region. In 2019 the level of internet access varied from 72% in Bosnia and Herzegovina to 93% in Kosovo, with a growing trend in all WB economies. According to data from Eurostat, the WB economies do not lag far behind the EU27 member states.

Although data on the percentage of people who use a computer show a rise in activity, they also reveal a widening gap between the WB economies and the EU27 Member States. These datasets are incomplete and entirely missing for Albania and Bosnia and Herzegovina.

While data on the level of internet and computer use are rising, data on the percentage of the IT sector as a share of GDP show a slight decrease for economies with data availability. Nevertheless, we can say that the market was stagnant for local actors included in the global value chain of the IT industry in previous years. Since data for the EU27 are not available for this indicator, we have used data for Croatia and Slovenia to offer a comparison with the WB economies. The data patterns are comparable in the WB economies and the nations picked for comparison from the region.

7.2.1 Decomposing

7.2.1.1 Overview

Through interviews and surveys we identified 68 companies with the potential to participate in our research. We chose the top 50 companies in the region based on the value of their total assets in 2019. We complemented this list in consultation with regional chambers of commerce, which pro-

Table 7.5. Households – level of internet access (percentage of individuals)

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
EU 27	72	75	77	80	81	84	86	88	90	91
ME	n/a	55	n/a	n/a	n/a	n/a	71	72	74	80
MK	n/a	58	65	68	69	75	74	79	82	n/a
AL	n/a	n/a	n/a	n/a	n/a	n/a	n/a	84	85	n/a
RS	n/a	n/a	n/a	n/a	64	n/a	68	73	80	81
BA	n/a	n/a	n/a	n/a	n/a	n/a	n/a	69	72	73
XK*	n/a	n/a	n/a	n/a	n/a	n/a	89	93	93	96

Note: n/a = not available.

Source: Eurostat (accessed March 2021).

Table 7.6. Individuals - computer use, % of individuals

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2017
EU 27	63	66	68	71	73	74	76	77	79	80
ME	n/a	n/a	n/a	n/a	n/a	62	n/a	n/a	n/a	64
MK	n/a	54	58	58	n/a	62	67	69	72	71
AL	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
RS	44	n/a	52	n/a	n/a	n/a	n/a	n/a	68	69
BA	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
XK*	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	50

Note: n/a = not available.

Source: Eurostat (accessed March 2021).

vided us with the details of additional companies with the potential to participate in our research. We conducted two interviews and received nine completed surveys, including from companies in Serbia, Macedonia and Bosnia and Herzegovina. In addition, we conducted two interviews with representatives from support organisations and two interviews with representatives from the research community.

The IT sector is dominated by large telecommunications companies, two of which completed our survey. Most of the companies from the IT sector which participated in our research develop different software solutions, ranging from ERP business software, cloud solutions, e-commerce and workforce management to specialised software for radiography support systems, character rigging, 3D/4D scanning, food safety etc. The economy-based representation of IT value chain is given in [Box 7.1](#).

7.2.1.2 Value-added dynamics in the GVC, identifying types of linkages and relationships between different actors in the GVC

In the IT sector the GVC has a simpler structure because of the very nature of the industry. Value chains in the IT sector can take different forms, depending on whether they include production or service activities. For the IT production activities in the GVC, early stages of development include R&D&I and product design, followed by manufacturing and assembling activities, while distribution, sales and marketing of the product come at a later stage. The chains for IT service activities are shorter: they start with the design stage, which is followed by the development phase and ends with distribution, sales and marketing. Here, different actors can operate along the value chain or even in the same phases of development, where several companies are involved in a range of activities along the value chain. In both cases, the final products are developed for/sold to commercial retailers or other companies. IT service activities are

Table 7.7. The share of the IT sector in GDP in %

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
CRO – total	4.09	4.61	4.04	3.9	4.11	4.08	4.2	4.23	4.38	4.45
IT manufacturing	0.25	0.21	0.17	0.11	0.36	0.37	0.42	0.41	0.41	0.38
IT services	3.84	4.4	3.87	3.79	3.75	3.71	3.79	3.81	3.97	4.07
SLO – total	n/a	3.5	3.47	3.55	3.56	3.59	3.6	3.59	3.67	3.59
IT manufacturing	n/a	0.37	0.35	0.31	0.31	0.32	0.36	0.36	0.34	0.38
IT services	2.85	3.13	3.12	3.24	3.26	3.26	3.25	3.24	3.33	3.21
MK – total	n/a	n/a	4.16	4.12	3.55	3.26	3.26	3.4	n/a	n/a
IT manufacturing	n/a	n/a	0.08	0.04	0.1	0.11	0.11	n/a	n/a	n/a
IT services	n/a	n/a	4.08	4.08	3.45	3.15	3.15	n/a	n/a	n/a
SER- total	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	4.42	n/a
IT manufacturing	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.22	n/a
IT services	n/a	n/a	n/a	n/a	n/a	n/a	n/a	4.13	4.2	n/a
BA – total	n/a	n/a	n/a	n/a	n/a	4.98	4.75	4.54	n/a	n/a
IT manufacturing	n/a	n/a	n/a	n/a	n/a	0.03	0.06	0.06	n/a	n/a
IT services	n/a	n/a	n/a	n/a	n/a	4.94	4.69	4.48	4.15	n/a

Note: n/a = not available.

Source: Eurostat (accessed March 2021).

more prevalent in the WB region. Here, local companies are outsourcing or supplying large foreign companies (usually also IT companies), while software solutions that are entirely locally developed supply end-users in the global market while still retaining a relatively modest share. Nevertheless, there are good examples of companies such as Nordeus, Vega-IT, Comtrade and others that have managed to position their products and solutions worldwide. Also, some large multinational companies have opened their development centres in Serbia (e.g. Microsoft). Most of the IT sector in the WB region is still based on a number of small companies, entrepreneurs and freelancers are not included in the GVC. The export-oriented part of the IT sector in the region has clearly defined its roles and positions, as we discovered in our interviews with the representatives of the support and research organisations in the region.

Two surveyed companies from the telecommunications sector claim that they are not integrated into global value chains, as they are not a part of a network of companies headed by the mother firm. Two surveyed companies, both providing IT

services, are already integrated into global value chain. Our survey findings show that they are large in size, have started doing business at the beginning of 2000s and are completely export-oriented. Other surveyed companies not integrated into global value chain have similar characteristics. They are in business for more than 20 years, medium-sized to large by size all export-oriented to certain extent, ranging from 10% up to 100%, with an average of over 40%³².

Surveyed companies operating in the IT sector rated regional cooperation as good. However, we managed to identify only one regional value chain in our research. From interviews with representatives of support and research institutions we concluded that the level of regional cooperation in the IT sector is not satisfactory and that it could be improved. According to respondents, this could be achieved through more active cooperation, while

(32) Methodological aspects of the survey and interviews including the questionnaire are reported in Appendix Section E.

Box 7.1. Economy-based representation of the IT value chain

Although the IT sector in the WB region boasts promising digital ecosystems that are well on their way towards creating significant economic growth opportunities, they need in many cases investment and support. However, currently each economy has its own operating environment, level and pace of development and different specificities. Despite its small share in software development, Albania has room for growth. In Montenegro, the strongest part of the IT sector is the communications sector, mostly owing to foreign investment by the telecoms operators. Software engineering has recently experienced development in the sector. Hardware is the largest segment of the IT market in North Macedonia, accounting for 55%, followed by IT services with 30% and software with 15% (see <https://investnorthmacedonia.gov.mk/invest-ict/>). The IT sector in Kosovo is based on outsourcing, while demand for local digital products and services lags. Serbia has the most developed IT sector, which is also dominated by outsourcing. However, the number of companies developing local software solutions is growing, as is the number of large multinational companies that have opened R&D centres in Serbia.

the roles of the business support organisations could officially be recognised to allow them to operate as efficient sectoral organisations with the capacity to establish and enhance such cooperation. The financial support of the local authorities and EU funds could also be enhanced.

Surveyed companies participating in the GVC operate either as local subcontractors assembling a final product or as developers of software solutions, mostly for companies from EU Member States or the regional economies, or as subsidiaries of a transnational corporation, where the majority stake is owned by the corporation. Our research results point to the different roles of the companies in the GVC. The intensity of cooperation and their roles are determined by the nature of their activities and their position in relation to the mother company. The role of foreign-owned companies is related to the technological development of products and services. The local company plays a major role in assembling, producing and developing custom-made solutions.

The IT industry has a strong business community in the region, and support organisations play an important role. We have identified over 10 nationally representative clusters and several other forms of business support organisations. Surveyed companies are mostly members of associations, clusters or business networks. Business support organisations in the IT sector bring together players from the triple helix (business, research, public administration) to contribute to the activities related to the development of the sector and the Digital Agenda for WB economies. In our interviews with the representatives of the support institutions we discovered that over the past decade the support sector for the IT community has been growing and is constantly contributing to raising awareness of the development and importance of the IT industry for the WB region's economy and society. Local support organisations represent between 10 and 100 companies and institutions. Support organisations play an important role in the GVCs through increasing the visibility of local companies and connecting them with foreign partners. At the same time, some of the business support or-

ganisations are part of a network of organisations that support the further development of digital technologies. *Box 7.2* presents several examples of cluster cooperation in Serbia's IT sector.

The position of the surveyed companies in the GVC and their share in the total value added is perceived as rather strong. According to estimates from our respondents, their share in the total value of the GVC ranges from a medium share (between 5% and 15%) to a large share of more than 15%. However, as the sample is small, it was determined through additional research and interviews with representatives of supporting actors that a significant number of companies do not make sufficient use of the available capacity and potential. These companies are mostly outsourced by large foreign companies. Instead of using their own capacities to develop innovative products and solutions, they supply foreign companies in accordance with their requirements.

In recent years the position of the surveyed companies has been upgraded in the GVC, and while they are planning to increase their level of participation, they are satisfied with their progress along the GVC.

Surveyed companies have identified users of product/services (commercial retailers, buyers), other companies and research/higher education institutions as the most important actors in their local value chain. Most of their products are tailor-made for the final users of their services (companies or commercial retailers) or for their mother company. They consider research institutions as important actors in the value chain and cooperate with them on the national level. Some of the companies participating in the research stated that they were not satisfied with the educational programmes offered to IT experts and that they were forced to establish their own higher-education institutions. Cooperation with research/higher education institutions includes the improvement of existing and the development and design of new products/services, but also paid internships for the best students. The level of cooperation between major GVC actors is rated as excellent.

Currently, respondent companies consider that there is room for improving their position in the GVC, and their future plans include scaling up their operations along the GVC. However, they see the following as key bottlenecks in the GVC:

- non-harmonised education programmes,
- lack of skilled workers,
- brain drain – most competent workers move away,

- capacities, and
- insufficient flow of information.

Bottlenecks and barriers related to employment characterise all WB economies. For the surveyed companies, lack of capacity is the limiting factor regarding the further delivery of services along the value chain. This problem is interconnected with the problem of availability of skilled workers, as the industry is dependent on the quality of its employees.

Box 7.2. Cluster cooperation in the IT sector in Serbia

Serbian ICT clusters

In 2012 Serbian clusters officially signed a memorandum of understanding (MoU) to become strategic partners with the aim of cooperating in areas of mutual interest, such as lobbying, education and the branding and positioning of the ICT industry on national and international markets. The members of the network are Vojvodina ICT Cluster (VOICT), the ICT Network, Niš Cluste of Advanced Technologies (NiCAT) and ICT Cluster of Central Serbia (ICT CS).

The **Vojvodina ICT Cluster – VOICT** provides a single point of contact for the leading companies in Serbia with a total workforce of 3,500 experienced ICT professionals. The VOICT cluster is a business association founded through a bottom-up initiative of ICT companies and several supporting institutions. It is a fast-growing organisation, whose membership consists of about 30 companies and 11 institutions. Over 90% of these members' businesses are connected to foreign markets – the EU, North America and the Middle East.

The companies in this cluster have experienced strong growth in recent years, despite the global recession. In general, Serbian ICT companies have made a noticeable breakthrough on world markets, putting the country on the map as an interesting alternative location for the development of sophisticated software. The Vojvodina ICT cluster gives institutional support to this trend by mobilising players from business, education and government. (Source: <https://vojvodinaictcluster.org/about-us/>)

The ICT Network is an association of companies, individuals and academic and research institutions devoted to the development of the ICT sector in Serbia. It provides its members with a variety of opportunities, helping them to build greater visibility while keeping their business operations cost- and time-effective. It supports more than 30 companies and other organisations. (Source: <https://www.ict-net.com/language/en/about-ict-net/>)

Along with this, they identified the following factors that constrain their activities in the GVC:

- complicated customs procedures,
- tariffs and trade regulations,
- political stability (domestic),
- security and safety,
- technical facilities for compliance with standards,
- transparency in rules and regulations, and
- unfair competition from companies with lower quality standards.

Improvements in the IT sector can be achieved through strengthening the capacity of companies in the areas of business skills, development and research. Along the global value chain of the IT industry major upgrades include improving the outsourcing of the business model in the direction of development for the end client (custom software development) and strengthening the ecosystem of support to entrepreneurship in all its elements.

7.2.1.3 Labour issues

The educational attainment of a typical worker employed in all respondents' companies is a college/ university education. Surveyed companies typically employ professionals (including science and engineering professionals, IT professionals, etc.), with the following skills:

- communication, collaboration and creativity,
- assisting and caring,
- information skills,
- working with computers,
- management skills, and
- working with machinery and specialised equipment.

Another important characteristic of educated professionals in the IT industry is the freelancing concept. The popularity of this model has been rising in all WB economies. Particularly young professionals prefer this type of short-term engagement

over permanent employment in companies or institutions. It seems like a convenient solution but has its own drawbacks as far as the national tax systems are concerned.

Employees have contributed the most to the development of the IT sector in the region, reflecting primarily the competitive prices and the quality of the workers. The salaries of employees in the IT sector in the region are still far lower than in developed economies in Western Europe or North America. However, cheap labour in this sector is not enough to attract further investments: employees must have skills and knowledge and deliver quality services. Companies participating in our research consider that the country in which they are located provides only partially enough of the occupations and skills they require.

Currently, one of the major problems in the region is the lack of staff as a result of inadequate educational programmes. All the governments of the WB economies identified the problem of higher education in IT as one of the major limiting factors to increasing the competitiveness of the local IT markets and engaging in the global market for digital products and services. One essential challenge, and the biggest limitation in the further development of IT companies, is the unavailability of staff, both in terms of quantity and of quality. Therefore, enabling constant access to staff is a huge competitive advantage for those companies that have the people they need.

In our interviews with the representatives of the research and academic community we found evidence that universities are increasing the number of enrolled students and developing new IT programmes. At the same time universities in the region are strengthening their own capacities (these patterns are most evident in Serbia and North Macedonia). Although many academic institutions in the region provide education for students in the field of IT, we did not gain the impression that there is significant competition between them, nor a high level of cooperation.

However, practices at universities differ. While some offer practical experience in addition to

theoretical knowledge, certain study programmes do not satisfy the needs of the companies sufficiently, i.e. students are largely engaged in theory, without reference to its practical application. We discovered such claims during our interviews with companies, but also with representatives of research and academic institutions. In particular, it is necessary to improve the quality of teaching at higher education institutions. The solution may be to strengthen the capacity of educational institutions, both for the formal and the informal education of IT staff. In certain WB economies there is a general perception that public-sector jobs are more desirable and young people are not taught the skills required for a career in technology, while technology is not promoted as a career path within formal education.

University curricula and procedures differ widely between the WB economies, and as a result several of them still lack a high level of engagement between universities and the business sector. This creates a problem, because a formal education does not provide the skills that IT companies need, which forces them to invest time and money into training staff before they are job-ready. Generally, cooperation between universities and the private sector can be seen as sporadic, with a low level of knowledge transfer. Companies contact academic institutions in their search for new talents and employees, internships, scholarships, etc. As we found out from interviews, additional cooperation is possible in all kinds of programming and app development (desktop, web, mobile), blockchain technology and game development, and also in the domain of artificial intelligence (AI). However, as mentioned before, this kind of cooperation is rather sporadic in the region and varies among institutions. Although formal cooperation between academia and companies is at a low level, informal contacts for individual initiatives do exist between universities and research staff and IT companies. In our interviews with representatives from the research and academic community we gathered that the level of cooperation with business is growing. In addition to cooperation with domestic companies, there are also companies from EU

Member States. Students are engaged in practice, but also to support joint software projects. Nevertheless, there are some excellent examples in the region, such as the Faculty of Technical Sciences in Novi Sad, Serbia, with more than 100 spin-off companies.

Despite all the factors listed above the outlook is positive, because there is a tradition of education in the region, with good technical faculties where programmers are educated. The vast majority of students and graduates speak good English, and one Serbian university is listed in the Shanghai Ranking.

Another identified problem related to the IT sector is brain drain, where the most competent and skilled workers move away. Reasons for their departure include not only new business opportunities and higher earnings but also a better quality of life, a better political environment and improved public services. Patterns of this behaviour are present around the region. [Box 7.3](#) shows a promotional public policy example from the WB region to boost the IT industry.

Besides the lack of skilled workers, the surveyed companies consider wages and labour regulations to be a somewhat important labour constraint. Potential workers in all positions (junior and senior) are often unrealistic and demand high salaries and additional working conditions that are very different and are usually completely outside the scope of companies. The average salary in the sector across all six WB economies has been rising and is expected to increase further.

Box 7.3. North Macedonia is lowering income tax in the ICT industry

According to the **Work Plan of the Government of Northern Macedonia 2020-2024**, personal income tax in the IT industry will be incrementally reduced to 0% by 2023 as follows: 5% in 2021, 3% in 2022 and 0% in 2023.

The government is making efforts to lift annual growth to 4% by the end of its mandate in 2024, and part of these efforts will significantly affect the ICT sector as well. Through the change in the tax policy different conditions will apply to this sector. Specifically, for employees in the ICT sector the income tax should be reduced to zero by 2023. However, personal income tax in the IT industry in the North Macedonian stayed at the level of 10% in 2021.

(**Source:** Proposal for the 2020-2024 Operational programme of the Government of the Republic of North Macedonia,

https://vlada.mk/sites/default/files/dokumenti/programme_for_work_of_the_government_for_2020-2024.pdf)

CHAPTER

8



Chapter 8. Impact of megatrends on selected GVCs

This chapter addresses the implications emerging from several megatrends that are important for the economies of the Western Balkans in general and for the evolution of the six chosen value chains in particular. More precisely, it tries to address the following issues:

- What are the likely evolutionary paths of the several megatrends that are important for the WB economies?
- What are the challenges and opportunities that are likely to ensue from these developments for the chosen value chains?
- How can the WB economies respond to these challenges and opportunities in a proactive manner to improve their potential for value-chain integration and competitiveness?
- The analytical process is based on the PESTLE framework, which discusses six key factors: political, economic, social, technological, legal and environmental. The analysis consists of three parts.
 - First, a framework for analysing change based on the notion of global megatrends – with the added perspective of the COVID-19 pandemic – is constructed and thematic areas sketched out and linked to current EU policy efforts aimed at the Western Balkans.
 - Second, a SWOT analysis is performed for each sector to show the challenges and opportunities for a) maintaining the current positioning and b) upgrading the current positioning of selected value chains.
 - Finally, a discussion of policy responses is presented with a focus on recalibrating Smart Specialisation Strategies and improving the EU's investment and promotion strategy.

The identification of six PESTLE drivers that will shape the future environment of the identified sectors is done by screening the literature on global megatrends, defined as powerful trajectories of change and usually presented grouped into broad topics (Hajkowicz, 2015). Combining the PESTLE approach with an analysis of megatrends allows for an adaptable and current framework in which to assess future movements.

For this, a wide variety of literature is used, including reports by international organisations and firms and recent academic literature, including Oxfam (2020), McKinsey (2017), OECD (2016), EEA (2015), UNDP (2017) and Hajkowicz (2015). To account for the most recent economic impacts of the COVID-19 pandemic on the region, the latest reports from the Vienna Institute for International Economic Studies (wiiw) are used. In addition, wiiw's recent report on economic integration in the Western Balkans (Grieveson et al., 2020) provides inputs to assess the future of regional flows of trade and investment.

A preliminary mapping of global megatrends points to four key developments that will influence the evolution of global value chains (GVCs) in the region:³³

- The emergence of Industry 4.0: digitalisation and automation are reshaping the way in which business is done in GVCs, as well as their spatial distribution.
- Greening the economies: markets and EU legislation call for new business practices, regulation and increased environmental risks.
- The way in which the COVID-19 pandemic and the associated economic crisis are likely to un-

(33) In addition, the world in general is approaching a new era of geopolitical competition, and the Western Balkans are at the cross-section of economic and political interests between the EU, Russia and China and the shift of global economic power to the East. However, these general shifts seem to have no specific impact on value chains as such, and they are also very long-term. They will therefore need to be kept in mind as background to the more specific megatrends discussed in detail.

fold, and the short- and medium-term consequences.

- Migration from and to the Western Balkan economies and its impact on the economy, society and the chosen value chains.

These four megatrends are discussed in more detail in the subsequent chapters.

8.1 Digitalisation and automation

The WB economies are lagging behind the EU in the pace of their digital transformation. The gap is all-encompassing and evident in the level of available digital equipment and the skills of the population. As illustrated in *Figure 8.1*, there are significant differences in internet access, digital skills, the use of online shopping and the employment of digital equipment at work. Serbia is generally seen as the most advanced WB economy, and its ICT sector is the strongest in the region. Kosovo is shown to be an active user of e-commerce and is well connected to the World Wide Web, which may be attributable to its young population. In addition, companies in the WB are lagging behind in their utilisation of various digital technologies, from basic applications such as digital invoicing to more advanced functions, such as machine learning, big data analysis and the automation of various business operations. Furthermore, on average only 12% of firms in the WB economies have outlined their digital security policies (OECD, 2020). Kleibrink et al. (2018) calculate the share of ICT services in the total exports of services of the WB economies: Serbia is the leader with 35%, which is the same as the EU average, followed by North Macedonia (24%) and Kosovo (15%).

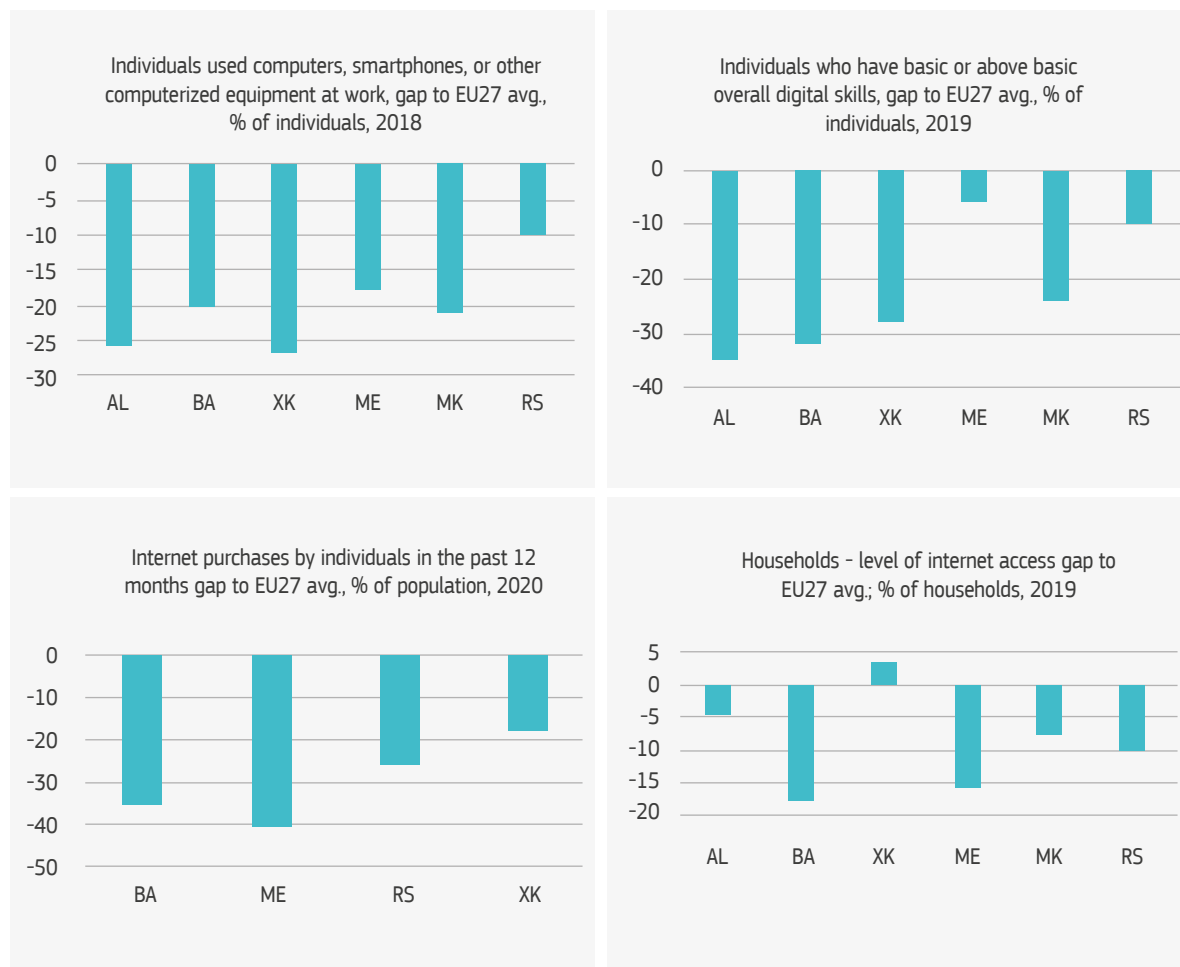
The COVID-19 pandemic has increased online traffic and put pressure on the resilience and availability of local broadband networks and digital services. Early developments, such as governmental projects to extend the reach of the internet in cooperation with the private sector (OECD, 2020), could be a sign that the crisis can act as an accelerator of digitalisation across the region.

Digitalisation drives, and is driven by, the increasing complexity and spatial distribution of GVCs. Boosting the speed and depth of digitalisation will be key for reaping economic and social benefits from digitalisation: making local firms more technologically advanced will enable faster GVC integration and possibly lead to them take over more complex tasks, such as R&D. Fostering digital skills and opening up more jobs for high-skilled workers will also reduce the outward migration of the highly educated. Failure to do so would place the WB economies in a considerably worse position when it comes to offering a competitive environment to international companies.

Digital transformation could impact the productivity of domestic firms, boost economic performance, increase the region's investment attractiveness, and speed up convergence with the EU (Barbić et al., 2018). The development of Industry 4.0 in manufacturing is crucially dependent on digitalisation. Importantly, digitalisation is not merely an end in itself but also provides solutions for dealing with other megatrends, such as the green transformation and the COVID-19 pandemic. The main risk factors for all GVCs are the slow uptake of digital solutions and being left behind in the global race for competitiveness and new markets. The state of digital equipment, such as computers, tablets, monitoring devices and networking devices, will be a key factor for attracting foreign direct investment. GVC integration can also be a driver for the uptake of digital solutions in companies.

The Digital Agenda for the Western Balkans was launched in 2018 by the six WB economies and the European Commission. As part of its programme, it features EUR 30 million of grants for investing in broadband connectivity, capacity-building programmes for digital security, supporting the deployment of e-government initiatives, setting up new research facilities, and integrating local researchers and engineers into the digital European Research Area. The Economic and Investment Plan for the Western Balkans envisions a substantial investment package to finance digital infrastructure and recommends the alignment of

Figure 8.1. Digital skills gap in the WB economies compared with the EU27 average



Sources: Eurostat; own calculations.

the WB economies with the EU's digital strategy.³⁴ Significant progress can still be made on issues such as adopting the EU legislation pertaining to the digital economy, aligning with the EU Digital Market and harmonising standards regarding data protection, privacy and consumer protection.

The Smart Specialisation Strategies of Montenegro and Serbia identify digitalisation as one of the priority domains. The strategic priority of digitalisation goes beyond developing domestic ICT

sectors and acts as a vertical tool for developing other priority areas, such as a low-carbon and resource-efficient economic model.

Regional initiatives – such as the elimination of roaming costs, the establishment of a regional e-market and the Balkans Digital Highway initiative, co-financed by the EU Western Balkans Investment Framework – are designed to combine digitalisation and regional integration by improving access to high-speed broadband services nationally and regionally, and advancing infrastructure-sharing opportunities in the region.

The development of the ICT sector correlates with the development of other sectors of the econo-

(34) European Commission Communication on 'Shaping Europe's Digital Future' (COM (2020)67 final).

my (Kleibrink et al., 2018). In the Western Balkans the ICT sector has the opportunity to supply the projects and services for their digital transformation. In Serbia, the manufacturing industry was the largest buyer of IT services in 2018 with EUR 68 million, followed by trade and tourism (EUR 43 million), energy and other utility companies (EUR 42 million) and agriculture and mining with only EUR 2.2 million (Matijević and Solaja, 2020).

All GVCs have to some extent already adopted digitalisation, if only through the use of computers. However, progress is uneven. To compete in the global economy, the uptake of cutting-edge technologies, such as the Internet of Things (IoT), artificial intelligence (AI) and big data analysis will be key.

Agriculture in the Western Balkans is characterised by a low level of technology, which is preventing the sector's much-needed modernisation. A considerable amount of financial and investment-related efforts will be needed to modernise the sector, which will be essential if the region wants to compete and collaborate with technologically advanced producers in the EU. In the tourism sector the benefits of digitalisation exceed simple engagements with online marketing and booking systems. It can result in greater turnover, products that are better aligned with the wishes of customers, and an overall adaptation to the needs of modern tourists. At the same time, small and fractured providers of tourism services are less well equipped to utilise advanced digital strategies than multinational chains and will require additional assistance from governments to reach tourists looking for more authentic experiences. For all manufacturing industries, including the automotive sector and textiles, the next generation of technologies is a prerequisite to take on more complex tasks within value chains and offer higher value-added products. The energy sector is split between less innovative public companies, which rely on monopolistic positions, and a minority of more internationally connected firms. For both, the key requirement is the modernisation of equipment and the installation of systems to monitor and optimise the supply of

energy. Improving efficiency and preventing losses during distribution through technological upgrades is especially important for coal-fired power plants, which are likely to evade closure longer than their EU-based counterparts. The switch to renewables will likewise require advanced solutions to develop smart grids and connect energy production from different sources. This is important, because with the exception of Albania the Western Balkans will need to develop a mix of renewables to satisfy the rising demand for energy.

Table 8.1. Challenges for GVC integration in the WB, emerging from digitalisation and automation, in a PESTLE framework

PESTLE aspect	Short term	Long term
Political	<ul style="list-style-type: none"> ■ Fragmented levels of digital competence in the public sector ■ Slow rollout of tenders for procuring digital equipment, investing in infrastructure 	<ul style="list-style-type: none"> ■ Digital space becomes an area for (geo)political competition ■ Low investment in security can be exploited by foreign actors ■ Government attempt to curtail digital freedoms, limit opposition voices, resulting in a chilling effect
Economic	<ul style="list-style-type: none"> ■ Low productivity due to low uptake of digital solutions ■ Not enough intersectoral collaboration for innovative projects ■ Too little founding capital for digital start-ups ■ Barriers for e-commerce/ digital economy 	<ul style="list-style-type: none"> ■ Slowing of GVC integration due to slow adoption of new technologies ■ Underdeveloped systems of alternative finance ■ Poor awareness of available funds and opportunities for international collaboration
Social	<ul style="list-style-type: none"> ■ Lack of digital skills among the population ■ Inadequate digital curricula in the education vertical 	<ul style="list-style-type: none"> ■ Brain drain – outflow of ICT experts ■ Low demand for ICT products and services
Technological	<ul style="list-style-type: none"> ■ Low willingness of companies to innovate, invest in digital technology ■ Obsolete equipment in households and companies ■ Broadband infrastructure is lacking; internet access is limited in some places ■ Slow granting of permits limits development of digital infrastructure 	<ul style="list-style-type: none"> ■ Slow rollout of digitalisation threatens the opportunity to leapfrog to upcoming wave of technologies (quantum computing, advanced biotechnology, advanced artificial intelligence, etc.)
Legal	<ul style="list-style-type: none"> ■ Labour market regulation prevents new types of labour contacts used in the digital economy ■ Taxation legislation not adapted to digital economy ■ Legal barriers to regional e-commerce 	<ul style="list-style-type: none"> ■ Legislation codifies problematic use of digital technologies (to curb privacy, criticism, etc.)
Environmental	<ul style="list-style-type: none"> ■ Slow adoption of digital technology limits the operating space for increasing environmental efficiency through optimisation, monitoring, innovation 	<ul style="list-style-type: none"> ■ Digitalisation contributes to rebound effect – efficiency gains overpowered by increasing absolute size of negative environmental damage due to increased production and consumption ■ Increased energy consumption and environmental costs of producing hardware components used

Table 8.2. Opportunities for GVC integration in the WB, emerging from digitalisation and automation, in a PESTLE framework

PESTLE aspect	Short term	Long term
Political	<ul style="list-style-type: none"> Regional integration based on establishing a common e-market, removing barriers 	<ul style="list-style-type: none"> E-governance enables more efficient civil service (for example, Serbia has already made considerable progress)
Economic	<ul style="list-style-type: none"> Investment in digitalisation drives GVC integration Integration in the EU Digital Single Market opens up new business opportunities Improving productivity through digital equipment/ optimisation of processes Boosting investment attractiveness 	<ul style="list-style-type: none"> Establishment of R&D operations within GVCs (Serbia is leading) Establishment of a regional e-market: allow local online businesses to realise economies of scale Faster convergence with the EU
Social	<ul style="list-style-type: none"> Jobs for high-skilled workers, entrepreneurs Digital skills and equipment open up alternative opportunities for employment/ education 	<ul style="list-style-type: none"> Decreased brain drain through job opportunities in the digital sphere Involvement of ICT experts and entrepreneurs from the diaspora Reduction of inequalities through investing in digital skills Retraining with a focus on digital skills can reduce unemployment
Technological	<ul style="list-style-type: none"> Using funds from the WB Investment Framework and Economic and Investment Plan to improve digital infrastructure, the level of access and equipment in companies Allowing for a large-scale modernisation: high-speed internet, equipment, smart solutions, etc. 	<ul style="list-style-type: none"> Enabling the emergence of Industry 4.0
Legal	<ul style="list-style-type: none"> Harmonisation with EU legislation Improvement of regulation for e-commerce Standards on data privacy, consumer protection 	<ul style="list-style-type: none"> A more efficient legal system Digitalisation can contribute to the fight against corruption
Environmental	<ul style="list-style-type: none"> Digitalisation supports and enables the green transformation, including decarbonisation of production, transport, building of renewables, improving energy efficiency of buildings and manufacturing Enables change in individual lifestyles – exchange of information, tracking of habits, consumption patterns, etc. Digital solutions can reduce environmental footprint of industries 	<ul style="list-style-type: none"> Sensors, big data analysis, IoT enable monitoring, tracking of weather patterns Prediction of extreme events enables adaptation to climate change

Table 8.3. Sectoral challenges for the WB emerging from digitalisation and automation in the selected value chains

Value chain	Challenges
Agri-food	<ul style="list-style-type: none"> ■ Lack of digital skills, particularly bad infrastructure in rural areas ■ Low technology transfers from R&D to businesses
Automotive	<ul style="list-style-type: none"> ■ Slow pace of digitalisation ■ Losing competitiveness to other regions
Textiles	<ul style="list-style-type: none"> ■ Slow pace of digitalisation ■ Losing competitiveness to other regions
Tourism	<ul style="list-style-type: none"> ■ Taking no further steps beyond online booking/website ■ Smaller providers lack resources/skills
ICT	<ul style="list-style-type: none"> ■ Losing out to foreign service providers ■ Few large companies (most are foreign-owned) ■ Weak domestic market ■ Large amount of financially weak micro-companies ■ Other countries overtake the region in building comparative advantages in ICT ■ Poor collaboration with the R&D sector ■ Limited soft business skills ■ Not enough ICT specialists and other qualified personnel, such as project managers ■ Inefficient systems for commercialising R&D output from universities ■ Reliance on simple outsourcing instead of taking on more complex tasks ■ Basic regulatory and legislation issues ('grey economy') ■ Lack of coordinated support from governments
Energy	<ul style="list-style-type: none"> ■ Low level of innovation in publicly owned companies, slow uptake of digital solutions ■ Inefficiencies due to low level of optimisation/not utilising all available tools result in distribution losses and higher emissions ■ Low investments in digital security could result in security issues

Table 8.4. Sectoral opportunities for the WB emerging from digitalisation and automation in the selected value chains

Value chain	Opportunities
Agri-food	<ul style="list-style-type: none"> ■ Improved efficiency, higher yield through solutions for raising productivity ■ Better monitoring of weather, water use, etc. ■ Using the internet and other technologies for promoting and selling products regionally ■ Digital tech enables structural change towards less labour-intensive, higher-yield production ■ Digital tech enables structural change towards more sustainable, organic production of food ■ Better competitiveness on the European market ■ Establishment of local food chains (following the Farm-to-Fork Strategy) ■ Increased resilience to changed weather patterns ■ Availability of skilled engineers and engineering schools ■ Competitiveness in light of a favourable price/quality ratio
Automotive	<ul style="list-style-type: none"> ■ Optimisation of production and logistics ■ Precondition for development of capacities to produce electric vehicles (EVs) ■ Enables development of local R&D capacities ■ Inclusion in Important Projects of Common European Interest (IPCEI) value chain for vehicles – cooperation in connected/ autonomous mobility ■ Production of advanced materials, IoT components, etc.
Textiles	<ul style="list-style-type: none"> ■ Improved productivity through automation of production and logistics ■ Enables individualisation of products/product lines
Tourism	<ul style="list-style-type: none"> ■ Reorientation of incoming tourists to less developed tourist regions, e.g. in Albania ■ Connectivity between different providers of tourist experiences ■ Easier customisation of holiday packages ■ Enables development of health tourism, especially in Montenegro ■ Enables decentralised provision of accommodation etc. ('scattered hotels model') ■ Enables more sustainable tourism on Adriatic islands
ICT	<ul style="list-style-type: none"> ■ Availability of a qualified workforce with decent English-speaking skills, especially in Serbia ■ Long-established reputation on the market ■ Competitiveness based on lower labour costs ■ Growing regional market for ICT products and services ■ Use and evolution of the outsourcing model with customers from the EU
Energy	<ul style="list-style-type: none"> ■ Prerequisite for development of renewables, planning of the energy transition ■ Improved efficiency of distribution of electricity ■ Development of smart grids ■ Enables greater energy efficiency in buildings through smart meters etc.

8.2 Climate change and greening

The EU aims to achieve a green transformation of its economy through promoting a carbon-neutral and resource-efficient economy, as outlined in the European Green Deal.³⁵ For the Western Balkans, this multi-layered and complex transformation presents both a great challenge and a necessity. Because of its slow uptake of environmental legislation and specific climate conditions the region is more vulnerable to the consequences of environmental change than the EU average. Moreover, it is less equipped to deal with mitigation and adaptation than the rest of Europe since it lacks financial, technological and human resources. As sustainability becomes a central concern of global value chains, which are increasingly adopting sustainability strategies and are facing pressure from governments and consumers to improve their environmental records (Ponte, 2019), the value chains in the Western Balkans will need to undergo a similar transition to avoid becoming stuck in carbon-intensive and polluting practices.

Climate change will have a more pronounced negative impact on the Western Balkans than on the global average. Simulations show an alarming rate of temperature increases from 1.2° C in the short term up to 4° C by the end of the century (Vuković and Mandić, 2018). Precipitation could increase in some areas, such as northern Serbia, and severely decrease in southern and coastal regions. Coupled with a tradition of bad water management, the WB economies could face strong droughts, heatwaves and dry seasons. Based on a vulnerability index developed by the UN Environment Programme (UNEP) and the Environment and Security Initiative (ENVSEC), Albania is the WB economy most vulnerable to climate change (Hughes, 2012). All economies also score below average in an index measuring adaptive capacity, with North Macedonia being the least prepared.³⁶

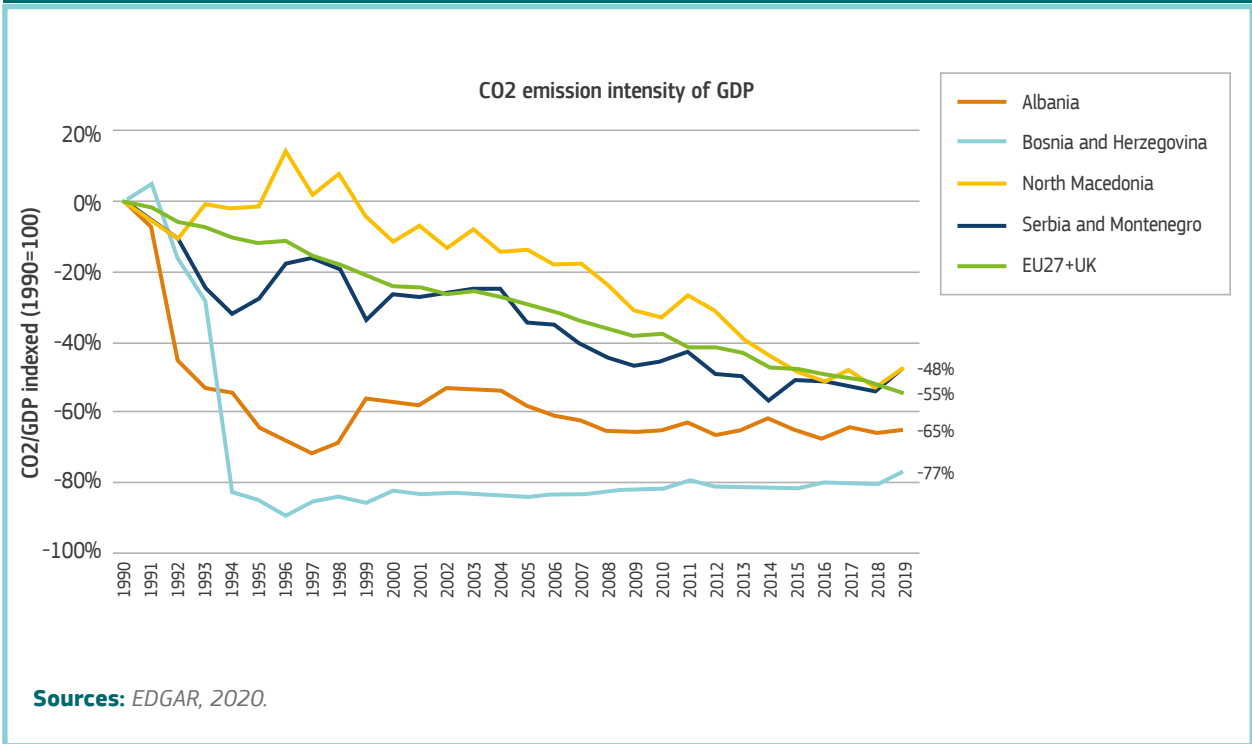
(35) See: https://ec.europa.eu/info/sites/info/files/european-green-deal-communication_en.pdf

(36) Adaptive capacity is determined by factors such as the strength of institutions, the resilience of the economic system, etc.

The WB region is far behind the EU in securing economic growth with a decreasing environmental impact. Driven by economic growth and changes in consumption patterns, CO₂ emissions per capita in the Western Balkans and the EU have been slowly converging, according to the Emissions Database for Global Atmospheric Research (EDGAR). Today, CO₂ emissions per capita in Serbia, Montenegro and Bosnia and Herzegovina surpass the EU average by a wide margin. *Figure 8.2* shows the changing CO₂ emissions intensity of economic growth (measured in GDP) between 1990 and 2019: Serbia, Montenegro and North Macedonia come close to the EU's average improvement in emissions intensity (48% and 55%, respectively), while Bosnia and Herzegovina and Albania surpass it by 10 and 22 percentage points, respectively. However, the emissions intensity in the Western Balkans is still 36% worse than the EU average because of the region's extensive use of lignite and also inefficient production processes and buildings. By far the largest contributor to greenhouse gas emissions is the energy sector, with 61.1%. Industrial emissions add another 10%, down from 17% in 1990. The WB economies are also performing worse in resource productivity (EUR 0.35/kg versus the EU average of EUR 2.07/kg). Inadequate waste management, and especially water resource management, are also highly problematic areas, which could increase business risks in the future (European Commission, 2020a). Despite these facts a survey conducted in the WB in 2019 revealed that only about 65% of the population considered climate change a threat, compared with 93% of EU citizens (Banja et al., 2020). For the chosen GVCs this presents a difficult path forward, where the need for rapid decarbonisation and improvements in environmental performance across the board is coupled with a low social valuation of the green transformation.

The adoption of EU legislation and standards is an important driver of change for local value chains. All WB economies except Kosovo have signed the Paris Agreement and are adopting the European environmental and climate acquis as part of the

Figure 8.2. CO2 emissions intensity of GDP for the WB



accession process. However, progress has been slow: by 2020 the WB economies had adopted an average of 27% of the climate acquis and about 60% of the legislation on large combustion plants and industrial emissions. The exception was Albania, which had adopted almost all of it (Banja et al., 2020).

The WB economies are – at least nominally – committed to reach the EU’s 2030 emissions reduction target and climate neutrality by 2050, and some of them have issued climate plans or referred to the green transformation in their Smart Specialisation Strategies (S3). For example, Montenegro’s Smart Specialisation Strategy introduces ‘Sustainable Montenegro’ as one of the three main strategic directions and leans heavily on improving resource efficiency. Four priority areas identified in the strategy include sustainable agriculture and food value chain; energy and sustainable environment; sustainable and health tourism; and ICT. Likewise, the Serbian Smart Specialisation Strategie

gy for 2020-2027³⁷ points to energy efficiency and environmental protection as key areas for action.

The Economic and Investment Plan for the Western Balkans (EIPWB),³⁸ adopted in October 2019, refers specifically to the need for the twin transitions in WB. The funding it foresees – EUR 9 billion through the Instrument for Pre-Accession Assistance (IPA-III) and another potential EUR 20 billion channelled through the proposed Western Balkans Guarantee Facility – will primarily be invested in the infrastructure needed for the green transformation. Clustered under the notion of ‘sustainable infrastructure’ are investments in energy production, modernising energy grids, transport infrastructure including ports, roads and railways, and waste management systems and other utilities.

(37) <https://pametnaspecijalizacija.mpn.gov.rs/wp-content/uploads/2020/09/Smart-Specialization-Strategy-of-the-RS-for-the-period-2020-to-2027.pdf>

(38) https://ec.europa.eu/commission/presscorner/detail/en/IP_20_1811

The Green Agenda for the Western Balkans³⁹ (GAWB) is part of the EIPWB and outlines the core areas of cooperation, including energy efficiency and the circular economy. It also outlines several existing European programmes that could be extended to the WB even before official membership status is attained. Among them is an instrument mimicking the Just Transition mechanism, designed specifically for the WB, which could help to finance the energy transition in areas dominated by lignite production. Extending the European Trading System to the WB would most likely include the energy sector and potentially also other individual installations with high energy use, e.g. in the textiles sector. The agenda specifically addresses the need for decarbonising the energy sector and envisions investments in clean energy.

The green transformation will require all-encompassing change. The costs of this transition could be substantial: a disproportionately large share of the population is employed in sectors that are especially vulnerable to climate change, namely agriculture and foods, forestry, tourism and other supporting activities. What is holding up progress is the lack of human and financial resources for dealing with the green transformation.

Among the selected value chains, two sectors stand out: first, agri-food, which is particularly vulnerable to environmental change, and second, energy, which plays a key role as a driver for lowering emissions and reaching the EU-mandated targets. Due to their importance, their potential future development is outlined in more detail in [Box 8.1](#) and [Box 8.2](#), respectively. The automotive industry may benefit from the push towards electric mobility and the EU's strategy to keep the production of vehicles and batteries in Europe. The value chain for clean and connected mobility, established under the Important Projects of Common European Interest,⁴⁰ represents a clear opportunity if collaboration can be secured.

For this to happen, the right kind of FDI must find its way into the region, or the existing plants must undergo a major transformation. The textile industry is a noticeably large user of water and will have to improve its resource-related footprint (e.g. sourcing of cotton), because consumers are pushing for more sustainably produced textiles. The ICT industry is an important enabler of the green transformation and is recognised as such in the Green Agenda for the Western Balkans, as well as in Smart Specialisation Strategies. Digital solutions and services needed for the green transformation include various types of software for monitoring and optimising energy and the stocks and flows of resources, smart meters for domestic use, integrated solutions for smart cities and online commerce, and tools that enable dematerialisation.

Overall, increased integration into European GVCs can be a driver of faster adoption of new technologies and contribute to the environmental efficiency of production.

(39) <https://eur-lex.europa.eu/legal-content/EN/TX-/?uri=CELEX%3A52020SC0223>

(40) See: <https://ec.europa.eu/docsroom/documents/37824>

Box 8.1. A closer look at the energy transition

Coal is of fundamental importance to the energy sectors of the Western Balkan economies and supplies 70% of all electricity. In some economies this share is even higher, with the exception of Albania, which relies heavily on hydropower. This structure of energy supplies leads to air pollution and high CO₂ emissions (European Commission, 2020a). Although the region has the potential to develop cost-efficient and renewable energy, its share is currently small, and the energy transition is slow. Due to the lack of regional integration in the energy sector, individual economies are planning unnecessary new installations. With new investments in fossil fuel plants being planned in all WB economies except Albania, the key question concerns the extent to which they will replace the existing, often obsolete installations (Milatović and Chung, 2020). One strategy, developed by the European Bank for Reconstruction and Development (EBRD), envisions the increased use of hydropower (although this meets with serious environmental concerns) and to some extent gas (CEE Bankwatch Network, 2018). However, there is potential to develop cost-efficient wind, solar and sustainable biomass solutions. Energy is also shaping up as one of the areas that are generating geopolitical competition in the Balkans. While the Western Balkans Investment Framework, the main investment vehicle of the EU, invests almost exclusively in renewable electricity, recent Chinese investments favour new fossil-fuel power plants (Grievesson et al., 2020).

Box 8.2. Agriculture's vulnerability to climate change

The need to make local agriculture and food processing more sustainable is clearly recognised in the Smart Specialisation Strategies (S3) of Serbia and Montenegro. As a result of climate change and the depletion of water resources the agricultural sector in the Western Balkan region could see reductions in yield mass and quality, a gradual decrease in the climate suitability for current varieties of crops, possible declines in food quality, new diseases, loss of the area available for cultivation due to land erosion, severe droughts and an overall degradation of land (Hughes, 2012). Yet another problem is unsustainable fishing, which could endanger the wellbeing of coastal zones. The agricultural sector employs a significant share of the labour force and supplies a higher value-added share than the EU average, making the WB economies more susceptible to climate shocks. Protecting the sector from the worst environmental impacts will require a large-scale mobilisation of EU-provided and national resources.

Table 8.5. Challenges for GVC integration of the WB, emerging from the green transition, in a PESTLE framework

PESTLE aspect	Short term	Long term
Political	<ul style="list-style-type: none"> ■ Fighting the COVID-19 pandemic overtakes the green transformation in importance ■ Lobbying power, economic rents from state-owned enterprises, especially in energy sector, preventing faster action 	<ul style="list-style-type: none"> ■ Increased political and regional instability due to impacts of climate change ■ If not equally distributed, costs of the transition could translate into protests, political movements against the green transformation ■ Accession process further delayed due to slow uptake of the EU environmental acquis ■ Democratic backsliding – less oversight on environmental issues, silencing of NGOs
Economic	<ul style="list-style-type: none"> ■ Lack of available investment funds ■ Wrong incentives ■ Losing the early mover advantage ■ Low level of intersectoral collaboration ■ Financial sector not ready to support the green transformation ■ Misuse and misallocation of EU funds 	<ul style="list-style-type: none"> ■ Slow and uneven progress leads to lower economic competitiveness and to slower convergence with the EU ■ Rising costs of extreme weather events ■ Stranded investments in fossil fuels
Social	<ul style="list-style-type: none"> ■ Lack of skilled labour force to support the green transformation ■ Low environmental awareness among the population ■ Educational systems not paying enough attention to environmental issues 	<ul style="list-style-type: none"> ■ Outward migration due to changes in climate, degradation of the environment ■ Health issues due to lingering air pollution, etc. ■ Increase in energy poverty ■ Increased unemployment in coal-heavy regions ■ Unemployment if GVCs pass on the WB owing to inadequate environmental record
Technological	<ul style="list-style-type: none"> ■ Slow uptake of green technologies ■ Inadequate and obsolete infrastructure, such as waste management ■ Low level of digitalisation 	<ul style="list-style-type: none"> ■ Low level of technologies needed for adaptation to temperature rises ■ Carbon lock-in due to slow pace of change, investments ■ Lagging behind as other countries build comparative advantages in technologies
Legal	<ul style="list-style-type: none"> ■ Weak oversight, enforcement – monitoring of standards, WB is unattractive for GVCs which are environmentally conscious 	<ul style="list-style-type: none"> ■ Inadequate adoption of EU acquis results in loopholes, etc.
Environmental	<ul style="list-style-type: none"> ■ Inadequate systems of monitoring, reporting, predicting environmental impacts of the economy 	<ul style="list-style-type: none"> ■ Deteriorating state of the environment and climate change significantly increase risks for GVCs establishing operations in WB ■ WB becomes an attractive region for GVCs to outsource polluting production

Table 8.6. Opportunities emerging from the green transition for the WB economies in a PESTLE framework

PESTLE aspect	Short term	Long term
Political	<ul style="list-style-type: none"> ■ Building on progress made in recent years (S3) ■ Pursuit of EU targets as accelerator for political action 	<ul style="list-style-type: none"> ■ Greater stability in the region (less climate-related migration, avoiding resource-based disputes) ■ Regionalisation built on through various environmental initiatives
Economic	<ul style="list-style-type: none"> ■ Making use of funding through the European Investment Bank (EIB) for building infrastructure, energy transition ■ Large opportunity for savings through increased environmental efficiency – low-hanging fruit ■ Nurturing clusters built on existing projects, e.g. in the automotive sector 	<ul style="list-style-type: none"> ■ Reshoring via environmental arguments ■ Achieving long-term decoupling of growth and environmental impacts ■ Faster convergence with the EU ■ Building of comparative advantages in the green economy ■ Greater integration into GVCs looking for suppliers for various intermediate 'green' products
Social	<ul style="list-style-type: none"> ■ Employment through low-hanging fruits (e.g. energy efficiency in renovated buildings) 	<ul style="list-style-type: none"> ■ Health benefits (reduced air pollution) ■ Potentially reduced inequality (if rural areas are protected) ■ Slowing the brain drain – keeping environmentally conscious labour force in the region ■ Additional high- and low-skilled jobs (retrofitting, renewables)
Technological	<ul style="list-style-type: none"> ■ Provision of various solutions from local companies 	<ul style="list-style-type: none"> ■ Development of green tech clusters ■ Adoption of green technologies may have positive spillover effects on the ICT sector
Legal	<ul style="list-style-type: none"> ■ Adoption of EU environmental and climate acquis 	<ul style="list-style-type: none"> ■ Strengthening of environmental legislation leads to better oversight, monitoring, enforcement
Environmental	<ul style="list-style-type: none"> ■ Environment – still in relatively good state ■ High level of biodiversity ■ 'Low-hanging fruits' – relatively simple projects for waste management, reducing air pollution, closing of most-polluting plants can contribute significantly to reaching environmental goals 	<ul style="list-style-type: none"> ■ Preserving natural environments – benefits for agriculture, tourism, etc. ■ Additional push towards decarbonisation (GVC integration as driver)

Table 8.7. Sectoral challenges emerging from the green transition for the WB economies for the selected value chains

Value chain	Challenges
Agri-food	<ul style="list-style-type: none"> ■ Low current demand (food processing, consumers, government) for more sustainably produced foods ■ New investments in insufficiently sustainable industries and technologies ■ Structural change towards a more industrial but even more polluting model ■ Vulnerability to extreme weather events as a result of climate change and lack of technological equipment (inadequate monitoring, etc.) ■ In the long term, climate change results in lower availability of arable land, trouble with water supply, land erosion, lower yields, lower quality of food ■ Further depopulation of rural areas owing to climate change
Automotive	<ul style="list-style-type: none"> ■ Slow adjustment to new demands of the market ■ Getting bypassed for FDI in EVs and batteries ■ Region misses out on reshoring ■ Becoming locked-in on production of fossil fuel-powered cars
Textiles	<ul style="list-style-type: none"> ■ Not following environmental standards – fewer chances of selling on the EU market ■ Losing out on environmentally conscious customers ■ Some installations could become part of the EU's Emissions Trading System and face higher operating costs ■ Long-term issues with water supply
Tourism	<ul style="list-style-type: none"> ■ Losing tourists who demand sustainable practices in tourism ■ Bad waste management systems leading to waste ending in the sea ■ Continuing trend of severe degradation of coastal areas caused by uncontrolled construction, pollution, floating waste and other environmental issues makes region unattractive to tourists owing to polluted coastal regions, extreme weather events, unbearable heat
ICT	<ul style="list-style-type: none"> ■ Lack of expertise connecting sustainability and ICT ■ Low level of interest for innovative solutions ■ Losing out to foreign competition – multinationals
Energy	<ul style="list-style-type: none"> ■ Opposition to new hydropower plants – not too many opportunities that would not interfere with relatively pristine nature ■ Lack of tax-based incentives for decarbonisation ■ FDI and national investments going to fossil-fuel plants ■ Prospective inclusion in Emissions Trading System – rising costs ■ Over-reliance on natural gas instead of wind/solar resulting in stranded assets long-term ■ In the long term, certain energy sources could become unfeasible, such as hydropower in Albania as a result of droughts

Table 8.8. Sectoral opportunities emerging from the green transition for the WB economies for the selected value chains

Value chain	Opportunities
Agri-food	<ul style="list-style-type: none"> ■ Developed agricultural production ■ Legacy of traditional products, non-GMO products ■ Pre-accession funds targeting agriculture – increased due to the pandemic recovery assistance by the EU ■ Keeping of jobs through transformation (as some labour will inevitably be let go) ■ Building on strong linkages to tourism: developing culinary experiences ■ Improving intersectoral cooperation for improving environmental efficiency and achieving positive spillover effects ■ Certification and commercialisation of traditional, organically produced foodstuffs ■ Preventing land erosion ■ Development of a sustainable 'blue' economy – preservation of fishing areas
Automotive	<ul style="list-style-type: none"> ■ First mover advantage: establishment of EV clusters, especially in Serbia ■ Establishment of lithium battery production thanks to availability of primary raw materials ■ In the long term, placement of R&D functions in EV – improved status in GVCs ■ Inclusion in Important Projects for Common European Interest value chain for vehicles – cooperation in EV/batteries ■ Circular economy in vehicles and parts can be established due to proximity to the EU (reuse/recycling of parts, secondary raw materials)
Textiles	<ul style="list-style-type: none"> ■ Reducing costs through greater resource efficiency ■ GVC integration due to geographical proximity to suppliers from WB ■ Circular economy in clothing as an alternative business model ■ Application of EU environmental standards and labels
Tourism	<ul style="list-style-type: none"> ■ Sustainability as a business model for islands ■ Certain regions enjoy a relatively high level of environmental preservation ■ Eco-tourism in underdeveloped regions ■ Opportunities to develop specialised types of tourism that depend on nature, such as health, sports, etc.
ICT	<ul style="list-style-type: none"> ■ Offering full-service solutions for the green transition – from products to service ■ Building of comparative advantages in 'green' digital solutions ■ EU funds for the twin transition – positive spillover effects ■ Products and services for the era of climate change adaptation (in case of greater temperature increases)
Energy	<ul style="list-style-type: none"> ■ Regional and EU-led initiatives in connecting power markets ■ Land/climate – high potential for cost-efficient renewable energy solutions ■ Economic and Investment Plan ■ Just Transition for the Balkans – additional funds for decarbonisation ■ Improving energy efficiency of buildings – cost savings ■ Exporting energy in case renewables are more cost-effective than elsewhere

8.3 The impact of COVID 19

The COVID-19 pandemic hit the economies of the Western Balkans during a period of reacceleration of economic growth. Although the death rates were lower than in some Western European countries, the pandemic exposed the inherent fragilities of the economic and political systems in the region, such as underfunded health systems, vulnerable economies reliant on FDI and remittances, and in some cases backsliding democracy – all factors that have the ability to impact the development of GVCs in the region. The effects of the crisis were felt differently across the region, and the individual economies took different routes to recovery. To illustrate the contrasting experiences, Serbia provided massive fiscal support by borrowing abroad and saw only a 1% decline in GDP, while Montenegro lost 15.5% of GDP owing to its reliance on tourism.

Across the region, the tourism sector was hit the hardest among the selected value chains, and it is likely to take the longest time to recover. As shown in [Figure 8.3](#), industrial production fell by less than the EU average (with the exception of North Macedonia) and had recovered to close to pre-2020 levels by the end of the year. During the

initial lockdown period, which saw supply-chain disturbances, the more endangered sectors were the internationally integrated sectors, especially the automotive industry. The WB economies were to some extent shielded by their strong backward links, whereas trade and industrial production fell more in economies with strong forward links. A tentative recovery started as soon as supply chains reopened, largely to satisfy the demand from EU destination factories (World Bank, 2020). Sectors more reliant on national (or regional) demand were hit much less: agricultural production grew by 3% in Albania and by 4% in Serbia (Astrov et al., 2020). In Serbia, exports grew in 2020 in energy (43%), agri-food (12%) and textiles (13%) but contracted in tourism, where turnover fell by 25%, while information and communication services fell by 11% and the automotive sector contracted by 11%.

The pandemic also brought a decline in FDI, although by a smaller margin than in other regions on the EU's periphery (Hunya and Adarov, 2020). Across the WB region the ratio of GDP to FDI fell in 2020 compared with 2019 by about 1.7 percentage points and in Serbia by about 3 percentage points (World Bank, 2020). Although FDI-led growth is by no means undesirable, the over-re-

Figure 8.3. Indexes of industrial production during 2020 (corresponding period of previous year = 100)



liance on FDI by Albania, Montenegro and Serbia, where FDI accounts for more than 7% of GDP, may be open to question.

In response to the crisis emergency legislation was passed and the state's role in the economy grew considerably, while the quality of governance dropped (Grieveson et al., 2020). Problematic measures intended to silence opposing views and democratic media were installed, according to Huszka and Lessenka (2020) in their review of democratic backsliding in the WB in light of the pandemic. Such developments could have a negative impact on the attractiveness of the local business environment for foreign GVCs in economies with governments that display authoritarian tendencies.

Experts have also suggested that the EU's influence in the region was damaged by the initial lack of solidarity, while Russia and China were quick to offer assistance. After a while the EU mobilised a financial package of EUR 3.3 billion to fight the pandemic and accelerate the recovery. This included EUR 455 million of funds to support businesses, EUR 1.7 billion of additional loans for public-sector projects through the European Investment Bank (EIB), and over EUR 467 million of Instrument for Pre-Accession Assistance (IPA) funding to build up the resilience of national health systems (European Commission, 2020b).

In the short term, a deceleration of public and private investment can be expected in the WB region as a consequence of the lockdown's damaging impact on enterprise revenues, supply disruptions and the negative forecasts of economic actors in the main investing countries. In recent years the majority of FDI has gone to sectors that were severely affected by the crisis, such as the automotive industry and tourism. A drop in earnings of foreign enterprises is likely to result in a decline in the rate of new investments, including mergers and acquisitions and greenfield investments (226 announced FDI greenfield projects in the WB in 2018, excluding Kosovo), as parent companies will be unable to inject enough liquidity in their regional affiliates (World Bank, 2020).

In the medium and long term, if the health crisis is prolonged, its economic aftermath could serve as an accelerator of the negative social and political trends, such as brain drain, geopolitical risk and internal stability, all of which can spell trouble for further integration in GVCs.

Tourism is likely to be one of the last sectors to recover completely from the pandemic. For manufacturing industries there is potential for reshoring (or nearshoring) in light of renewed concerns regarding the resilience of supply chains, although there is at present little evidence to support this, and investors are more likely to prefer Central and Eastern Europe (Hunya and Adarov, 2020). Nearshoring could be supported by the EU's recent push towards 'strategic autonomy', which could spill over into the WB economies, for example through projects to increase the capacity to produce lithium batteries. The domestic ICT sector, whose low level of digitalisation was exposed by the pandemic, could benefit strongly, as we explain in the following section.

Can the ICT sector benefit from the pandemic? The WB region entered the pandemic with a comparatively low level of digitalisation, which caused problems for teleworking and distance learning. Still, through sheer need and with the help of government assistance the region experienced a digitalisation jump, not least through an increase in online retail sales. A survey conducted in Kosovo in August 2020 showed that 50% more businesses were considering starting or increasing their online business activities compared with the previous year.

For domestic ICT industries the current crisis presents a major opportunity to provide solutions for teleworking and the digitalisation of sales and other business functions. Integration with larger firms could lead to local partners being responsible for tailoring software to local needs. Their success will depend on the proactive intervention of governments to improve the reach and bandwidth of the internet, and on legislation that will allow further steps towards teleworking (World Bank, 2020).

Online business can also facilitate the integration of regional economies and empower local companies to begin selling their products with little upfront cost. The regional ICT sector can offer a variety of solutions needed to establish the necessary capacities for distance working and learn-

ing, and for online shopping. In the long run it may benefit from an increased push for outsourcing of various ICT-related services as a result of the pandemic. European companies may seek service providers that are still within travelling distance and culturally closer.

Table 8.9. Challenges for GVC integration for the WB, emerging from COVID-19, in a PESTLE framework

PESTLE aspect	Short term	Long term
Political	<ul style="list-style-type: none"> ■ Political disputes with the EU and between WB economies due to the supply of medical equipment, border closures, etc. ■ Loss of EU's influence due to China and Russia providing a faster early response 	<ul style="list-style-type: none"> ■ An inward turn coupled with more protectionist economic policy ■ The pandemic is used for geopolitical competition in the region (through supply of vaccines, donations of medical equipment, etc.) ■ Slowdown of EU accession process ■ Slowdown of regional integration processes ■ Democratic backsliding due to invasive emergency laws
Economic	<ul style="list-style-type: none"> ■ Low foreign demand ■ Decreased FDI inflows ■ Reduced earnings of firms prevent new investments ■ Additional damages due to trade barriers ■ Undiversified export structure is exposed to shocks (e.g. over-reliance on tourism) ■ Slow recovery of services 	<ul style="list-style-type: none"> ■ Contributes to slower convergence ■ Increased external imbalances as debt/GDP ratios increase ■ Low growth of productivity due to decreased investment ■ Increased long-term unemployment
Social	<ul style="list-style-type: none"> ■ Labour shortages in labour-intensive sectors due to closed borders ■ High level of social mistrust towards authorities and experts; spread of conspiracy theories 	<ul style="list-style-type: none"> ■ Negative demographic trend accelerates due to prolonged effects of the crisis ■ Skills shortage exacerbated due to long school closures, ineffective distance learning
Technological	<ul style="list-style-type: none"> ■ Lower level of digitalisation (skills, infrastructure) hinders effective teleworking and distance learning 	<ul style="list-style-type: none"> ■ The pandemic will accelerate online commerce, outsourcing of digital services, etc. – without adequate support GVCs will bypass the region
Legal	<ul style="list-style-type: none"> ■ Emergency laws suppress individual freedoms – decrease investment attractiveness of the region 	
Environmental	<ul style="list-style-type: none"> ■ Slower progress of the green transformation in the business sector as investments dry up 	<ul style="list-style-type: none"> ■ The pandemic recovery funds are not used for a green recovery ■ Green transformation loses importance at the political level

Table 8.10. Opportunities for GVC integration for the WB, emerging from COVID-19, in a PESTLE framework

PESTLE aspect	Short term	Long term
Political	<ul style="list-style-type: none"> Increased regional cooperation in the vaccination effort led by Serbia 	
Economic	<ul style="list-style-type: none"> Public investments and EU recovery funds Resilience of manufacturing – quick recovery 	<ul style="list-style-type: none"> Reshoring – bringing GVCs closer to the vicinity of Europe New incentives to remove trade barriers may boost imports and exports
Social	<ul style="list-style-type: none"> Extension of support measures – strengthened welfare policies 	<ul style="list-style-type: none"> Return of migrant workers – application of acquired skills in the local economy New jobs as a result of reshoring Investments in health infrastructure
Technological	<ul style="list-style-type: none"> Provision of free internet for students through public-private partnerships 	<ul style="list-style-type: none"> Increase in digital skills due to the spread of teleworking and distance learning New investments in digital infrastructure through recovery funds
Legal	<ul style="list-style-type: none"> Push towards removal of legal barriers for e-commerce 	
Environmental	<ul style="list-style-type: none"> Lower emissions as a result of lockdown periods 	<ul style="list-style-type: none"> Renewed need to protect rivers and biodiversity as European tourism shifts away from long-distance destinations A new-found appreciation of local ecosystems

Table 8.11. Sectoral challenges emerging from COVID-19 for the WB in a PESTLE framework in the selected value chains

Value chain	Challenges
Agri-food	<ul style="list-style-type: none"> Labour shortages due to travel bans Rural poverty increases, further depopulation
Automotive	<ul style="list-style-type: none"> Low foreign demand Exposure to supply-chain disturbances Decrease of FDI inflows and greenfield investments
Tourism	<ul style="list-style-type: none"> Long-lasting travel restrictions Opening up too quickly and too much – could lead to new infection clusters COVID-19 passport scheme can ease the tourist season in 2021 Lasting negative impact on tourism Loss of staff due to career changes
ICT	<ul style="list-style-type: none"> Legislation puts limits on regional e-commerce, development of the e-economy Democratic backsliding causes problems with personal data security, surveillance
Textiles	<ul style="list-style-type: none"> Low foreign demand Initial problems with logistics due to border closures High potential for infections (proximity of work spaces) Retail shutdowns
Energy	<ul style="list-style-type: none"> Increased unemployment, economic crisis used as an excuse to delay decarbonisation process

Table 8.12. Sectoral opportunities emerging from COVID-19 for the WB in a PESTLE framework in the selected value chains

Value chain	Opportunities
Agri-food	<ul style="list-style-type: none"> ■ Resilience due to reliance on domestic/regional consumption ■ Potential for growth as supply chains shorten ■ Increased intraregional trade
Automotive	<ul style="list-style-type: none"> ■ Near-shoring driven by push for localised supply chains ■ Europe's push towards 'strategic autonomy' accelerates – placement of production in WB
Tourism	<ul style="list-style-type: none"> ■ Majority of guests arrive by car from Central or Northern Europe – local tourism is not dependent on restrictions affecting air travel ■ WB is likely to be COVID-19-safe ahead of certain popular tourist hotspots outside Europe (such as Egypt, Thailand, etc.) ■ New trend of taking holidays in Europe ■ Underdeveloped regions with fewer tourists may benefit (Adriatic islands, Albania) ■ Development of health industry for patients with long COVID
ICT	<ul style="list-style-type: none"> ■ Partnerships with governments to support public outreach related to health ■ Providing solutions for teleworking ■ Integration into GVCs – customising solutions for digitalisation ■ Benefiting from increased investments in infrastructure ■ Projects to adopt e-governance gain new traction ■ Providing various outsourced digital services – offshoring, but closer to the EU
Textiles	<ul style="list-style-type: none"> ■ Reshoring trend could also impact textiles
Energy	<ul style="list-style-type: none"> ■ EU recovery funds can support the switch to renewables

8.4 Migration

Migration is a very significant phenomenon in the Western Balkan economies. Throughout history the region has been characterised by large movements of people, and these trends prevail even today in one way or another.

All Western Balkan economies have high *emigration* rates, some of which are among the highest in the world (Albania and Bosnia and Herzegovina). The total stock of migrants from the WB region is estimated at 4.6 million people in 2019. This is similar to the stock of migrants of Poland, which is twice as big in terms of population.

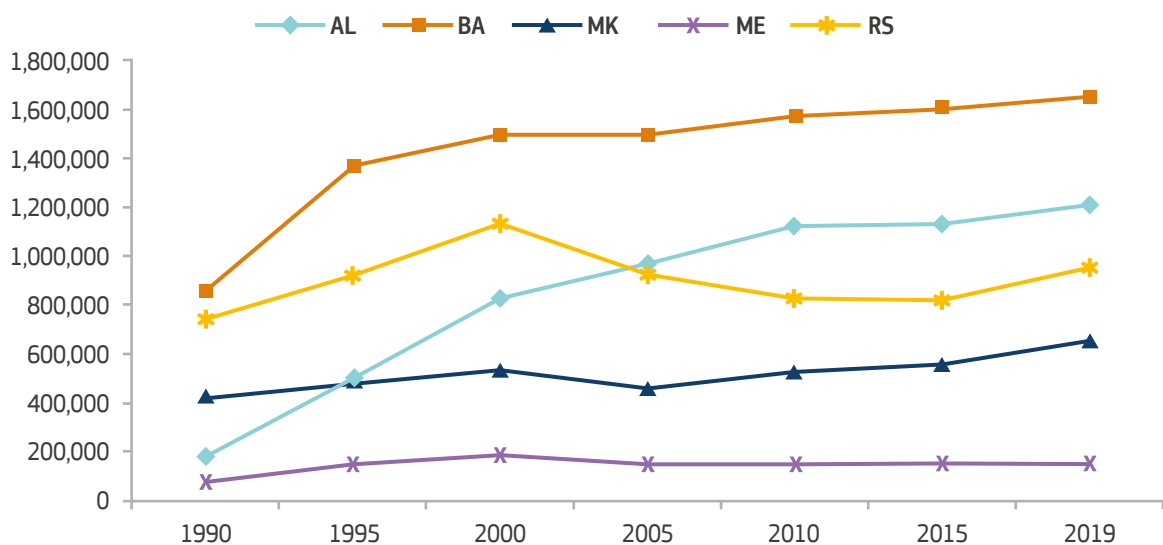
Emigration has been a characteristic of the Western Balkan region for a long time, and there are no signs that it is slowing down. On the contrary, it has accelerated in recent decades, driven by the opening of these economies after the fall of socialism and the wars in the 1990s. Most recently the WB economies have seen a renewed surge in emigration after the opening of the EU borders, and this is likely to accelerate even further in the coming period, following accession to the EU.

By contrast, even though the region has historically often experienced waves of *immigration*, this has stopped almost completely in recent years. Unlike the EU countries, the Western Balkan economies are no longer attractive to migrants from other countries because of their low living standards.

The main destination countries for emigration are the EU Member States, which account for 75% of migrants, although some of the WB economies have diasporas that are located much further afield, such as the US, Canada and Australia.

There is a rich literature on the causes and effects of migration. Some of the most recent studies include Leitner (2021) and Landesmann and Mara (2021). As for the causes, the standard explanation is that migration happens in pursuit of a better life, meaning that people leave the WB because of low wages, high unemployment, high poverty and generally low living standards. This might imply that as the WB economies develop and catch up with EU countries, migration will slow down. However, migration often involves costs in terms of obtaining permits, travelling abroad, finding a job, settling down etc., and these costs

Figure 8.4. Stock of migrants abroad, country of birth, in million



Sources: United Nations, Department of Economic and Social Affairs, Population Division (2019). Kosovo is missing due to data unavailability.

will become smaller as the WB economies develop and accede to the EU, which means that the slow-down of migration need not necessarily occur.

The effects of migration on the emigration country can be both negative and positive. The negative effects are usually associated with brain drain – educated people leaving the country, reducing the human capital and the labour supply, which later on results in many adverse effects, such as lower levels of innovation, investment and consumption, slower growth, worse institutions, ageing of the population, increased burdens on the public finances, etc. The positive effects are usually as-

sociated with brain gain – people who have lived abroad coming back and making positive contributions to all segments of the economy and society. In addition, emigration generates high remittances (money that people send back home), which can have positive effects on poverty, inequality, investment, etc.

Table 8.13 and *Table 8.14* present the main threats and opportunities that migration poses for the WB economies, in a PESTLE framework. *Table 8.15* and *Table 8.16* then present some specific threats and opportunities for each of the six value chains.

Table 8.13. Challenges for GVC integration for the WB, emerging from migration, in a PESTLE framework

PESTLE aspect	Short term	Long term
Political	<ul style="list-style-type: none"> ■ An inward turn ■ Anti-EU tendencies ■ More protectionist economic policy 	<ul style="list-style-type: none"> ■ Weaker governance due to brain drain ■ Rise of nationalism ■ Democratic backsliding
Economic	<ul style="list-style-type: none"> ■ Lower human capital ■ Labour shortages ■ Weaker institutions 	<ul style="list-style-type: none"> ■ Ageing ■ Burden on public finances ■ Lower innovation
Social	<ul style="list-style-type: none"> ■ Worse education ■ Worse healthcare ■ Lower trust in society 	<ul style="list-style-type: none"> ■ Higher poverty ■ Higher inequality ■ Weaker social cohesion
Technological	<ul style="list-style-type: none"> ■ Slower adoption of new technologies 	<ul style="list-style-type: none"> ■ Lower level of digitalisation ■ Lower level of automation ■ Lower innovation
Legal	<ul style="list-style-type: none"> ■ Weaker legal institutions due to brain drain ■ Lower trust in legal system ■ Lower legal compliance 	<ul style="list-style-type: none"> ■ Lower quality of judiciary ■ Lower rule of law ■ Weaker control of corruption ■ Weaker regulatory quality
Environmental	<ul style="list-style-type: none"> ■ Slower progress as young and progressive people emigrate (no push for changes in this area) ■ Green transformation loses importance on the political level (no acceptance of these ideas) 	<ul style="list-style-type: none"> ■ Lower innovation in this area

Table 8.14. Opportunities for GVC integration for the WB, emerging from migration, in a PESTLE framework

PESTLE aspect	Short term	Long term
Political	<ul style="list-style-type: none"> Greater integration due to bigger diaspora 	
Economic	<ul style="list-style-type: none"> More remittances (leading to higher consumption and investment) More FDI 	<ul style="list-style-type: none"> Brain gain (educated people returning home)
Social	<ul style="list-style-type: none"> Lower poverty and inequality due to remittances 	
Technological		<ul style="list-style-type: none"> Technological spillovers if relations with diaspora are maintained
Legal		<ul style="list-style-type: none"> Better compliance and rule of law etc. due to spillovers from other countries (people see how things work elsewhere and accept them)
Environmental	<ul style="list-style-type: none"> Acceptance of positive trends and examples from abroad 	

Table 8.15. Sectoral challenges emerging from migration for the WB economies in the selected value chains

Value chain	Challenges
Agri-food	<ul style="list-style-type: none"> Labour shortages (rural migration is often stronger) Dying out of whole regions Lower investment and technology adoption
Automotive	<ul style="list-style-type: none"> Labour shortages (people gain skills working in this sector and then go abroad to do the same work but earn much more) Loss of competitiveness due to the need to raise wages to find workers
Tourism	<ul style="list-style-type: none"> Labour shortages due to better job opportunities in other industries
ICT	<ul style="list-style-type: none"> Labour shortages as more IT people emigrate
Textiles	<ul style="list-style-type: none"> Labour shortages due to low wages in this sector Lower competitiveness due to the need to increase wages to find workers Dying out of the whole industry Dying out of whole regions (the industry is very regional) Increase in gender inequality due to adverse effects on the industry, which is dominated by women)
Energy	<ul style="list-style-type: none"> Lower demand Lower investment and technology adoption

Table 8.16. Sectoral opportunities emerging from migration for the WB economies in the selected value chains

Value chain	Opportunities
Agri-food	<ul style="list-style-type: none"> Increased investment in agri-food from people coming back
Automotive	<ul style="list-style-type: none"> Knowledge transfer in case of return-migration
Tourism	<ul style="list-style-type: none"> Increase in tourism demand due to diaspora coming home for holidays Increase in investment in tourism from people coming back
ICT	<ul style="list-style-type: none"> Higher investment of people who have worked abroad and gained capital Greater adoption of new technologies
Textiles	<ul style="list-style-type: none"> Greater innovation due to educated people coming back
Energy	<ul style="list-style-type: none"> Greater adoption of new technologies

8.5 Conclusions

In this chapter we assess the implications for the chosen GVCs as they emerge from four megatrends: digitalisation and automation; climate change and greening of the economy; COVID-19; and migration. National governments as well as the EU can respond proactively to foster the opportunities and counter threats posed by these megatrends. What should be the goal of these policy efforts? In light of the potentially damaging consequences of inaction, some of which are predominantly immediate (COVID-19) while some are medium to long term (such as the green transformation), the first goal must be to improve the resilience of the GVCs in light of these megatrends. The second should be to improve the standing of these sectors within their respective GVCs, for example by capturing more value added, taking on more complex and technologically demanding tasks and improving the overall economic development of the region. A discussion of the resilience is presented below. [Table 8.17](#) lists our assessment of key actions available to governments and the EU (primarily through its investment policy and promotion framework) that can improve the relative standing of local companies within GVCs.

The first megatrend, **digitalisation and automation**, will grow in importance globally over the next decades, carrying implications for employment, productivity and competitiveness. The main challenge it will bring will be that actors who do not adopt the new technologies will tend to lag behind, and the most prominent weaknesses of the Western Balkans in this respect are their low capacity for adopting new technologies and the insufficient finances for such projects. Of the six selected GVCs, digitalisation and automation are likely to pose the greatest challenges for agri-food, textiles and the automotive industry. Digitalisation and automation also provide some opportunities for the Western Balkan economies. If they manage to position themselves well vis-à-vis this megatrend, they could be able to overcome some of their current chronic weaknesses, such as low productivity and low non-price competitiveness. For this to happen, they need to address their biggest weaknesses in this respect, i.e. they have to increase the pace of adoption of new technologies through training and other direct measures, and they have to provide favourable financing for projects aimed at digitalisation and automation. At the same time, to soften the possible adverse

social effects of digitalisation and automation, these economies should make their social protection systems more redistributive by increasing social spending and adopting more progressive taxes. Regional cooperation to remove barriers on the digital markets and closer integration with EU standards would also give a boost to the digital economy in the Western Balkans.

The second megatrend, **climate change and greening of the economy**, is probably the most important for the Western Balkans in the coming period. Climate change presents a serious threat to agri-food, tourism and energy, as their current model of operation is based on today's climate conditions, which will undoubtedly change in the years ahead. Textiles and the automotive industry are also challenged by the green transition, and for the same reasons. The energy sector is the most problematic in light of climate-change mitigation, since it is still largely reliant on carbon-intensive technologies. On the political, legislative, technological, educational and cultural level the WB region lags seriously behind the rest of Europe in the pace of its green transformation. At the same time, this megatrend also brings many opportunities for the Western Balkan economies. If they can build competitive advantages in the new green economy and adapt to the changes that it is bringing, they can capitalise on their strengths and overcome their weaknesses in the selected GVCs. To do that, the WB economies should take concrete actions to change the existing models on which the chosen GVCs are based, making them more environmentally friendly. Significant finances will be required to compensate for the lag, both to support private businesses to make the transition and to implement the required public investment, primarily in energy.

The third megatrend, **COVID-19**, will impact the chosen GVCs in the Western Balkans through three main channels: reduced demand due to the pandemic and the lockdowns, the scarring effects of the health and economic crisis, and the pandemic-induced changes and reforms. The first channel will last for 1-2 years, the second will last for several years, and the third may extend over a peri-

od of 1-2 decades. The first two effects will pose significant challenges, which will be most serious for the tourism value chain, while the third channel will open up many opportunities to make the required changes in order to strengthen the GVCs. To protect themselves from the threats and seize the opportunities arising from COVID-19, the economies of the Western Balkans have an important task ahead of them. Most notably, substantial fiscal support from their governments will be needed to make up for weak demand and to protect their fragile economies from collapsing in the aftermath of the pandemic. Substantial financial support will also be required to carry out the reforms and changes that will emerge as an answer to the weaknesses the pandemic has revealed.

Migration, the last megatrend we analyse, has always been a characteristic of the Western Balkan region and will continue to be so in the coming years, although it is hard to assess whether it will grow in importance or decline as these economies develop and accede to the EU. The main challenge migration brings for the chosen GVCs relates to the unavailability of labour, reduced human capital and the brain drain. The main opportunity it brings relates to brain gain, i.e. to educated people coming back. In order to minimise the challenges and maximise the opportunities, the Western Balkan economies have an important role to play. To slow down emigration they will have to improve their living standards, which will require reforms in virtually all segments of society, including education, healthcare and social protection. To make the most of the brain gain, these economies will have to create favourable conditions to induce migrants to return to their home economies in order to contribute to their social development.

Table 8.17. Assessment of responses to challenges and fostering of opportunities in order to improve the competitiveness of GVCs (taking on more tasks, increased value added)

Megatrend	Governments – Internal action	EU support – Investment policy and Promotion Framework
Digitalisation	<ul style="list-style-type: none"> ■ Offer funding programmes to encourage uptake of digital technologies in underequipped sectors. ■ Invest in broadband infrastructure to extend reach to all regions. ■ Invest in teaching of business skills and soft skills among ICT personnel. ■ Remove barriers to digital economy in the region. 	<ul style="list-style-type: none"> ■ Step up funds for the WBIF regional cross-border cooperation project ‘Balkans Digital Highway’ in cooperation with the World Bank for the joint use of fibre assets.⁴¹ ■ Reduce the time needed between approval and implementation for digital projects financed by the WBIF blending mechanism, given that technological change is very fast in this area.
Green transformation	<ul style="list-style-type: none"> ■ Increase public investment in renewable energy, energy efficiency, non-polluting public transportation and recycling. ■ Locate sectors where comparative advantages can be built – adapt S3 strategies to support them. ■ Use government tenders to support local companies, offer incentives for research and innovation in green products and services. ■ Include sustainability in the whole educational system, including technical universities. ■ Promote cooperation between universities, start-ups and established companies. ■ Take advantage of favourable conditions for renewable energy wherever possible; avoid investments in fossil fuels. 	<ul style="list-style-type: none"> ■ Increase support for the strategic planning of the mapping and zoning of solar photovoltaic and wind electricity-generation projects. ■ Provide additional funds for investment in renewable energy and related technical assistance via the Instrument for Pre-accession Assistance (IPA), grants and European Investment Bank (EIB) loans, blended by the WBIF.⁴² ■ Support the region’s electricity distribution networks with investment and technology transfers with regard to the integration of new (green) producers and consumers of electricity.
COVID-19	<ul style="list-style-type: none"> ■ Extend fiscal support to key sectors to prevent job and output losses. ■ Capitalise on potential for reshoring. 	<ul style="list-style-type: none"> ■ Double the EU’s COVID-19 support to the Western Balkans.⁴³ ■ Increase the share of the Western Balkans in the EU’s COVID-19 vaccine purchase and delivery programmes.⁴⁴ ■ Help organise local mass vaccination via e.g., EU companies operating in the Western Balkans.
Migration	<ul style="list-style-type: none"> ■ Invest in economic and social development to prevent outward migration. ■ Create a favourable living and working environment to retain high-skilled workers and attract returning migrants. 	<ul style="list-style-type: none"> ■ Help organising a return migration programme to allow for both brain-gain as well as the containment of demographic decline in the Western Balkans. ■ Support local centres of excellence and universities to keep human capital in the region.

Sources: Author’s assessment.

(41) More information on the Balkans Digital Highway can be found here: <https://wbif.eu/project/PRJ-MULTI-DII-006>

(42) More information on current EU support for renewable energy in the Western Balkans can be found here: <https://ec.europa.eu/jrc/en/science-update/eu-support-decarbonising-western-balkans>

(43) More information on the current COVID-19 support to the Western Balkans by the EU can be found here: https://ec.europa.eu/neighbourhood-enlargement/sites/near/files/coronavirus_support_wb.pdf

(44) More details on the current EU support for COVID-19 vaccines for the Western Balkans can be found here: https://ec.europa.eu/commission/presscorner/detail/de/ip_20_2539

CHAPTER



Chapter 9. Barriers, prospects, and policy aspects

In this section we first discuss the barriers, constraints and bottlenecks faced by actors in the selected GVCs. This builds on the decomposing exercise reported in Sections 2-7 (and based on the questionnaire presented in Appendix E). This is followed by a discussion of the potential prospects for each of the selected value chains, given the barriers and constraints and the megatrends discussed in *Chapter 8*. Finally, policy options are outlined in *Section 9.3*.

9.1 Main barriers, constraints and bottlenecks faced by actors in the GVC

9.1.1 Agri-food

Actors at different levels of the value chain face different difficulties in conducting their business activities. Key barriers and constraints have been identified at the levels of input supply, production and processing. Stakeholders from the input supply and production levels face similar or almost the same barriers and constraints. On the other hand, actors from the processing level face different limitations in business.

The following main barriers and limitations in business are cited by the actors from the level of **input supply and production**:

- lack of modern or clean production technology,
- lack of finance,
- high price of input raw materials,
- uncompetitive market price,
- lack of skilled workers,
- lack of quality standards, and

- limited access to input raw materials.

The main barriers faced by these actors are also linked to their size. All economies of the Western Balkans are characterised by the presence of fragmented agricultural holdings and small farms. The fragmented agricultural holdings are primarily the result of unresolved ownership disputes over agricultural land and unfinished restitution. The lack of opportunities to increase production capacity directly affects the yield and financial power primarily of small agricultural households, smallholders and medium-sized farmers. Being insufficiently strong financially and insufficiently attractive to obtain external sources of financing, small agricultural households, smallholder farmers and medium-sized farmers are limited in terms of quantity and quality of production. Quantity is lacking because they cannot expand their production capacities, while poorer quality is a reflection of insufficient investment in innovative processes. For these reasons, small agricultural households and smallholder farmers are mainly engaged in extensive agricultural production, which is characterised by the use of obsolete machinery, high human labour consumption and low yield per hectare and livestock. In the Western Balkans there are not enough medium-sized and large-scale farmers who, in addition to intensive agricultural production, meet all the quality standards required by the global market. This primarily refers to the controlled use of fertilizer, plant growth regulators, pesticides, etc. Control is possible with the implementation of innovations that provide a modern process of mass production with optimal use of fertilizer, growth regulators, mechanised processing, etc.

Smallholders and medium-sized and large-scale farmers who do not have sufficient production capacity and do not meet quality standards in the next levels of the value chain are included exclusively through traders and agricultural cooperatives (actors at the third level of the value chain: collection). When negotiating the purchase price, the bargaining power of smallholders and medium-sized farmers is very low. Agricultural cooperatives have stronger bargaining power because

they charge for their services of classifying and storing products. However, in practice it often happens that agricultural cooperatives manipulate the position of smallholders and medium-sized farmers, i.e. because of their lack of financial resources smallholders and medium-sized farmers often resort to the procurement of basic inputs (seeds and fertilizer) through agricultural cooperatives that offer them deferred payment. However, deferred payment, which should facilitate the production of smallholders and medium-sized farmers, mainly binds them to cooperatives by making them debtors. This is because the price that smallholders and medium-sized farmers pay for inputs can often be very high and almost equal to the market price that agricultural cooperatives offer them for the purchase of their finished products. In this way, agricultural cooperatives get finished products from smallholder farmers and medium-sized farmers through compensation with minimal or no payment of the difference in price.

Thus, at the input supply and production level, there is a great scope for policy initiatives to address these issues.

The main barriers and limitations in business cited by actors from the **processing** level are slightly different:

- complicated customs, tariffs and trade regulations,
- unfair competition practices,
- legal uncertainty,
- political instability,
- red tape or bureaucracy, and
- lack of skilled labour.

Improving the business environment, the functioning of the state institutions and the government effectiveness would help to mitigate the impact of these barriers.

9.1.2 Textile industry

Companies have identified several factors that can significantly limit their activities in the GVC.

These are above all:

- lack of skilled labour,
- complicated customs, tariffs and trade regulations,
- transparency in rules and regulations, transport and logistic infrastructure or services,
- red tape or bureaucracy.

Respondents see high tariffs and other customs barriers as big problem affecting their business, but also their involvement in the GVC. Further, their activities are significantly affected by high transport costs. For manufacturing companies, skilled labour is also very important, but this is relatively limited in this industry in the economies of the Western Balkans due to low wages and the difficult working conditions.

The companies that were included in this research are generally of the opinion that in the coming period there are good prospects for improving their position in the GVC. Entry barriers to value chains are based on knowledge or skills that are unique and not universally accessible, insulating firms from simple price-based competition. Most value in the apparel sector is added at the planning and retail ends, associated with the control of key functions such as branding, designing and marketing, which are highly knowledge-intensive.

It is characteristic of the economies of the Western Balkans that the privatisation process was carried out inadequately. These mistakes have contributed to the disintegration of a fairly homogeneous vertical structure of the textile industry. This was particularly pronounced in Serbia and North Macedonia and resulted in a reduction in processing capacity in the production of clothing. Despite this, foreign investors are trying to take advantage of cost competitiveness combined with relatively high levels of productivity, which can ultimately contribute to the positioning of this region when it comes to production and distribution of products in the West European markets.

Barriers that significantly slow down the process are:

- constant changes in market conditions, among other things owing to faster and more frequent changes in fashion trends,
- insufficient connection/ cooperation with vocational schools, which offer courses that are tailored to the textile industry and conduct practical classes,
- insufficient cooperation with international organisations/ institutions in order to train staff and transfer the latest knowledge and experience in the field of textiles and work organisation,
- lack of membership in textile industry clusters, where more visible representation could improve the position of the textile industry in the domestic market as well as the attitude of the state towards it.

The problems encountered in the economies of the Western Balkans often involve incompetent employees bringing inadequate knowledge and skills to their performance in the workplace; the long time required for workers' introduction into the business; unwillingness to work in a team; lack of business and entrepreneurial skills and knowledge; lack of communication and problem-solving skills; mismatch of theoretical and practical knowledge and skills; ignorance of new technologies; ignorance of the quality system, etc.

Entry barriers arise from the particular requirements of lead firms (buyers) in terms of product quality, production volume capabilities, lead times and compliance with different social and environmental standards, etc.

Companies which have stated that they are not included in the GVC consider the following to be major obstacles:

- limited production/ operational capacity,
- lack of finance,
- lack of skilled workers,
- limited access to input raw materials, and
- high prices of input raw materials.

The companies we interviewed (see Appendix E for details) were mostly aware of the key factors or barriers that were preventing them from being part of the GVC. Four companies which participated in our research are currently not part of the GVC, two companies said they had not tried to become part in the previous five years, while the other two companies were not ready to answer our questions. One of the questions was whether the companies would try to become part of the GVC in the future. We received no answer to this question from three companies, while one company expressed its readiness to become part of the GVC in the future. For textiles and apparel, collaboration with industry associations (within and across economies) as well as joint projects with universities can strengthen knowledge exchange and drive innovation. Partnerships with brands and knitting houses or weaving mills can also foster more vertical integration for companies. These collaborations can unlock higher value added within economies and provide a strong return on investment.

Another big problem is the old technology of production and machines that companies use, which limits productivity and increases production costs. It also leads to low-value added production used as intermediary products for other companies, which lowers the productivity of the companies. This is partly a consequence of the inadequate financial support for this industry.

The rapid liberalisation of the foreign trade regime in all Western Balkan economies and the policy of appreciation of the exchange rate of the national currencies, in turn, have accelerated the growth of imports, which has led to the choking of production in the clothing production sector as well as the expansion of existing and the creation of new structural imbalances, which are posing a serious obstacle to the further development of this industrial branch.

9.1.3 Automotive industry

The WB economies share relatively similar problems in all aspects of economic development. In the automotive industry the similarity is even

more pronounced because of its historical heritage and the same development model, which is currently centred around low value-added production, labour-intensive activities and cheap labour. However, the barriers and constraints are not the same for multinational and domestic companies, given their different roles and positions in the value chain. Most of the obstacles and barriers faced by value chain actors have already been described, and here they are grouped and summarised based on whether they relate to large foreign-owned or local companies.

Barriers faced by foreign-owned companies:

- Regulatory framework
- Poor local supply of raw materials
- Limited production capacity
- Lack of skilled labour
- Political instability.

Barriers faced by local companies:

- Limited competitiveness
- Limited resources for investments
- Labour-intensive activity
- Low technology and innovation capability
- Insufficient cooperation along the value chain.

Foreign-owned companies complain most often about regulatory issues such as customs, taxes, double bookkeeping, permits, etc., which constrain and/or slow down their business activities. Poor local supply of raw materials and limited production capacities are referred to as a limiting factor for the expansion of their activities and the production of volumes to supply a larger number of foreign plants. A high degree of dependence on imported raw materials is certainly one of the bottlenecks in the value chain. The ability to source raw materials from local suppliers would increase production efficiency despite quality and delivery risks. Another major barrier is the lack of skilled local labour, which is key to the development of technologically demanding and innovative products. Despite the advantages of low labour costs, business expansion and development largely depend on

skilled employees. In recent years the problem of labour shortages has been further highlighted by the increasing outflow of labour, especially young and highly qualified professionals, to EU countries. Unresolved political problems and instability remain a factor that affects the long-term plans of foreign companies to expand their business in the region.

9.1.4 Energy

In our surveys and interviews we focused on the factors that are preventing companies from becoming involved in the GVC. Respondents who told us that they were not included in the GVC cited the following factors as major obstacles:

- limited production/operational capacity,
- lack of finance,
- lack of quality standards, and
- the high price of input raw materials.

Although they are aware of their limits, they are unable to overcome these obstacles and are not interested in involvement in the GVC, even if they have the potential. None of the surveyed companies has tried to become part of the GVC in the past, while only one has plans and is ready to become a GVC participant in the future. This underscores the need for policy initiatives in this area.

9.1.5 Tourism

Tourism can take on the role of a leading driver of economic development through its supply-and-demand links to other sectors. What is needed for the faster development of the tourism sector in the WB economies is a trained and skilled workforce, which is currently suffering from shortcomings in both tourism and catering. The lack of management skills and knowledge about the tourism and catering sectors can also present a major obstacle to the development of this sector. One very important item is support to the development of tourism, where the representatives of support organisations (clusters or business associations) are primarily representatives of government support institutions as well as research institutions.

According to some respondents, the support of these organisations is often not adequately directed, which is certainly a major limitation for all stakeholders in the GVC.

Among the constraints faced by the main actors in the GVC is the indifference of other participants in the value chain, i.e. the limited coordination between key public and private actors for the purpose of developing tourism. The lack of willingness on the part of service providers in the tourism sector to commercialise their offer can also be a limiting factor. One of the barriers faced by companies in the tourism sector is ignorance of foreign languages, which can make it significantly more difficult for companies to operate.

Some of the biggest problems of the tourism offer in the WB region are an insufficiently developed physical infrastructure, poor transport capabilities, low quality of service, unsatisfactory accompanying facilities, poorly developed recreational facilities, uncompetitive prices in larger tourist centres and/or a poor price-quality ratio.

The most important factors that constrain activities in the GVC are:

- different unfair competition practices,
- lack of skilled labour, and
- insufficient institutional support, etc.

The main barrier is the inability to submit (distribute) an offer from a region directly to clients in the biggest markets (Europe, China).

9.1.6 IT

Companies which have stated they are not included in the GVC consider the following to be major obstacles:

- lack of skilled workers,
- limited production/operational capacity,
- lack of finance,
- the high price of labour.

Some of these companies have already tried to become part of the GVC and will continue to try their best to overcome any obstacles and join the

GVC. However, two-thirds of surveyed companies (six) are satisfied with their current position and are not interested in becoming part of the GVC.

Table 9.1 summarises the findings concerning the barriers and constraints in the six value chains and marks whether a specific barrier has been mentioned at least once in a survey or an interview. The rows are ranked according to the number of value chains in which the specific barrier is mentioned, whereas the columns are ranked according to how many barriers have been flagged in each value chain. According to this tabulation, agri-food, the automotive industry and textiles face the largest number of barriers and constraints. The most frequently mentioned barriers and constraints are lack of skilled workers, geographical location (and related lack of infrastructure), lack of finance, limited production and operational capacities, and the high price of input raw materials. These concerns are mentioned in at least half of the selected value chains. The remaining barriers and constraints seem to be more value-chain specific.

9.2 Outlook and prospects

9.2.1 Agri-food industry

The way in which the activities of each of the participants in the value chain are performed is conditioned by the national and regional institutional framework. This refers primarily to national regulations, agreements on cross-border cooperation, the level of cooperation between support institutions, etc. Traditionally, there is cooperation between the Western Balkan economies regarding the exchange of agricultural and food products. The level of this cooperation could be enhanced by further liberalisation of trade relations and more intensive cooperation between support institutions.

The improvement of cooperation between the economies of the Western Balkans is visible in the free flow of products. The free flow of services is conditioned by the Central European Free Trade Agreement (CEFTA), while in the domain of the free flow of capital there is a lot of room for improve-

Table 9.1. Overview of barriers and constraints across value chains

Barriers and constraints	Agri-food	Automotive	Textiles	Energy	IT	Tourism	TOTAL
Lack of skilled workers	x	x	x		x	x	5
Geographical location	x		x		x	x	4
Lack of finance	x		x	x	x		4
Limited production/ operational capacity		x	x	x	x		4
High price of input raw materials	x		x	x			3
Complicated customs, tariffs and trade regulations	x		x				2
Cost of energy/supplies	x		x				2
Lack of quality standards	x			x			2
Limited access to input raw materials	x		x				2
Political instability	x	x					2
Red tape or bureaucracy	x		x				2
Security and safety				x	x		2
Uncompetitive market price	x	x					2
Unfair competition	x					x	2
High price of labour					x		1
Insufficient cooperation along the value chain		x					1
Insufficient institutional support, etc.						x	1

Barriers and constraints	Agri-food	Automotive	Textiles	Energy	IT	Tourism	TOTAL
Labour-intensive activity		x					1
Lack of modern or clean production technology	x						1
Legal uncertainty	x						1
Limited competitiveness		x					1
Limited resources for investments		x					1
Macroeconomic environment	x						1
Poor local supply of raw materials		x					1
Regulatory framework		x					1
Transparency in rules and regulations, transport and logistic infrastructure or services			x				1
Transport and logistic infrastructure or services			x				1
Total number of barriers and constraints	15	10	11	5	6	4	
Number of surveys and interviews with major stakeholders	20	12	9	11	15	14	81

Sources: Own elaborations based on survey results (see Appendix E for details).

ment. Intensive efforts are being made to improve work and residence permits, so that labour can flow freely among the economies of the Western Balkans. This is very important, because the whole region needs a skilled workforce of a certain profile. Viewing the region in a synergetic sense, as a single market, and strengthening economic relations are prerequisites for preventing the migration of active labour to developed countries.

A significant step has been made by including the economies of the Western Balkans in the Sys-

tem of Green Corridors, which has proven to be an effective mechanism of regional connectivity, especially during the current pandemic. (The system of Green Corridors implies the convenience of priority crossing at borders). In addition, an initiative by European countries to 'shorten' supply chains is a great opportunity to strengthen the existing value chains and create new ones in the Western Balkans. Shortening supply chains would increase resistance to external shocks. This is primarily useful for value chains in the agri-food sector, both because the Western Balkans region

has enough input and because of the very nature of production (raw materials and products with a limited shelf life).

To overcome the barriers faced by actors at different levels of national policy of the agri-food sector's value chain, the development and implementation of innovative and technological solutions should be encouraged. In this way, production systems would be aligned with international food quality standards, which would reduce export barriers and increase the added value of agri-food products. Here, cooperation between support institutions is very important. This cooperation could be enhanced by the formation of a regional support organisation in the agri-food sector. This organisation should involve both the public and the private sector in the dialogue to solve regional problems in the agri-food sector. If it were under the auspices of a renowned international organisation, it would contribute significantly to a greater response as well as the implementation of the conclusions of such cooperation.

Demographic changes, green transformation, digitalisation and geopolitical changes, among others, have been identified as the key external factors influencing the development of GVCs. Each of these factors affects business in the agri-food sector. Just as organic production in agriculture has set higher standards, so will the green transformation. In the words of a representative of the Food and Agriculture Alliance (NALED): 'The demand for exotic spices in the western hemisphere, or fast food in the eastern, are certainly the result of demographic change and population migration.' Digitalisation and automation may have the most intense impact, the speed of which cannot be predicted. The main limiting factors to growth at the global level are geopolitical in nature, and they are also reflected in the economies of the Western Balkans. Free trade growth should ensure long-term sustainable global growth. However, in recent years foreign trade has been growing more slowly than GDP because economies turn to the concept of self-sufficiency. In this sense, the economies of the Western Balkans that are not sufficiently developed are much more exposed to geopolitical risk.

9.2.2 Textile sector

The COVID-19 pandemic has had a negative effect on the textile sector. This was especially noticeable among local companies that do not have a share of foreign capital in their structure. However, we should not ignore the fact that the pandemic has significantly reduced foreign investment in the Western Balkans, which has automatically affected the business of the textile sector. In a situation where countries adopt strict measures with the goal of stopping the pandemic, it is inevitable that there will be a reduction in production. As a result, there are disturbances in the value chains as well as losses to which companies are exposed. In the current situation it is very difficult to predict in which direction the development of the textile sector will move, given that the pace is dictated by the global crisis caused by COVID-19.

Half of the companies that participated in the research stated that production remained about the same in 2020, one company's output declined by more than 20%, while two companies refused to answer this question. Despite the fact that the crisis has affected all sectors, including the textile industry, 33% of companies expect to increase their sales strongly in the next three years, 50% expect their sales to remain about the same, and one company had no position on increasing sales over the next three years.

Based on four identified megatrends – demographic changes, the green transformation, digitalisation and geopolitical changes – companies have generally stated that these megatrends will have no major influence on their business activity in the coming years.

According to the qualitative results from the survey (see Appendix E for details) demographic changes will have no major influence on business activity as far as four companies are concerned, while one company stated that it will have a small positive influence and another company predicted a big negative influence. Demographic changes will be reflected through the concentration of the population in larger cities, higher population growth on a global scale, and the ongoing change in the profes-

sional structure of the population. When it comes to the green transformation and its impact on the business of companies in the coming period, five companies stated that it will have no major influence, while one company stated that it will have a big positive influence. It is certainly important that those textile enterprises which are focused on improving their environmental responsibilities interact with suppliers, contractors and intermediaries which are also focused on the introduction of 'green' manufacturing and logistics technologies. Besides, textile enterprises need to influence the transformation of consumer behaviour in the direction of demand for products that are environmentally friendly and harmless to humans. Five companies believe that geopolitical changes will have no major influence on their business activity in the coming years, while one company stated that it will have a big positive influence. The global textile sector is facing many risks stemming from geopolitical tensions between major producer countries and consumer markets. Multinational brands are facing exposure to unstable political situations in producer countries and geopolitical trade tensions between the US, the EU27 and China.

Regarding the impact of Industry 4.0 on business activity in the coming years, four companies expect no major impact, one company believes that the impact will be small, and one expects a big positive impact. The textile industry with its highly fragmented value chains is seen both as a future key supplier and as an adopter of digital technologies and Industry 4.0 solutions, but companies are hesitant to start their digital transformation process due to severe implementation barriers, including uncertainties about financial benefits and the lack of specialist knowledge.

9.2.3 Automotive sector

The competitiveness lost during political conflicts in the region and through wars, the disintegration of former Yugoslavia and the overall deindustrialisation of the WB economies is extremely difficult to restore. Years of technological backwardness have resulted in low competitiveness among domestic companies, which has become even more

pronounced with the globalisation of the world economy and the arrival of foreign investment. The spillover effect of foreign investment in the automotive industry to local companies has not met general expectations and has only served to emphasise the technological lag further. The low competitiveness of local companies is a consequence of outdated equipment and a lack of funds for investments in modernisation, plant construction, the purchase of modern machines and competence and knowledge enhancement. Local companies, especially SMEs, face limited access to financing, a lack of advanced technological skills and innovation capabilities, a lack of knowledge in the field of finance, management and marketing, difficult foreign market entry, and constraints in meeting the quality and delivery standards required by assemblers and component manufacturers in the GVC. Moreover, the general lack of interest of multinational companies which have entered local markets to establish close business relationships with local suppliers has constrained their integration into the GVC. And finally, local component suppliers are fragmented and insufficiently connected both with other companies and with supporting actors. Because of that, the potential synergetic effects of joint performance and upgrading to improve their position in the value chain are missing.

Strengthening competitiveness in a globalised market cannot be based on labour-intensive but rather on knowledge-intensive activities. Solving the identified problems will not be simple, as they did not arise overnight but were caused by decades of decline in the automotive industry.

The automotive industry is highly globalised, and as such it is vulnerable to many factors in the external environment that directly or indirectly impact the business operations along the GVC. Because activities are geographically dispersed, changes in the environment in one country spill over across the entire GVC. Our research has revealed that the main challenges in the external environment that affect the performance of the automotive industry in the WB economies stem from political, institutional, economic, sociological, demographic and technological factors.

Political stability is an important factor for businesses and for attracting foreign investments. Although significant progress has been made, the stability of the political environment in the WB economies is still being challenged by frequent elections and government instability, EU accession negotiations, relationships across the region, ongoing political issues, corruption, migrant crisis, etc.

As regards the institutional environment, the most challenging factors in the WB economies are judicial inefficiency, bureaucracy, access to funding, labour, tax law and intellectual property rights. Economic factors that affect business activities and performance in the automotive sector are taxes and tax administration, interest rates, energy prices, the informal economy and economic policy measures. In particular, representatives of support institutions in Bosnia and Herzegovina, Macedonia and Serbia pointed out that domestic companies do not look favourably on the benefits provided to foreign investors, because they believe that this puts them in a less favourable position.

Identified sociological and demographic challenges relate to the lack of a highly skilled workforce as a result of the less favourable educational structure of the population, brain drain and the migration rate. Population migration is a major problem in the automotive industry, which is characterised by a lack of workers at all levels of the value chain. Part of the problem is the general shortage of workers, while another part is the lack of highly qualified and skilled labour needed for more complex tasks and processes.

Given that the WB economies are characterised by a considerable lag in terms of technical and technological equipment, innovation activities, technological capabilities and intellectual property rights protection, domestic automotive companies and support institutions consider technological factors to be the most significant prerequisites for their upgrading in the GVC. The adoption of new technologies will to a large extent determine the competitiveness of domestic companies and their survival as partners in the GVC. Local small producers will have trouble responding to this demand, and systemic support, primarily from gov-

ernmental institutions but also from other actors such as academia, clusters, innovation centres and the like, will be needed. However, foreign-owned companies are certainly in a better position here, because they have access to technologies and resources through their mother companies.

In terms of the megatrends that will have the greatest impact on the automotive GVC in the coming period, what stands out in particular is the green transformation – the use of renewable energy sources to power motor vehicles – because it is already the focus of interest of researchers and manufacturers around the world. The awareness level about this issue has been raised, and efforts are being made by support actors such as clusters to steer the transformation of businesses. Industry 4.0 (digitisation, automation, etc.), primarily through autonomous vehicles, is an emerging trend. Also, demographic changes and migration will exacerbate labour shortage problems further.

Recently, the major external impact on the automotive value chain has come from the COVID-19 crisis. Many companies have suffered losses through reduced demand, supply-chain disruptions and governmental measures to combat the effects of a pandemic that forced them to shut down or minimise their operations. Adjusting to the ‘new normal’, i.e. the new way of living and doing business, will certainly be a great challenge for the whole world, and especially for the fragile developing WB economies.

9.2.4 Energy

The COVID-19 pandemic infected millions and slowed down economic activity, bringing the largest economic shock the world has experienced in decades.

According to our interviews and surveys, the situation in the energy sector is different for individual companies. While some of them managed to gain certain advantages, primarily because the green transformation increased their sales, most companies suffered losses, with sales declining in some cases by over 20%. Major problems for all surveyed companies were disrupted supply chains and choked-off demand.

Despite this, most of the surveyed companies expect to increase their sales over the next three years. As demand dropped in 2020, valid contracts were not implemented, with their implementation postponed to a future date. And because fairs and other promotional activities were cancelled in 2020, respondent companies believe that sales levels based on these activities will increase.

We have identified four current megatrends that could influence the development of the GVC in the region: demographic changes, the green transformation, digitalisation and geopolitical changes. Depending on the sector analysed, however, the consequences of these trends may vary. The green transformation and digitalisation will have a major influence on the energy sector, especially where the European Green Deal is concerned. The energy systems in the WB region require a transformation that can bring secure, sustainable and competitive energy supplies. The green transformation is the most important trend for the sector, as the shut-down of thermal power plants creates space for new power plants in the field of renewable energy sources. The regeneration of the locations where the thermal power plants used to be, create space for the development of new installations, such as for solar energy. The advantage of these locations is that they already have an infrastructure and existing installations.

The green transformation and digitalisation represent a great opportunity for companies in the energy sector, especially for young innovative companies, as innovation is a key driver in the transition to the green economy. The main reason for the boom in green energy is the decreasing cost of key energy technologies and equipment, especially wind turbines, solar panels, storage and smart energy management systems. Five out of six surveyed companies (83%) identified the green transformation and digitalisation as major positive influences on the sector. The same number identified geopolitical changes as having no major influence (83%) or only a small negative influence (17%). However, the surveyed companies consider that demographic changes will not have a significant impact on the sector.

9.2.5 Tourism

At the national economy level, it is important that economic policy makers identify tourism potential and performance by comparing the ranking of their sector with that of other countries. One of the most important indicators of tourism performance is the Travel and Tourism Competitiveness Index (TTCI) published by the World Economic Forum (WEF). Scores range from 1 to 7, where 1 = worst and 7 = best. In the 2021 edition of the TTCI Montenegro performs best and shows the greatest potential of all the observed economies of the Western Balkans. It is ranked 67th, with an index of 3.9, and is followed by Serbia (83rd, index 3.6), Albania (86th, index 3.6), North Macedonia (101st, index 3.4) and Bosnia and Herzegovina (105th, index 3.3). The purpose of this methodology is to measure the determinants that affect the competitiveness of tourism in different countries. Tourism, like other sectors, is quite sensitive to economic crises and instability. Due to the strength and trend of the global economic crisis, the challenges that tourism will face are likely to continue for some time to come.

Many external factors influence the tourism value chain, among them geopolitical and demographic changes, the economic environment, global competition, natural disasters, energy prices, etc.

The tourism sector has been hit hardest by the COVID-19 pandemic. As long as the pandemic lasts and most countries are closed, it is difficult to estimate the losses suffered by the tourism sector and predict the beginning of a recovery. However, despite travel bans and closed borders there has been a flow of people across the WB region, which is a reason for hope that the problems will be overcome.

9.2.6 IT

The crisis caused by the COVID-19 virus has had a serious impact on the business of all companies, and it is possible that this crisis will grow over time.

The IT sector recorded continuous growth until the end of the first quarter of 2020. Among the surveyed companies (see Appendix E for details)

only two recorded a drop in demand, production and sales. One half of the companies which participated in our research reported increases in their output in 2020, while 30% said it had remained the same. It is interesting to note that 60% of the companies do not anticipate a promising future and expect their sales to remain unchanged, while the remaining 40% of IT firms expect a slight increase in sales.

Digitalisation is the single most important megatrend that will influence the IT industry, according to the answers we received from the companies we surveyed. Nine companies (more than 80%) expect a big positive effect from of the digitalisation process and 20% think it will have a small positive influence. They do not expect other trends to exert a major influence. The green transformation may affect the sector, as six companies (over 50%) consider that it will have a small positive influence, while two firms think that the influence will be big. Others believe that the green transformation will have no influence on the sector. However, the surveyed companies do not consider that demographic or geopolitical changes will have a significant impact on their sector.

9.3 Policy options for developing the selected value chains

9.3.1 Agri-food

The general strategy for the agri-food value chain should be to focus on providing premium rather than cheap products. The WB economies have the potential to provide high-quality, ecological products that are not too price elastic and can be competitive even with a relatively higher selling price. The ongoing green transition megatrend provides a positive impetus in this respect, as it will tend to increase the demand for these types of product in the coming years.

To achieve this, the non-price competitiveness of producers should be improved. Even though many of the issues in this chain are related to the small size of the producers, this does not necessarily imply that the strategy for the sector should be to

enlarge producer size. Small producers can have certain positive social effects, such as reducing poverty and inequality, which are very important issues for the WB economies. In addition, they can operate in a more environmentally friendly manner.

Concrete policy recommendations for the agri-food chain could be:

- Providing support for adopting new, modern and clean production technology;
- Providing support for introducing new premium products and own brands;
- Designing special financing schemes for the industry, such as favourable loans or loan guarantee schemes;
- Improving the existing formal education (both secondary and tertiary) as well as introducing new publicly provided programmes for professional education in this area;
- Providing direct support to producers and firms for adopting quality standards required in the EU countries;
- Assisting with the transportation of final goods, especially small producers;
- Providing investment in agricultural infrastructure (irrigation, sewage etc.);
- Fostering networking between producers through clusters, for example, in order to improve cooperation between them;
- Removing non-tariff trade barriers imposed by the Western Balkan economies on imports.

9.3.2 Textiles

The overall strategy for the development of the textile value chain should be to transform the sector from its current low-value, low-cost state to a high-value state, where local firms provide high-quality products that will compete not just on price but also on quality.

Concrete policy recommendations for this value chain should be targeted at:

- Providing special support, both in finance and in knowledge, for developing own brands;

- Technological upgrading of the firms operating in the sector in order to improve productivity and competitiveness and to increase production capacities;
- Ensuring that there is enough skilled labour for the industry for the coming period by improving vocational education in this area and by introducing the relevant professional schools;
- Increasing the attractiveness of the industry by improving the working conditions and ensuring that the level of wages corresponds to them;
- Removing existing tariff and non-tariff barriers imposed by the Western Balkan economies on imports in order to improve the price competitiveness of the industry;
- Introducing special financing schemes for the industry, such as concessional loans and credit guarantee schemes, to foster firm investment;
- Repairing the broken linkages between agricultural production from the region and the textile industry by promoting sheep and cattle breeding in order to improve the availability of cheaper and higher-quality raw materials.

9.3.3 Automotive

The overall strategy for the automotive value chain should be to turn towards higher value-added activities and to improve the cooperation between local and foreign companies from this area.

Concrete policy recommendations could be:

- Focusing efforts to attract foreign investors on technologically more advanced companies at the higher value-added end of the supply chains;
- Improving political stability, government effectiveness and institutional quality so that foreign investors are not driven away by these factors;
- Improving vocational education in the sector by stimulating cooperation with companies;
- Enhancing cooperation between foreign investors specialising in this area and local educational institutions (i.e. universities) by opening research centres, technological parks and the like;
- Enhancing the cooperation between local and foreign companies through B2B events, fairs etc. so that local companies become parts of value chain from this area;
- Ensuring that raw materials are sourced locally as much as possible by helping local companies adopt international standards;
- Providing financial support to local companies for investment in new technologies and innovation so that they could cooperate more closely with foreign companies.

9.3.4 Energy

The overall strategy for the energy value chain should be to focus on renewable energy, energy efficiency, reduction of emissions and reduction of pollution in accordance with the Green Agenda for the Western Balkans and the European Green Deal.

Concrete policy recommendations could be:

- Increasing public investment in renewable energy, energy efficiency, ecological transport, reduction of CO₂ emissions and reduction of pollution, which will have positive multiplier effects on the private sector as well;
- Improving access to finance for companies willing to invest in this area by designing special favourable credit lines and providing credit guarantee schemes;
- Enhancing the cooperation between higher education institutions and companies through opening technology parks, innovation centres etc.
- Fostering the adoption of new technologies by companies from this field through direct financial measures;
- Providing subsidies for use of renewable energy and energy efficiency;
- Removing certain existing tariff and non-tariff barriers that favour imports instead of domestic production of photovoltaics and similar products.

9.3.5 Tourism

The overall strategy for the tourism value chain should be to transform the sector into an industry that offers a unique and premium experience.

Concrete policy recommendations should look at:

- Enriching the supply of tourist services by tapping existing potentials and exploring inter-linkages between various activities;
- Developing alternative tourism activities by focusing on the areas in which the region is rich, such as ecotourism as well as rural, heritage, religious, spa, hiking, culinary and wine tourism, etc.;
- Increasing public investment in infrastructure related to tourism;
- Improving the promotion of the region to clients from the big global markets (EU, US, Asia) with the purpose of entering those markets and establishing the region as an alternative to conventional tourist destinations;
- Ensuring fair competition on the part of all relevant actors by reducing informality and increasing compliance with tax and other regulations;
- Upgrading the skills of the tourist workers by improving existing vocational education and providing special tailor-made professional education.

9.3.6 IT

The overall strategy for the IT value chain should be to focus on greater innovation while supporting the successful development of the sector in general.

Concrete policy recommendations should be targeted at:

- Providing special support for innovation activities through financial aid and guarantees, so that local innovative companies can become leaders in their fields of operation;
- Providing attractive ecosystem for the development of the sector by supporting start-ups, opening up technological parks etc.;

- Increasing the availability of IT workers by expanding the capacity of the educational institutions in this field;
- Providing favourable financing opportunities for firms that want to invest in this area and expand their activities.

CHAPTER

10

Chapter 10. Conclusions

The Western Balkan economies can improve the economic landscape of the region through more intensive regional cooperation. Stronger efforts for regional cooperation can positively affect region's research and innovation capacities and provide crucial support to better selection of innovation investments. Smart Specialisation plays a strategic role in this process, as it has the ability to open up new opportunities for regional cooperation. The Western Balkan economies are investing efforts into identifying their strengths and specialised areas to build their international competitiveness by applying the Smart Specialisation concept. Identification of regional value chains within Smart Specialisation priority areas could have positive effects on the competitiveness of the region.

This report provides a thorough analysis of the selected value chains that include several common priority domains identified in Smart Specialisation processes in the Western Balkan economies.

In regard to the textile industry value chain, the results show uneven development across the region. Albania and Bosnia and Herzegovina feature increasing employment and have revealed comparative advantage indicated in this area. North Macedonia recorded highest share of value added, while Bosnia and Herzegovina and Serbia are the most attractive economies in regard to the FDI. There is evidence for the expansion of the textile sector due to FDI inflows and the local SMEs. This area should be further developed by additional activities surrounding the manufacturing process, i.e. by branding and promotion. It was also shown that the trade structures strongly feature the manufacture of wearing apparel and the manufacture of leather and related products across the region, with the exception of Kosovo, where they are dominated by the exports of textiles. In regard to research potential, Serbia leads the way with Albania following. It should be also mentioned that the

support to businesses in this area is the strongest in Serbia and North Macedonia, whilst it requires further improvement in other economies.

Agri-food is an area where a significant potential is detected across the region. Revealed comparative advantage was demonstrated in all Western Balkan economies except for Albania, where the capacity in the processing industry should also be further improved, as well as in Montenegro. Although trade patterns demonstrate similarities in the Western Balkan region, there is a significant diversity of production potential across the region which can be exploited. In terms of research capacities in the agri-food area, Serbia dominates the landscape, being the most important research partner for Montenegro, North Macedonia and Bosnia and Herzegovina, as well as the second most important partner for Albania. Serbia is also the most attractive destination for foreign direct investments in the region. When publications per capita are taken into account, Serbia is joined on top by Montenegro. However, in terms of employment, the results suggest the downward trends in Bosnia and Herzegovina, Serbia, Albania and North Macedonia. It has been identified that supply, production and collection dominate the agri-food value chains. Further efforts should be put into connecting different-sized as well as various types of stakeholders through national and regional programmes and measures. Linking different actors in the value chains would help in enhancing the efficiency of the agri-food value chains. As agri-food is also one of the common Smart Specialisation priority areas in the Western Balkans, economic and innovation capacities should be further explored.

Unlike agri-food, the automotive value chain demonstrated strong potential only in three Western Balkan economies. Development of this sector in Serbia, Bosnia and Herzegovina and North Macedonia can be explained with the size of foreign investments that also affected the structure of value chains in this area. In addition, this sector is actively supported in several economies by governmental agencies and institutions through various programmes and initiatives. Trade structures are clearly dominated by the manufacture of mo-

tor vehicles and the sector shows strong dependency from international upstream industries and countries. Revealed comparative advantage was identified only in Serbia, which is also the most attractive destination for FDI, while North Macedonia showed an increasing trend in this area. However, it should be noted that the recent data demonstrate increase in exports for Albania, North Macedonia and Kosovo. Concerning the research potential of the automotive sector, Montenegro and Serbia lead the way with the most publications per capita.

In regard to the energy sector value chain, strong regional cooperation has been identified. Stakeholders from the region exhibited high cooperation levels between private, highly innovative companies in the manufacturing process and the provision of services. Vertical integration is observed among the actors in the regional value chain, whereas the companies in the value chain produce complex, high value-added products or services requiring advanced technology and know-how. It should be mentioned that generation of electricity greatly varies between the Western Balkan economies with thermal power plants dominating energy landscape in one group of economies, hydropower in another, while there are also different levels of cultivating wind and solar photovoltaic energy across the region. Revealed comparative advantage was demonstrated in all Western Balkan economies, except in North Macedonia. On the other hand, employment shows declining trend in the region, with the exception of Serbia. Serbia is also the most attractive destination for FDI and leads the way in publications per capita in this area, where it is joined by Montenegro.

Significant development potential was also observed in the tourism and IT value chains in the Western Balkan region. The structure of tourism value chain is characterised mostly by diversification, interconnectedness of actors and does not differ much between the Western Balkan economies. Employment in the tourism sector is increasing in the entire region. On the other hand, the share of the tourism sector in total value added varies strongly, being very high in Montenegro and very low in Kosovo. Revealed comparative advantage in

this sector is clearly demonstrated for Albania and Montenegro. The latter is also the most attractive destination for FDI, followed by North Macedonia. The touristic attractiveness of the region was on constant increase before the COVID-19 pandemic, which caused a noticeable decline. However, the recovery of the sector should be supported also by strong links with other sectors, such as food and beverage.

The IT sector is having a sound base for development in the Western Balkans and is further expanding, especially in the area of software engineering. Outsourcing of IT produce is evident across the region; however, a growth of companies developing local software solutions is also observed. This sector is highly developed in Serbia, where it records the highest share of value added in the region. Serbia also has several clusters that streamline targeted support to companies in this area. Revealed comparative advantage is apparent for Serbia and North Macedonia, and has an increasing trend. Employment in this area is on the constant rise in the region, with the exception of Montenegro. On the other hand, Montenegro leads the way in publications per capita in this area, followed by Bosnia and Herzegovina. The IT sector is increasingly receiving attention from governments in the Western Balkans, which design support programmes and measures for facilitating further growth of this industry.

By analysing each of these value chains, the report provides a solid base for directing further efforts towards strengthening competitiveness both at national and regional levels. It elaborates on possible actions that would be needed for addressing related challenges, threats and opportunities. The report reflects on the potential opportunities and issues in relation to new EU policies and megatrends. By presenting various types of linkages and relationships between different actors in the value chains through a regional perspective, the findings of this report can enhance opportunities for advancing economic and innovation potential through identification of possible crucial partnerships in the selected value chains.

REFERENCES

Adarov, A. and Stehrer, R. (2020), 'Implications of Foreign Direct Investment, Capital Formation and its Structure for Global Value Chains', *wiiw Working Paper*, No. 170, Vienna, November.

Astrov, V. et al. (2020), '*Autumn Forecast Report 2020*', Vienna Institute for International Economic Studies (wiiw), Vienna.

Banja, M., Dukanović, G. and Belis, C. (2020), '*Status of air pollutants and greenhouse gases in the Western Balkans*', Joint Research Centre Science for Policy Report, Publications Office of the European Union, Luxembourg.

Barbić, T., Bieber, F., Broz, T., Buturac, G., Mikulić, D. Stojčić, N., Tkalec, M., Tomić, I. and Vizek, M. (2020), '*The Impact of Digital Transformation on the Western Balkans: Tackling the Challenges towards Political Stability and Economic Prosperity*', Digital WB6+, Bonn.

Brennan L. and Rakhmatullin, R. (2015), 'Global Value Chains and Smart Specialisation Strategy. Thematic Work on the Understanding of Global Value Chains and their Analysis within the Context of Smart Specialisation', Joint Research Centre Science for Policy Report, JRC98014, Brussels.

Carrara S., Alves Dias P., Plazzotta B. and Pavel C. (2020), 'Raw materials demand for wind and solar PV technologies in the transition towards a decarbonised energy system', EUR 30095 EN, Publication Office of the European Union, Luxembourg, 2020, ISBN 978-92-76-16225-4, doi:10.2760/160859, JRC119941

CEE Bankwatch Network (2018), '*Western Balkans power sector future scenarios and the EBRD*', Briefing paper.

EEA (2015), 'The European Environment, State and Outlook: Assessment of Global Megatrends', European Environment Agency: Copenhagen. Available at: <https://www.eea.europa.eu/soer/2015/global/action-download-pdf> [5.11.2020].

European Commission (2015), Blending in the energy sector - Tools and Methods Series. Reference Document No. 19, (retrieved on 28 March 2021)

European Commission (2020a), 'Guidelines for the Implementation of the Green Agenda for the Western Balkans', *Commission Staff Working Document*, COM(2020) 641 final, European Commission, Brussels.

European Commission (2020b), '*Reinforced EU support to the Western Balkans in tackling the coronavirus crisis and post-pandemic recovery*', European Commission, Brussels.

GCPSE (2015), '*Foresight Manual*', United Nations Development Programme, Global Centre for Public Service Excellence, Singapore.

Grievesson, R. et al. (2020), '*Pushing on a String? An Evaluation of Regional Economic Cooperation in the Western Balkans*', Bertelsmann Stiftung, Vienna Institute for International

Economic Studies, Gütersloh, Germany.

Hajkowicz, S. (2015), *Seven Patterns of Change Shaping our Future*, CSIRO Publishing, Clayton South, Australia.

Hughes, G. (2012), 'Climate Change in the Western Balkans', UNEP, ENVSEC, Zoi environment network.

Hunya, G. and Adarov, A. (2020), 'Foreign Investments Hit by COVID-19 Pandemic. FDI in Central, East and Southeast Europe', Vienna Institute for International Economic Studies, Vienna.

Huszka, B. and Lessenka, T. (2020), 'Viral Vulnerability: How the Pandemic is Making Democracy Sick in the Western Balkans', *Policy Brief*, European Council on Foreign Relations.

Kleibrink, A., Radovanovic, N., Kroll, H., Horvat, D., Kutlaca, D. and Zivkovic, L. (2018), 'The Potential of ICT in Serbia: An Emerging Industry in the European Context', EUR 29558 EN, Publications Office of the European Union, Luxembourg.

Koopman, R., Wang, Z. and Wei, S.-J. (2014), 'Tracing Value-added and Double Counting in Gross Exports', *American Economic Review*, 104(2), pp. 459-494.

Landesmann, M. and Mara, I. (2021), 'Interrelationships between Human Capital, Migration and Labour Markets in the Western Balkans: An Econometric Investigation', *wiiw Working Paper* No. 196, March.

Leitner, Sandra M. (2021), 'Net Migration and its Skill Composition in the Western Balkan Countries between 2010 and 2019: Results from a Cohort Approach', *wiiw Policy Note/Policy Report* No. 47, March 2021.

Matijević, M. and Solaja, M. (2020), 'ICT in Serbia – At a Glance, 2020 Edition', Vojvodina ICT Cluster, Novi Sad.

McKinsey (2017), 'Trends and Global Forces', McKinsey Special Collections. Available at: https://www.mckinsey.com/~media/McKinsey/Business%20Functions/Strategy%20and%20Corporate%20Finance/Our%20Insights/Strategy%20and%20corporate%20finance%20special%20collection/Final%20PDFs/McKinsey-Special-Collections_Trends-and-global-forces.ashx

Milatović, J. and Chung, D. (2020), 'How can the Western Balkans electricity mix be made sustainable?', European Bank for Reconstruction and Development, London.

OECD (2016), 'An OECD Horizon Scan of Megatrends and Technology Trends in the Context of Future Research Policy', Danish Agency for Science, Technology and Innovation, Copenhagen.

OXFAM (2020), *Confronting Carbon Inequality - Putting Climate Justice at the Heart of the COVID-19 Recovery*, OXFAM Policy Paper.

Ponte, S. (2019), 'Business, Power and Sustainability in a World of Global Value Chains', Zed Books, London.

Reiter, O. and Stehrer, R. (2021), 'Value Chain Integration of the Western Balkan Countries and Policy Options for the Post-COVID-19 Period', *wiiw Policy Note/Policy Report*, No. 48, March.

Timmer, M.P., Dietzenbacher, E., Los, B., Stehrer, R. and de Vries, G.J. (2015), 'An Illustrated User Guide to the World Input-Output Database: The Case of Global Automotive Production', *Review of International Economics*, 23 (3): 575-605. <https://doi.org/10.1111/roie.12178>.

Timmer, M. P., Los, B., Stehrer, R. and de Vries G.J. (2016), 'Peak trade? An anatomy of the global trade slowdown', *GGDC Research Memorandum* (162).

UNDP (2017), '*Global Trends: Challenges and Opportunities in the Implementation of the SDGs*', United Nations Research Institute for Social Development, Geneva.

Vuković, A. and Vujadinović Mandić, M. (2018), '*Study on climate change in the Western Balkans region*', Regional Cooperation Council Secretariat, Sarajevo.

World Bank (2020), 'An Uncertain Recovery', *Western Balkans Regular Economic Report*, No.18, World Bank, Washington.

LIST OF ABBREVIATIONS AND DEFINITIONS

ALB	Albania
B2B	Business-to-business
B2C	Business-to-consumer
BIH	Bosnia and Herzegovina
DIHK	German Chambers of Commerce
EPO	European Patent Office
ETOI	European Tourist Bus Association
EU	European Union
GVC	Global value chain
IATA	International Air Transport Association
ICT	Information and communication technology
ILO	International Labour Organisation
IT	Information technology
IPR	Intellectual property rights
MC IOD	Multi-country input-output database
MKD	North Macedonia
MNE	Montenegro
NACE	Nomenclature Générale des Activités Économiques dans les Communautés Européennes
R&D	Research and Development
SBS	Structure of business survey
SEE	South-East Europe
SRB	Serbia
TTCI	Tourism Competitiveness Index
WB	Western Balkans
WEF	World Economic Forum
XKX	Kosovo

LIST OF BOXES

Box 2.1 Economy-based representation of the agri-food value chain	31
Box 2.2. Support organisations play an important role in the agri-food value chain.....	36
Box 3.1. Economy-based representation of the textile value chain	59
Box 4.1. Economy-based representation of the automotive value chain.....	82
Box 4.2. Dynamic support of the automotive sector	84
Box 5.1. Economy-based representation of the energy value chain	102
Box 5.2. Strong regional cooperation in the sector	104
Box 6.1. Economy-based representation of the tourism value chain	120
Box 7.1. Economy-based representation of the IT value chain.....	142
Box 7.2. Cluster cooperation in the IT sector in Serbia.....	144
Box 7.3. North Macedonia is lowering income tax in the ICT industry.....	147
Box 8.1. A closer look at the energy transition	160
Box 8.2. Agriculture's vulnerability to climate change.....	160

LIST OF FIGURES

Figure 2.1. Value added shares of the agri-food sector	13
Figure 2.2. Employment levels in the agri-food sector.....	13
Figure 2.3. Revealed comparative advantages in the agri-food sector.....	14
Figure 2.4. Value-added structure of gross exports in the agri-food sector.....	14
Figure 2.5. Intra-WB backward linkages in the agri-food sector	15
Figure 2.6. Relative GVC position of the agri-food sector.....	16
Figure 2.7. Gross exports in the agri-food sector	16
Figure 2.8. Distribution of agri-food companies by WB economies.....	21
Figure 2.9. Share of agri-food projects in all fDi projects	22
Figure 2.10. Distribution of the agri-food projects by economies.....	23
Figure 2.11. Technological patent network Agri-food for the West Balkan economies	25
Figure 2.12. Scientific publications in 2008-2020 in the agri-food sector.....	26
Figure 2.13. Scientific publications per capita in the agri-food sector, 2008-2020.....	27
Figure 2.14. Cooperation network WB economies in the agri-food sector, 2008-2020.....	28
Figure 2.15. Active organisations* in the agri-food sector, 2008-2020.....	28
Figure 2.16. The size of enterprises at different levels of the agri- food value chain.....	30
Figure 2.17. The typical occupation of employees in the agri-food value chain.....	37
Figure 3.1. Value-added shares of the textile sector	39
Figure 3.2. Employment levels in the textile sector.....	40
Figure 3.3. Revealed comparative advantages in the textile sector.....	40
Figure 3.4. Value-added structure of gross exports in textiles	41
Figure 3.5. Intra-WB backward linkages in textiles.....	42
Figure 3.6. Relative GVC position in textiles.....	42
Figure 3.7. Trade developments (NACE 2-digit) in textiles	43
Figure 3.8. Distribution of companies by WB economies in textiles.....	49
Figure 3.9. Share of textile projects in all fDi projects.....	50
Figure 3.10. Distribution of the textile projects by economies.....	51
Figure 3.11. Patent network in the textile value chain	53

Figure 3.12. Scientific publications 2008-2020 in the textile sector in the WB economies.....	54
Figure 3.13. Scientific publications per capita, 2008-2020.....	55
Figure 3.14. Cooperation network WB economies, Textiles, 2008-2020.....	56
Figure 3.15. Active organisations in the textile sector.....	56
Figure 4.1. Value-added shares of the automotive industry.....	63
Figure 4.2. Employment levels in the automotive industry.....	64
Figure 4.3. Revealed comparative advantages in the automotive industry.....	64
Figure 4.4. Value added structure of gross exports in the automotive industry.....	65
Figure 4.5. Intra-WB backward linkages in the automotive industry.....	66
Figure 4.6. Relative GVC position in the automotive industry.....	66
Figure 4.7. Detailed trade structures (NACE 2-digit) in the automotive industry.....	67
Figure 4.8. Distribution of automotive companies by WB economies.....	72
Figure 4.9. Share of automotive projects in all fDi projects.....	73
Figure 4.10. Distribution of automotive projects by economies.....	74
Figure 4.11. Patent network in the automotive sector.....	76
Figure 4.12. Scientific publications 2008-2020 in the automotive sector.....	78
Figure 4.13. Scientific publications per capita in the automotive sector.....	78
Figure 4.14. Cooperation network WB economies, 'Automotive', 2008-2020.....	79
Figure 4.15. Cooperation network WB economies, 'Automotive', 2008-2020.....	79
Figure 5.1. Value-added shares of the energy sector.....	87
Figure 5.2. Employment levels in the energy sector.....	88
Figure 5.3. Revealed comparative advantages in the energy sector.....	88
Figure 5.4. Value-added structure of gross exports in the energy sector.....	89
Figure 5.5. Intra WB backward linkages in the energy sector.....	90
Figure 5.6. Relative GVC position of the energy sector.....	90
Figure 5.7. Detailed trade structures (NACE 3-digit) of the energy sector.....	91
Figure 5.8. Distribution of energy firms by WB economies.....	94
Figure 5.9. Share of energy projects in all fDi projects.....	95
Figure 5.10. Distribution of the energy projects by economy.....	96
Figure 5.11. Scientific publications 2008-2020 in 'Energy'.....	98
Figure 5.12. Scientific publications per capita 2008-2020 in 'Energy'.....	98
Figure 5.13. Cooperation network WB economies, 'Energy', 2008-2020.....	99
Figure 5.14. Active organisations* 'Energy'.....	99

Figure 6.1. Value added shares of the tourism sector.....	107
Figure 6.2. Employment levels in the tourism sector.....	108
Figure 6.3. Revealed comparative advantages in the tourism sector.....	108
Figure 6.4. Value-added structure of gross exports in the tourism sector.....	109
Figure 6.5. Intra-WB backward linkages in the tourism sector.....	110
Figure 6.6. Relative GVC position in the tourism sector.....	110
Figure 6.7. Distribution of tourism firms by WB economies, 2019.....	113
Figure 6.8. Share of tourism projects in all fDi projects.....	114
Figure 6.9. Distribution of tourism projects by country.....	115
Figure 6.10. Scientific publications, dynamic 2008-2020 in Tourism.....	116
Figure 6.11. Scientific publications, dynamic 2008-2020, per-capita, Tourism ...	117
Figure 6.12. Co-operation network WB economies, Tourism, 2008-2020.....	118
Figure 6.13. Active organisations, 2008-2020, in the tourism value chain.....	118
Figure 7.1. Value added shares of the IT sector.....	125
Figure 7.2. Employment levels in the tourism sector.....	126
Figure 7.3. Revealed comparative advantages of the IT sector.....	126
Figure 7.4. Value added structure of gross exports in the IT sector.....	127
Figure 7.5. Intra-WB backward linkages in the IT sector.....	128
Figure 7.6. Relative GVC position in the IT sector.....	128
Figure 7.7. Distribution of companies in IT by WB economies, in 2019.....	132
Figure 7.8. Share of IT projects in all fDi projects.....	133
Figure 7.9. Distribution of the IT projects by economies.....	134
Figure 7.10. Patent network in IT.....	136
Figure 7.11. Scientific publications in IT, 2008-2020.....	137
Figure 7.12. Scientific publications per capita in IT, 2008-2020.....	137
Figure 7.13. Cooperation network WB economies in IT, 2008-2020.....	138
Figure 7.14. Active organisations in IT, 2008-2020.....	138
Figure 8.1. Digital skills gap in the WB economies compared with the EU27 average.....	151
Figure 8.2. CO2 emissions intensity of GDP for the WB.....	158
Figure 8.3. Indexes of industrial production during 2020 (corresponding period of previous year = 100).....	165
Figure 8.4. Stock of migrants abroad, country of birth, in million.....	170
Figure C.1. Value-added shares in Western Balkans (in %), 2012-2018.....	216
Figure C.2. Value-added shares in Western Balkan economies (in %), 2018.....	216

Figure C.3. Employment by industries (as a % of total employment in the WB economies), 2019	217
Figure C.4. Female employment by industries (as a % of total employment in the respective industry), 2019.....	217
Figure C.5. Backward linkages (foreign value-added content in exports), 2012-2018.....	219
Figure C.6. Forward linkages (value added in third countries' exports, in % of gross exports), 2012-2018.....	219
Figure C.7. GVC integration (in % of gross exports), 2012-2018.....	220
Figure C.8. Relative GVC positioning, 2012-2018.....	220
Figure C.9. Relative GVC positioning by country, 2018.....	221
Figure C.10. Value-added content of gross exports in %, 2011-2018	221
Figure C.11. Backward linkages to WB economies (in % of gross exports), 2011-2018.....	222
Figure C.12. Backward linkages to EU27 (in % of gross exports), 2011-2018.....	222
Figure C.13. Revealed comparative advantages (in logs), 2012-2018.....	224
Figure C.14. Export shares in % of total exports, 2012-2018.....	224
Figure C.15. World market shares in %, 2012-2018.....	225
Figure C.16. Revealed comparative advantages (in logs) by country, 2018.....	225
Figure C.17. Export shares in % of total exports by country, 2012-2018	226
Figure C.18. World market shares in %, 2012-2018.....	226

LIST OF TABLES

Table 1.1. Selection of industries and value chains.....	7
Table 2.1. Detailed industry structure of CA, 2019.....	17
Table 2.2. Detailed industry structure of C10 (Manufacture of food products), 2019.....	18
Table 2.3. Overview of companies in the agri-food sector (<i>in 2019</i>).....	21
Table 2.4. Patent network – Most frequently featured subclasses agri-food.....	25
Table 3.1. Detailed industry structure (textiles, wearing apparel and leather, CB), 2019.....	44
Table 3.2. Detailed industry structure of C13 (Manufacture of textiles), 2019.....	45
Table 3.3. Detailed industry structure of C14 (Manufacture of wearing apparel), 2019.....	46
Table 3.4. Detailed industry structure of C15 (Manufacture of leather and related products), 2019.....	47
Table 3.5. Overview of companies in the textiles sector (2019).....	49
Table 3.6. Patent network – Most frequently featured textile subclasses.....	53
Table 4.1. Detailed industry structure (NACE CL), 2019.....	68
Table 4.2. Detailed industry structure of C12 (Manufacture of motor vehicles, trailers and semi-trailers), 2019.....	69
Table 4.3. Detailed industry structure of C30 (Manufacture of other transport equipment), 2019.....	70
Table 4.4. Overview of companies in the automotive sector (<i>in 2019</i>).....	72
Table 4.5. Patent network – most frequently featured subclasses ‘Automotive’ ...	77
Table 5.1. Detailed industry structure (D), 2019.....	92
Table 5.2. Overview of companies in the energy sector, 2019.....	94
Table 6.1. Detailed industry structure (Tourism, I), 2019.....	111
Table 6.2. Overview of companies in the tourism sector, 2019.....	113
Table 7.1. Detailed industry structure (IT, NACE JC), 2019.....	129
Table 7.2. Detailed industry structure of J63 (Information service activities), 2019.....	130
Table 7.3. Overview of companies in the IT sector, 2019.....	132
Table 7.4. Patent network – Most frequently featured subclasses IT.....	136
Table 7.5. Households – level of internet access (percentage of individuals).....	139
Table 7.6. Individuals - computer use, % of individuals.....	140
Table 7.7. The share of the IT sector in GDP in %.....	141

Table 8.1. Challenges for GVC integration in the WB, emerging from digitalisation and automation, in a PESTLE framework	153
Table 8.2. Opportunities for GVC integration in the WB, emerging from digitalisation and automation, in a PESTLE framework	154
Table 8.3. Sectoral challenges for the WB emerging from digitalisation and automation in the selected value chains.....	155
Table 8.4. Sectoral opportunities for the WB emerging from digitalisation and automation in the selected value chains.....	156
Table 8.5. Challenges for GVC integration of the WB, emerging from the green transition, in a PESTLE framework.....	161
Table 8.6. Opportunities emerging from the green transition for the WB economies in a PESTLE framework.....	162
Table 8.7. Sectoral challenges emerging from the green transition for the WB economies for the selected value chains.....	163
Table 8.8. Sectoral opportunities emerging from the green transition for the WB economies for the selected value chains	164
Table 8.9. Challenges for GVC integration for the WB, emerging from COVID-19, in a PESTLE framework.....	167
Table 8.10. Opportunities for GVC integration for the WB, emerging from COVID-19, in a PESTLE framework.....	168
Table 8.11. Sectoral challenges emerging from COVID-19 for the WB in a PESTLE framework in the selected value chains.....	168
Table 8.12. Sectoral opportunities emerging from COVID-19 for the WB in a PESTLE framework in the selected value chains.....	169
Table 8.13. Challenges for GVC integration for the WB, emerging from migration, in a PESTLE framework.....	171
Table 8.14. Opportunities for GVC integration for the WB, emerging from migration, in a PESTLE framework	172
Table 8.15. Sectoral challenges emerging from migration for the WB economies in the selected value chains	172
Table 8.16. Sectoral opportunities emerging from migration for the WB economies in the selected value chains	173
Table 8.17. Assessment of responses to challenges and fostering of opportunities in order to improve the competitiveness of GVCs (taking on more tasks, increased value added).....	175
Table 9.1. Overview of barriers and constraints across value chains	182
Table B.1. Sector classification used for analysis.....	212
Table C.1. Foreign direct investment inflows 2012-2019, in EUR million.....	228
Table C.2. Foreign direct investment stocks	230

Table C.3. Summary tables	232
Table C.4. Number of patents by country.....	239
Table C.5. Number of patents by type	239
Table C.6. Distribution of patent families at different NACE Rev. 2 levels and by type of patent applicant.....	242
Table C.7. Shares of patent families at different NACE2 levels.....	243
Table C.8. Shares of trademarks at different NACE2 levels	244
Table C.9. Mapping NACE Rev. 2 classification with corresponding publication subject areas, and scientific output in the period 1996-2019.....	246
Table C.10. Data on the scientific output, productivity and impact (measured by the number of documents, citation and H-index for WB economies in the period 1996-2019).....	250
Table C.11. Export and innovation promotion programmes	254
Table C.12. Business support organisations	255
Table C.13. Overview of S3 in the Western Balkans.....	256
Table C.14. S3 by industry and common regional market strategy.....	257
Table D.1. Top 30 companies in the Agri-food sector.....	259
Table D.2. Top 30 companies in the Textiles sector	260
Table D.3. Top 30 companies in the Automotive sector	262
Table D.4. Top 30 companies in the Energy sector.....	264
Table D.5. Top 30 companies in the Tourism sector.....	266
Table D.6. Top 30 companies in the ICT sector.....	268
Table E.1. Statistics on the participants in the interviews and surveys	271

ANNEX



A. Description of data sources

This section lists the data sources on which the quantitative analyses in the main report are performed. These include (i) data on production integration (multi-country input-output data), trade, and foreign direct investment (FDI), (ii) detailed industry-level data on gross output, value added and employment, (iii) firm-level information for performance and foreign direct investments, and (iv) science and innovation indicators.

A.1 Data on production integration and trade

A.1.1 wiiw multi-country input-output database

The value chain integration of the Western Balkan economies with the EU27 and other countries in the world is documented using GVC indicators (see Appendix Section B). These indicators are derived from the wiiw multi-country input-output data (referred to as 'wiiw MC IOD').⁴⁵ This database comprises international trade flows of intermediates and final goods of 50 countries and 38 industries and covers the period 2005-2018. The database is an updated and extended version of the 2016 release of the World Input-Output Database (WIOD).⁴⁶ At this stage the wiiw MC IOD includes all EU27 countries together with the non-EU European countries Iceland, Norway, Switzerland, the UK, the six Western Balkan economies (Albania, Bosnia and Herzegovina, Kosovo, North Macedo-

(45) These data are not released as including compilations of data which are not officially reported.

(46) See Timmer et al. (2015) and Timmer et al. (2016) for a documentation of this previous WIOD release. The update and extension in the wiiw MC IOD is documented in Reiter and Stehrer (2020).

nia, Montenegro and Serbia), Russia, Turkey and Ukraine.⁴⁷ Additionally, the data cover the biggest non-European economies, such as Australia, Brazil, Canada, China, India, Indonesia, Japan, Mexico, South Korea, Taiwan and the United States. Furthermore, the database includes an estimate of the rest of the world (RoW) region.

A.1.2 Trade data

To gain some further insights into trade structures, we draw on the EU COMEXT trade data, which provide detailed bilateral trade data for the EU Member States and other European countries, including the Western Balkan economies (particularly also Kosovo).

A.1.3 FDI data

Another important driver of value-chain integration are FDI flows. For the Western Balkan economies, the wiiw FDI database compiled from national sources is used. It provides FDI data for 23 countries in Central, East and Southeast Europe and covers FDI inflows and outflows and inward and outward stocks by components, by partners or by activity on an annual basis, following the IMF BPM6/ OECD BMD4 definitions and methodological guidelines.⁴⁸ Therefore we will draw on these data.

A.2 Detailed industry, employment and firm-level data

A.2.1 Employment data

In this study employment is seen an important part for an analysis of value chains in the Western Balkans, as these economies generally have a chronic problem with high unemployment as well as low female labour force participation rates. In

(47) Belarus and Moldova are still missing from the full coverage of all European countries due to severe data constraints.

(48) See Adarov and Stehrer (2020) for a detailed analysis based on these data.

order to analyse the state of employment by different sectors, we use data from the International Labour Organisation (ILO). These data are available in a two-digit ISIC-Rev. 4 classification, which is easily matched to the NACE Revision 2 classification used by the other data sources. These data are generally available for all six Western Balkan economies on an annual basis until 2019.

A.2.2 Industry-level data

Eurostat's Structural Business Statistics (SBS) provide detailed data that for a breakdown to the 3- (or 4-) digit level for industries. These data are used to document more detailed information at the NACE Rev. 2- to 3-digit level for gross output, value added and employment. However, these data are only available for Bosnia and Herzegovina (since 2011), North Macedonia (since 2012) and Serbia (since 2016).

A.3 Firm-level data

For a further in-depth analysis of the selected value chains we use more detailed data at the firm level that allow us to identify important players from a firm perspective.

A.3.1 Orbis data

We use Orbis data to identify important players in the selected industry's value chains. Bureau van Dijk Electronic Publishing gathers financial information on companies globally and compiles specific packages of data for business, research and academic purposes. The Orbis and Amadeus databases are two such packages prepared by this supplier. While Orbis covers a wide range of firms from small to medium to large enterprises (78 million enterprises in Europe, including banks, insurers and small non-publishing enterprises), its detailed financial information is limited. However, we propose using the Orbis database as the main source of data for this project, as it also covers employment information for small and medium-sized enterprises (SMEs). Orbis contains balance-sheet information of firms in addition to detailed information on their location (postcodes),

ownership (as well as legal and public entities), patents, subsidiaries, etc. Orbis classifies the activities of firms according to the 4-digit NACE Rev. 2 classification. The coverage of these data across the Western Balkan economies may differ, which must, however, be assessed when working on the data. Unfortunately, a potential unequal availability of data for the WB economies cannot be resolved but only documented.

A.3.2 fDI Markets database

The fDI Markets cross-border investment monitor database (<https://www.fdimarkets.com/>) provides records of individual cross-border greenfield investment projects by industries and business functions from 2003 onwards. The database is global in scope, and in addition to the number of projects it also contains information on the capital investment and job creation involved. The database only records new investment projects, referred to as greenfield investments, as well as major extensions of existing projects. This subset of FDI projects is more closely related to real investments – understood as additions to the capital stock – than the aggregate FDI stock, which is for many countries dominated by mergers and acquisitions and inter-company financial flows.

Specifically, fDi Markets from the Financial Times is the most comprehensive database of cross-border greenfield investments covering all countries and sectors since 2003. Each entry in the database is a project and the data are rich in detail, providing information on the number of investment projects, the creation of jobs, the donor and recipient country, the year of investment, the recipient sector, the function of the project, the type of project (new, expansion, co-location), and the capital investment (capital expenditures) associated with the project.

One has to keep in mind, however, that the fDi Markets database is less systematic than FDI data from official balance-of-payments data, as the recorded projects reflect commitments or intentions of firms to undertake the respective investment projects. However, the database is cleared from projects that have not materialised and therefore is deemed to be reliable.

A.4 Science and innovation data

A.4.1 Patent data

The Economica Institute (Austria) operates a patent database listing over 90 sources worldwide. The database includes information from the European Patent Office (EPO), which tracks innovation activity in 195 countries around the world (the 'global patent universe', according to the United Nations). In total, the database contains over 120 million documents. The evaluable fields of patents can be differentiated according to different dimensions to allow a more in-depth analysis based on the following criteria: chronological (priority date, publication date, date of application); geographical (company's location or residence of the inventor); organisational (patent applicant); human-related (inventor); technological (patent classification and via concordance table also NACE Rev. 2 2-digit-level – see details in Deliverable 2); and content (title and abstract). Patents are intellectual property rights that grant protection in a specific country or countries. Therefore, patent applications are often filed for inventions at various national or regional patent offices or with the World Intellectual Property Organisation. If there are several applications or publications (in different countries) for a particular invention, we speak of a 'patent family'. A patent family thus groups together all patent applications for the same invention.

A.4.2 Scopus

The Scopus database – one of the central citation databases for scientific and research publications with about 80 million documents – is used to evaluate scientific publications in this study. The period considered covers the years 2000 to 2020, and therefore the latest scientific developments. Data on scientific potential are used to define the strongest position and specialisations in certain fields, as scientific potential is a major factor defining regional capabilities. In this context collaborations between the Western Balkan economies and European authors in basic research can be determined and shown in network diagrams, for example.

A.4.3 Trademarks

The World Intellectual Property Organisation (WIPO) collects worldwide trademarks in its Global Brand Database (GBD). This database contains information about the owner of the trademark and the classes of goods and services under which the current trademark is stored. The classification is based on the Nice Classification (NCL) system, with a total of 45 classes (34 classes of goods and 11 classes of services). For the WB economies the development of the registered trademarks is determined. The distribution of the trademarks according to the Nice classification is calculated, and the designation of the property right according to countries is shown.

ANNEX

B

B. Methodological description of quantitative indicators used in the report

In this section we provide technical details on the indicators used for the selection and description of industries and value chains. The indicators used are classified into economic performance indicators, innovation and science indicators, and qualitative information.

1 Quantitative economic performance indicators:

(a) Size of the industries as a share of total value added in industries A-N (see [Table B.1](#)) to indicate the relative importance of these industries for income and employment.

(b) Dynamics of total employment in each industry over the period 2012-2019.

2 Indicators of GVC participation:

The conventional indicators of backward and forward GVC participation are used: backward and forward integration as a percentage of gross exports and the related global value chain (GVC) integration index. Specifically, the following indicators are presented (following Koopman et al., 2014):

■ Backward GVC participation

$$GVC_{ijt}^B = \frac{FV_{ijt}}{X_{ijt}}$$

indicating the domestic and foreign value added content in exports

■ Forward GVC participation

$$GVC_{ijt}^F = \frac{IV_{ijt}}{X_{ijt}}$$

indicating the domestic value-added content of gross exports of third countries

■ Total GVC participation

$$GVC_{ijt}^T = GVC_{ijt}^F + GVC_{ijt}^B = \frac{FV_{ijt}}{X_{ijt}} + \frac{IV_{ijt}}{X_{ijt}}$$

as the sum of backward and forward participation

■ Relative GVC position

$$GVC_{ijt}^P = \ln\left(1 + \frac{IV_{ijt}}{X_{ijt}}\right) - \ln\left(1 + \frac{FV_{ijt}}{X_{ijt}}\right)$$

where the first term measures the forward GVC participation in

$$GVCs \quad GVC_{ijt}^F = \frac{IV_{ijt}}{X_{ijt}}$$

A further distinction of these linkages with respect to the Western Balkan region, the EU27 and the rest of the world is included.

3 Revealed comparative advantages of exports using the Balassa index indicating specialisation performance. The indicator used is defined as:

$$RCA = \frac{E_i^c}{\sum_k E_k^c} \bigg/ \frac{\sum_c E_k^c}{\sum_{k,c} E_k^c}$$

and presented in log terms. Thus, a positive value indicates a comparative advantage (according to the Balassa index).

4 Detailed analysis of the value chains:

(a) For a more detailed analysis of the number of enterprises, the value added at factor costs and the number of persons employed indicators from the Structure of Business Services (SBS) database are presented at the NACE 2- and 3-digit level. Data are only available for Bosnia and Herzegovina, North Macedonia and Serbia.

(b) Detailed trade structures for each industry are presented at the NACE 2- and 3-digit level based on the EU COMEXT data.

5 Firm level analysis:

(a) The Orbis database is used to present indicators on the number of operating firms, total assets, operating revenue/ turnover, costs of employees, number of employees, foreign-owned, average

revenue per firm, average number of employees per firm, average gross monthly salary, revenue per 1 EUR of assets, and revenue per worker.

(b) The fDI markets database is used to indicate the share of projects for each industry as a share of the selected value chains (for capital investment and employment) and the allocation across the WB economies.

6 Science and technology indicators:

(a) The existence of patenting activities in the Western Balkan economies is documented. These activities are broken down by NACE industry to the extent possible. Patent cooperations are mapped

at the country level. This information is based on the Economica patents database.

(b) Further, scientific publications and citations by field (based on the SC Imago database for scientific output) are explored in absolute numbers and relative to population. These provide important information on scientific output relevant for specific value chains and industries.

The industries covered are the market economy industries including agriculture, manufacturing, and business services. These are listed in [Table B.1](#), where the selected industries for detailed analysis are highlighted.

Table B.1. Sector classification used for analysis

Nr.	NACE Rev. 2		Description (NACE Rev. 2)
1	A01-A03	A	Agriculture, forestry and fishing
2	B05-B09	B	Mining and quarrying
3	C10-C12	CA	Food products, beverages, and tobacco products
4	C13-C15	CB	Textiles, apparel, leather and related products
5	C16-C18	CC	Wood and paper products, and printing
6	C19	CD	Coke and refined petroleum products
7	C20	CE	Chemicals and chemical products
8	C21	CF	Basic pharmaceutical products and pharmaceutical preparations
9	C22_C23	CG	Rubber and plastic products, and other non-metallic mineral products
10	C24_C25	CH	Basic metals
11	C26	CI	Computer, electronic and optical products
12	C27	CJ	Electrical equipment

Nr.	NACE Rev. 2		Description (NACE Rev. 2)
13	C28	CK	Machinery and equipment n.e.c.
14	C29_C30	CL	Motor vehicles, trailers and semi-trailers
15	C31-C33	CM	Furniture, and repair and installation of machinery and equipment
16	D35	D	Electricity, gas, steam and air conditioning supply
17	E36-E39	E	Water supply; sewerage, waste management and remediation activities
18	F41-F43	F	Construction
19	G45_G47	G	Wholesale and retail trade; repair of motor vehicles and motorcycles
20	H49_H53	H	Transportation and storage
21	I55_I56	I	Accommodation and food service activities
22	J58-J60	JA	Publishing, audio-visual and broadcasting activities
23	J61	JB	Telecommunications
24	J62_J63	JC	IT and other information services
25	K64-K66	K	Financial and insurance activities
26	L68	L	Real estate activities
27	M69-M71	MA	Legal, accounting, management, architecture, engineering, technical testing, and analysis activities
28	M72	MB	Scientific research and development
29	M73-M75	MC	Other professional, scientific, and technical activities
30	N77-N82	N	Administrative and support service activities

Sources: NACE Revision 2.

ANNEX



C. Presentation of quantitative and qualitative indicators for selection of value chains

In this section the quantitative indicators (formally described in Appendix Section B) are presented graphically for the whole Western Balkan region.

C.1 Size indicators

C.1.1 Value-added shares

Figure C.1 shows the share of the selected industries in the total economy.⁴⁹ As can be seen, industry A (agriculture) has a large share of around 12% and together with the food industry (CA) accounts on average for around 17% of the region's value added. The next most important industry is energy (D) with around 5%, followed by tourism with 4%. The ICT industries together also account for a share of around 4%. The textile and clothing industry (CB) and the automotive industry (CL) account on average for 2.3% and 1%, respectively. Among the industries not selected for further analyses, construction (F) with almost 10%, wholesale and retail trade (G) with close to 20%, and real estate activities (L) with around 10% account for significantly higher shares. *Figure C.2* indicates how these shares differ across the six economies in 2018. To highlight important differences, Albania shows a high share of value added in agriculture (A), whereas in other economies this applies to food processing (CA); for North Macedonia it is textiles and clothing (CB) and for Montenegro it is tourism (I); Serbia shows a significantly higher share in IT (industry JC).

(49) In the graphs the industries selected for detailed investigation are highlighted by their names.

C.1.2 Employment

The following two figures show the total employment in each of the industries, as well as the employment of women. Regarding total employment, the biggest employer by far in the WB region is agriculture, with 19% of total employment. Tourism, textiles and food processing are also big employers, each of them accounting for more than 3% of total employment.

Looking at the share of female employment, the sector with the highest share is the textile industry, with 78% of female workers. In agriculture, food processing and automotive this share is above 40%, in the other industries it is below that level.

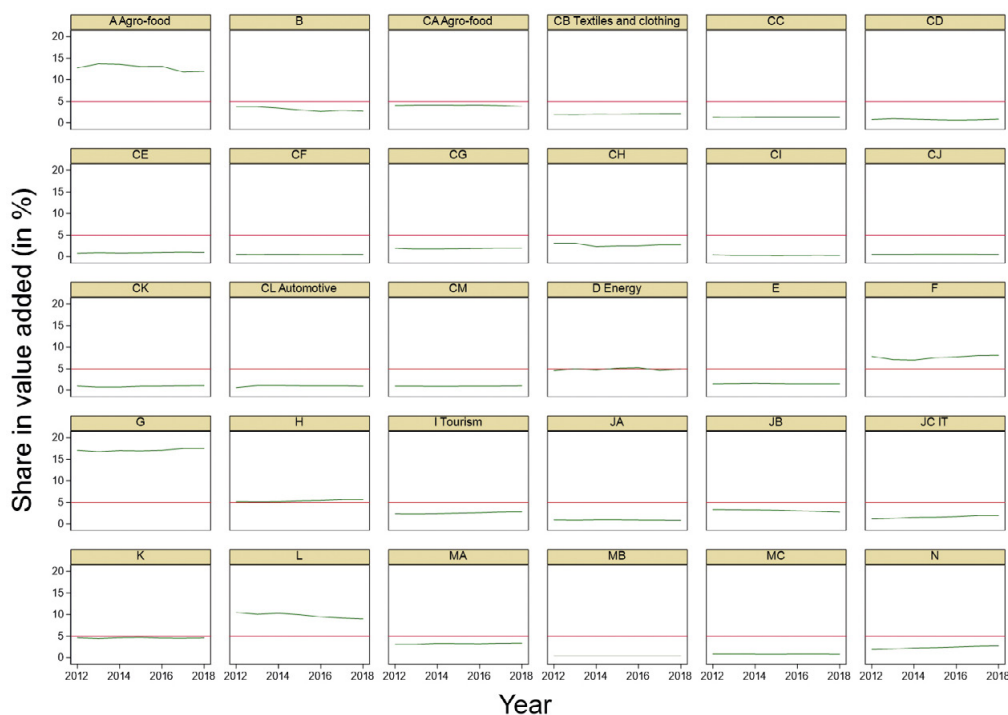
C.2 GVC integration and trade specialisation

C.2.1 GVC integration

The next figures present the GVC integration indices for all industries (see Appendix Section B for the formulas). Concerning backward linkages (measured as the foreign content of exports, see *Figure C.5*), the share of the total economy is around 35% (mostly driven by a few manufacturing industries). Significantly higher shares are indicated for the automotive industry (CL), whereas the share for textiles and clothing (CB) is close to the average. The other selected industries are below this average but still in the range of 20-30%. *Figure C.6* shows the forward integration measure (i.e. a country-industry's value added directly and indirectly embodied in other countries' exports). Here energy (D) shows a high forward linkage; however, it should be noted that this index can be strongly upward-biased as expressed relative to exports (which can in some cases be very small).⁵⁰ Combining both indicators (see *Figure C.7*) from the selected industries, energy (D) is the most integrated sector (as for this the forward linkages are dominant – see above).

(50) This also applies for industries K and L (not shown) because of this.

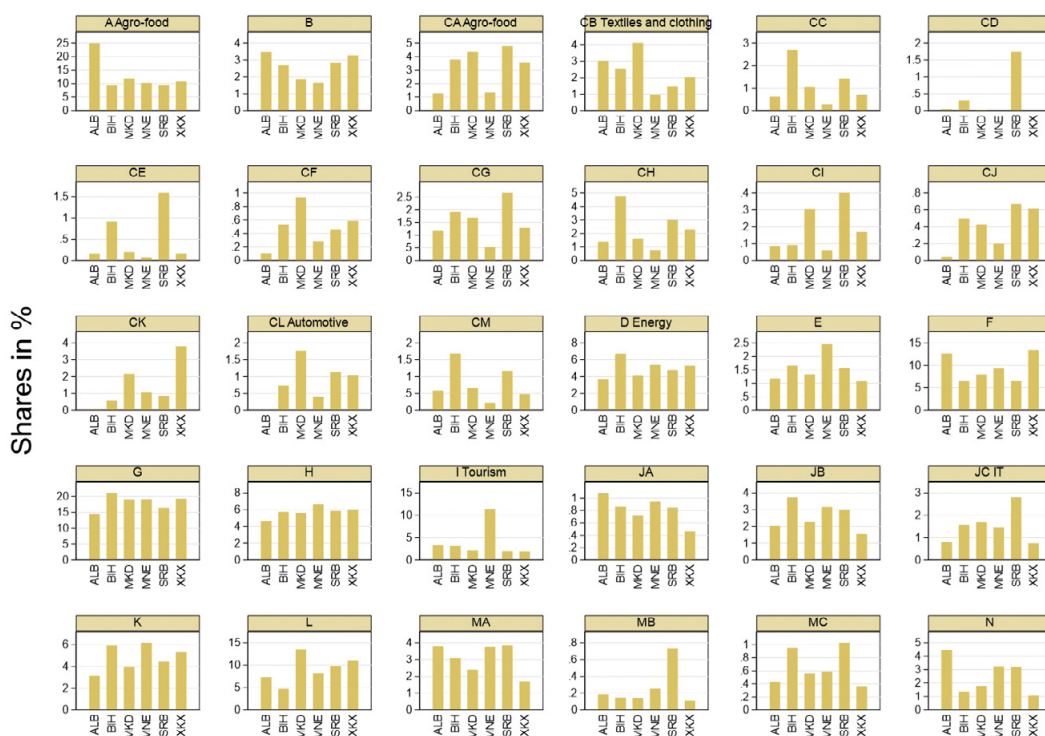
Figure C.1. Value-added shares in Western Balkans (in %), 2012-2018



Note: (1) See Table B.1 for list of industries. Names are included for selected industries.

Sources: wiiw MC IOD (Version 11/2020); own calculations.

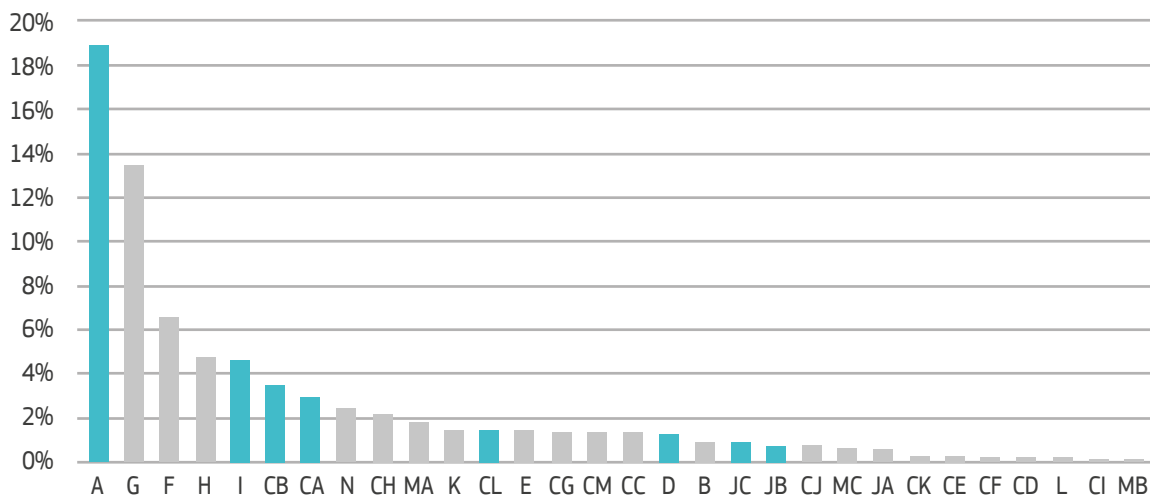
Figure C.2. Value-added shares in Western Balkan economies (in %), 2018



Note: (1) See Table B.1 for list of industries. Names are included for selected industries.

Sources: wiiw MC IOD (Version 11/2020); own calculations.

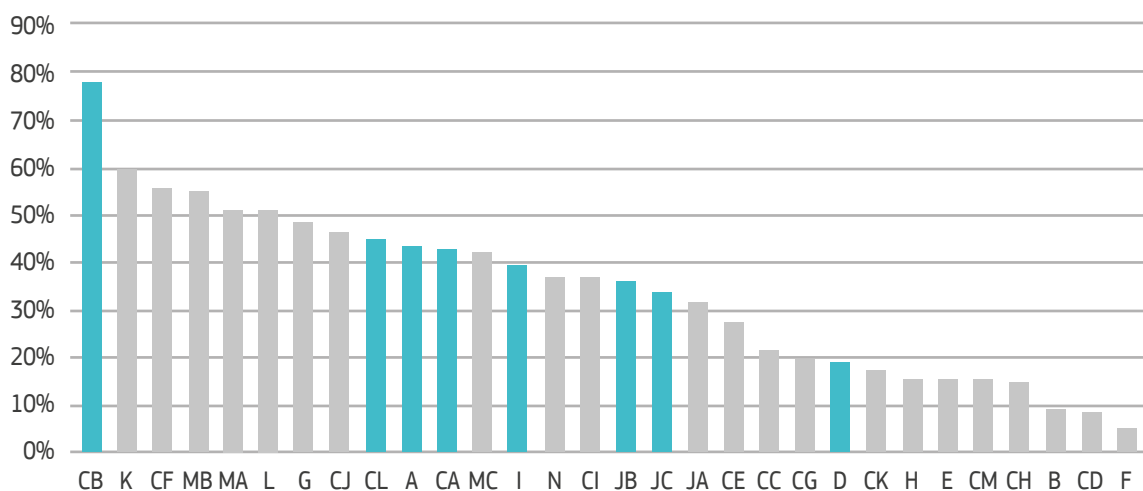
Figure C.3. Employment by industries (as a % of total employment in the WB economies), 2019



Note: Total for all Western Balkan economies. See [Table B.1](#) for list of industries.

Sources: International Labour Organisation.

Figure C.4. Female employment by industries (as a % of total employment in the respective industry), 2019



Note: Total for all Western Balkan economies; see [Table B.1](#) for list of industries.

Sources: International Labour Organisation.

The other selected industries are characterised by average or slightly below-average GVC integration.

Finally, considering the relative GVC integration measure in [Figure C.8](#), which measures whether an industry is predominantly backward- or forward-linked, one can see that energy is relatively more forward-linked, as already discussed above. The relative GVC positioning is comparatively more balanced for agriculture (A) and tourism (I), whereas IT (JC) shows even slightly higher relative forward linkages. For the other selected industries the backward linkages dominate.

Specifically, the automotive industry (CL) is dominated by strong backward linkages (i.e. relying on intermediary imports). It should be noted that the magnitude of GVC integration for the automotive industry is relatively low compared with the other manufacturing industries. This is because the automotive industry in these economies is still based on high imports and relatively low domestic value added. As most of the big companies operating in the sector are rather new in the Western Balkans, this pattern is quite expected. With time it is likely to change, as the new companies will establish themselves in the local markets and will start to produce more locally and to integrate local companies more into their production processes. Thus, the share of domestic value added is likely to grow with time, and with that, the forward linkages.

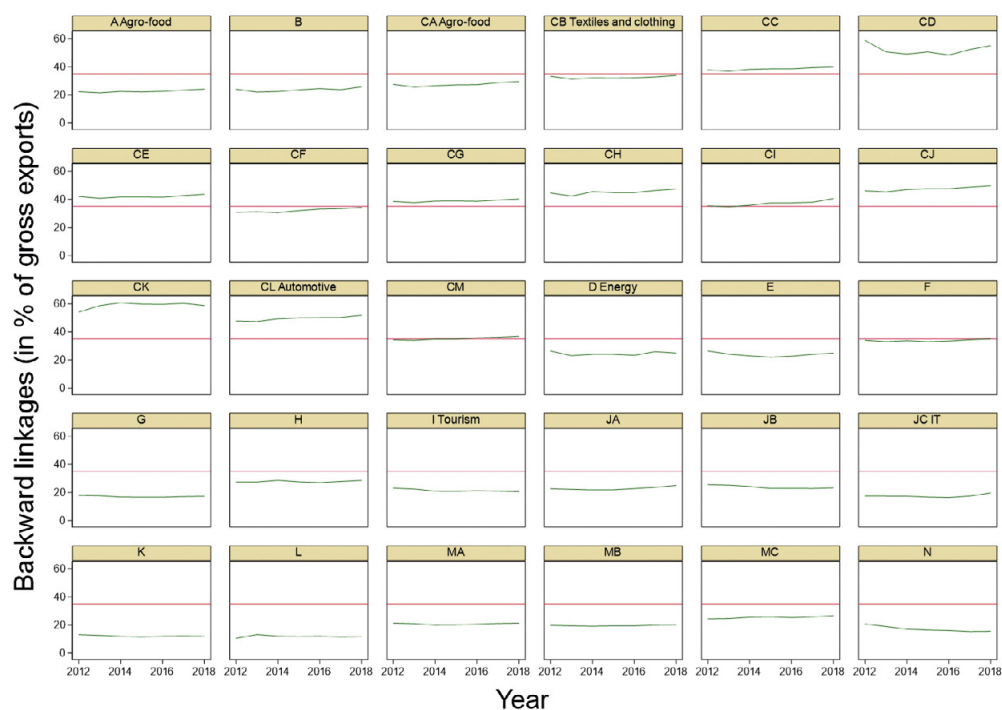
[Figure C.9](#) shows the relative GVC positioning across the economies in 2018. One can see that the patterns are similar across the economies. Differences can be seen for Albania, which shows relatively higher forward linkages in agriculture (A) but stronger backward linkages in tourism (I).

[Figure C.10](#) shows the value-added content of exports in the respective industries. Given the results of the foreign content in exports above, the domestic content dominates, ranging between 60% and 80% of the gross export value. The remaining share is captured by the value-added content from the EU27 and the other countries, but with the relative share of these two country groups differing across industries. The other Western Balkan economies (i.e. the intra-regional value-added

content) play a much smaller role (also dependent on the relative size of these economies compared with the main partners).

These linkages to the WB economies and the EU27 are further highlighted in [Figure C.11](#) and [Figure C.12](#), respectively. Intra-regional backward linkages range between 2% and 4% in most cases and are relatively stable for most industries. They are only higher, albeit on a declining trend, for machinery and equipment (CK). With respect to EU27 linkages, one can find much more differentiation (from 5% to 25%) in some manufacturing industries. Further, it is possible to see some upward trends with respect to the EU27. This is particularly the case for the agri-food industry (A and CA) and the automotive industry (CL).

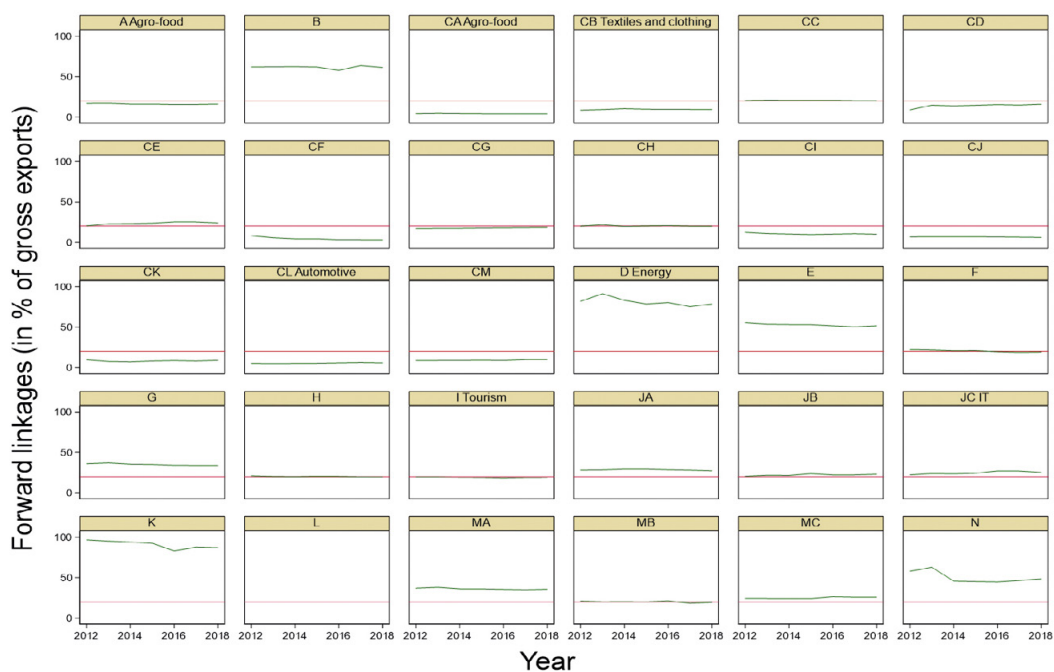
Figure C.5. Backward linkages (foreign value-added content in exports), 2012-2018



Note: (1) See [Table B.1](#) for list of industries. Names are included for selected industries. (2) The horizontal line indicates backward linkages for the total economy.

Sources: wiiw MC IOD (Version 11/2020); own calculations.

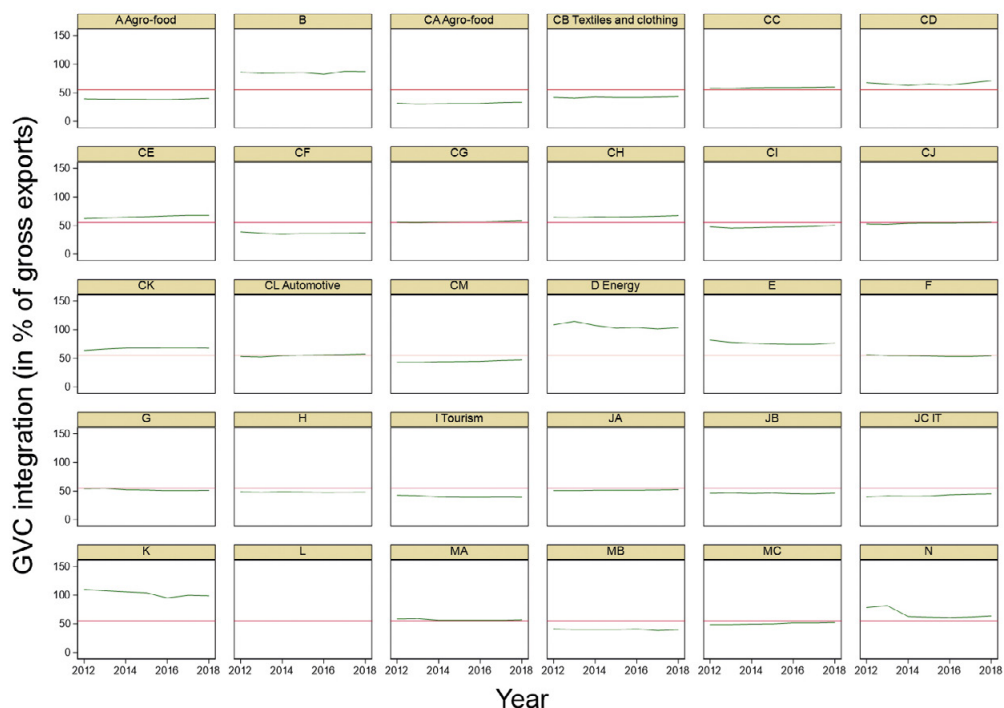
Figure C.6. Forward linkages (value added in third countries' exports, in % of gross exports), 2012-2018



Note: (1) See [Table B.1](#) for list of industries. Names are included for selected industries. (2) The horizontal line indicates backward linkages for the total economy.

Sources: wiiw MC IOD (Version 11/2020); own calculations.

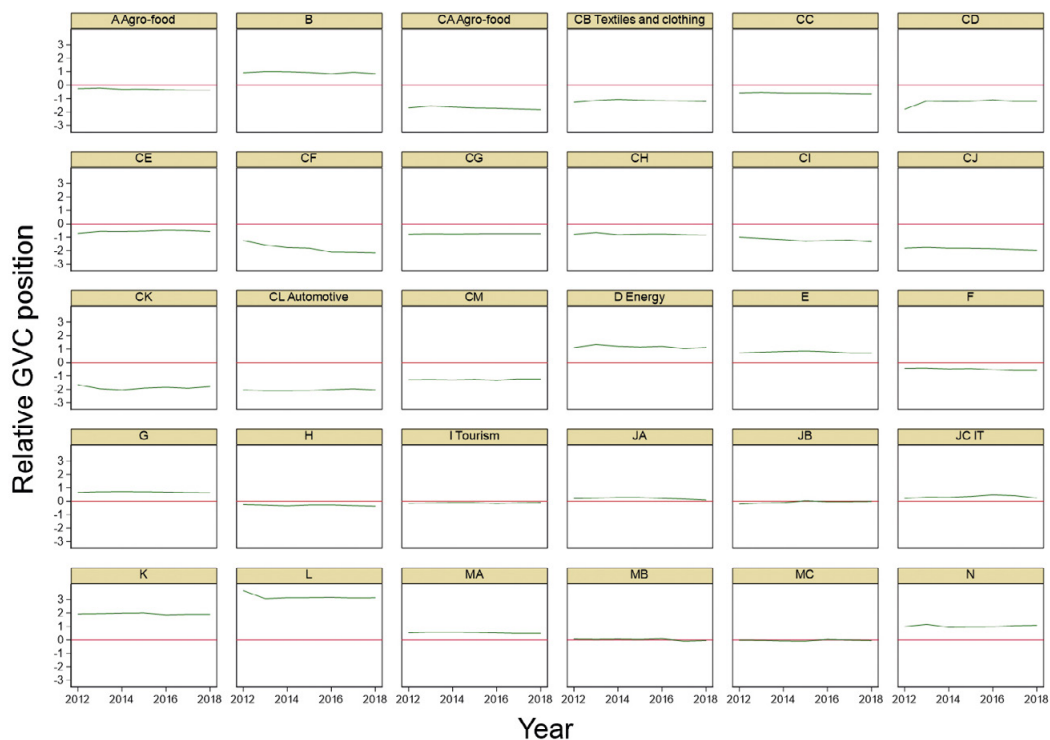
Figure C.7. GVC integration (in % of gross exports), 2012-2018



Note: (1) See [Table B.1](#) for list of industries. Names are included for selected industries. (2) The horizontal line indicates backward linkages for the total economy.

Sources: wiiw MC IOD (Version 11/2020); own calculations.

Figure C.8. Relative GVC positioning, 2012-2018



Note: (1) See [Table B.1](#) for list of industries. Names are included for selected industries. (2) The horizontal line indicates backward linkages for the total economy.

Sources: wiiw MC IOD (Version 11/2020); own calculations.

Figure C.9. Relative GVC positioning by country, 2018



Note: (1) See [Table B.1](#) for list of industries. Names are included for selected industries. (2) The horizontal line indicates backward linkages for the total economy.

Sources: wiiw MC IOD (Version 11/2020); own calculations.

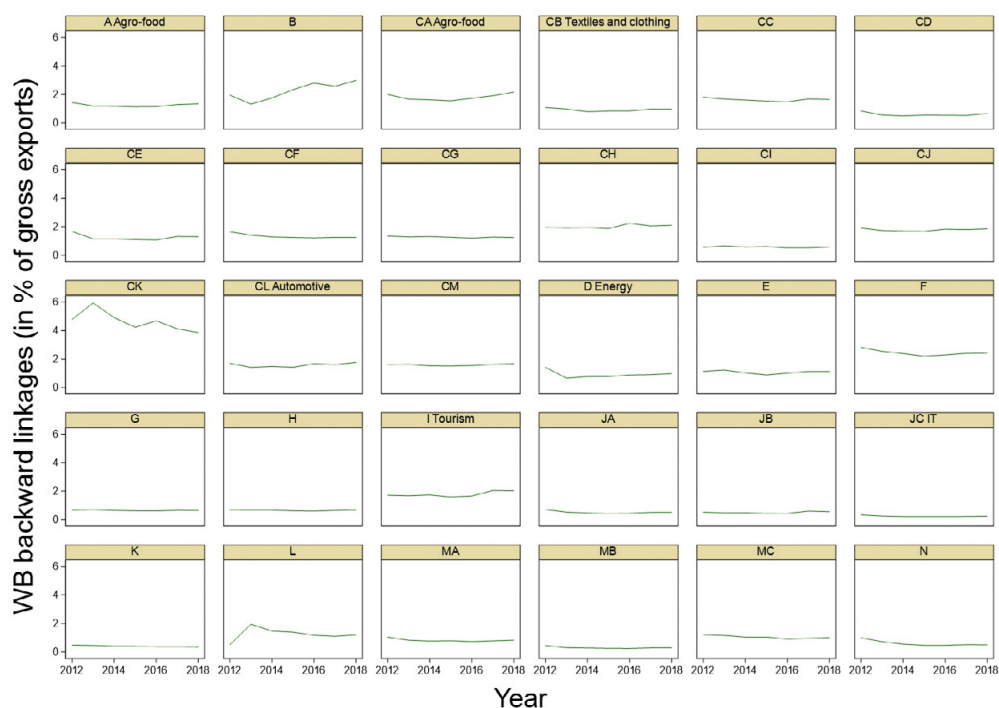
Figure C.10. Value-added content of gross exports in %, 2011-2018



Note: (1) See [Table B.1](#) for list of industries. Names are included for selected industries.

Sources: wiiw MC IOD (Version 11/2020); own calculations.

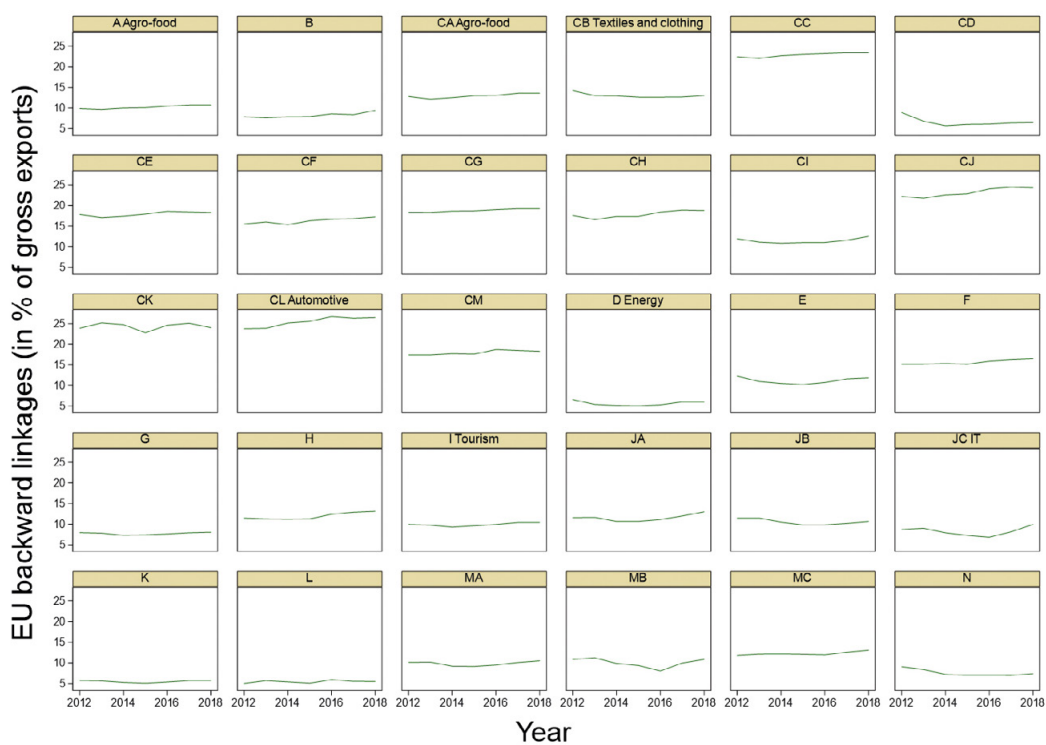
Figure C.11. Backward linkages to WB economies (in % of gross exports), 2011-2018



Note: (1) See Table B.1 for list of industries. Names are included for selected industries.

Sources: wiiw MC IOD (Version 11/2020); own calculations.

Figure C.12. Backward linkages to EU27 (in % of gross exports), 2011-2018



Note: (1) See Table B.1 for list of industries. Names are included for selected industries.

Sources: wiiw MC IOD (Version 11/2020); own calculations.

C.2.2 Revealed comparative advantages

Finally, *Figure C.13* presents the indicator of revealed comparative advantages (the Balassa index in log terms; thus a value above 0 suggests a comparative advantage). For all selected industries and value chains – except for the automotive industry (CL) – the Western Balkan economies have partly strong comparative advantages. Again, the low comparative advantage of the automotive industry is mainly due to the fact that most of the companies operating in these industries have only been established fairly recently and need some time to reach their expected production capacities.

The next two figures show the components of the RCA index, i.e. the structure of exports and world market shares. Export shares are rather big for agri-food (A and CA), textiles and clothing (CB) and the automotive sector (CL) for the selected industries. For the former industries (A and CA) together with energy (D) also the shares in world markets are above those compared to the region's total exports.

Figure C.16 to *Figure C.18* show the revealed comparative advantages, the export structure and the world market shares by country and industry in 2018. In most cases the patterns correspond to the regional pattern, although there is some differentiation in some industries, such as food processing (CA), tourism (I), and IT (JC), with some economies showing comparative advantages, whereas others show comparative disadvantages.

C.3 Foreign direct investment

Finally, we consider FDI stocks and flows in the Western Balkan economies. Unfortunately, the coverage of FDI data for these economies is patchy, and some information cannot be reported for some countries. Specifically, data on FDI stocks are not available for Serbia and Montenegro, and there are no data available on flows for Montenegro. Further, in many cases data are not available at the 2-digit industry level.

Table C.1 presents the (cumulated) foreign direct investment inflows over the period 2012–2019.

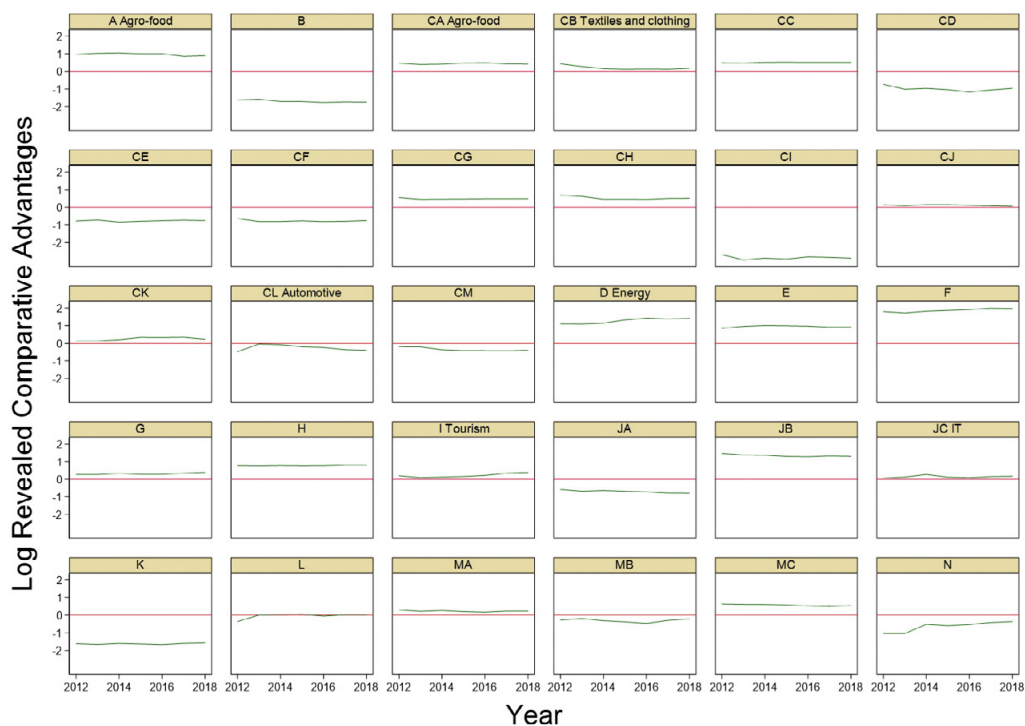
Focusing on the structures and the selected industries indicates that these inflows are high for energy (D) in Albania with 36%, and in North Macedonia for the automotive industry (CL) with 34%. The share of inflows for food processing (CA) is around 5% in both Bosnia and Herzegovina and Serbia. In Serbia the share of the automotive industry is also 4.7%.

Table C.2 presents the stocks in 2012 and 2019 and their growth rates.⁵¹ Focusing first on growth rates, the impression is that these are very heterogeneous across the economies and industries. Growth rates of the stocks are very high in Albania in agriculture (A) and energy (D), in North Macedonia in the automotive industry (CL), and in Kosovo again in energy (D). However, in the tourism industry (I) the stocks are relatively stable or in some cases even slightly declining. Concerning the structure of FDI stocks, these are very large in Albania in energy (D) with 30%, and in North Macedonia in the automotive industry (CL) with 18.7%. Further, food processing captures around 5–6% in the economies for which data are available. On the other hand, the shares of FDI stocks in agriculture (A) and tourism (I) are very small.

Summarising, some of the selected industries are also recipients of foreign direct investment, although this differs quite strongly across individual economies and industries.

(51) Note that the stocks and flows are not directly comparable due to different valuation concepts.

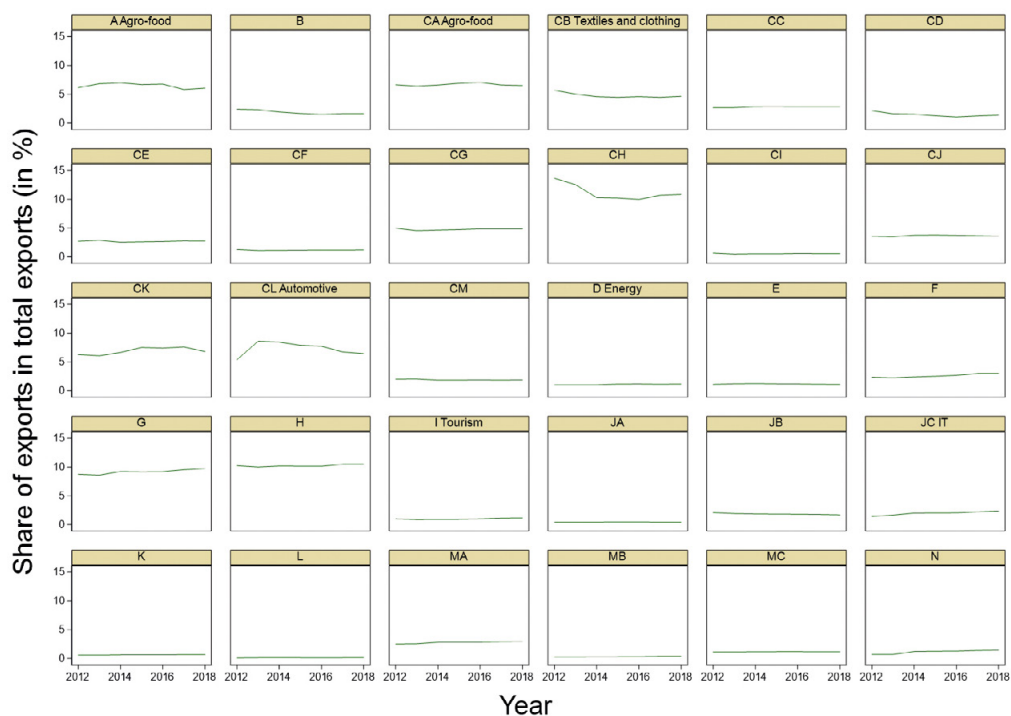
Figure C.13. Revealed comparative advantages (in logs), 2012-2018



Note: (1) See Table B.1 for list of industries. Names are included for selected industries.

Sources: wiiw MC IOD (Version 11/2020); own calculations.

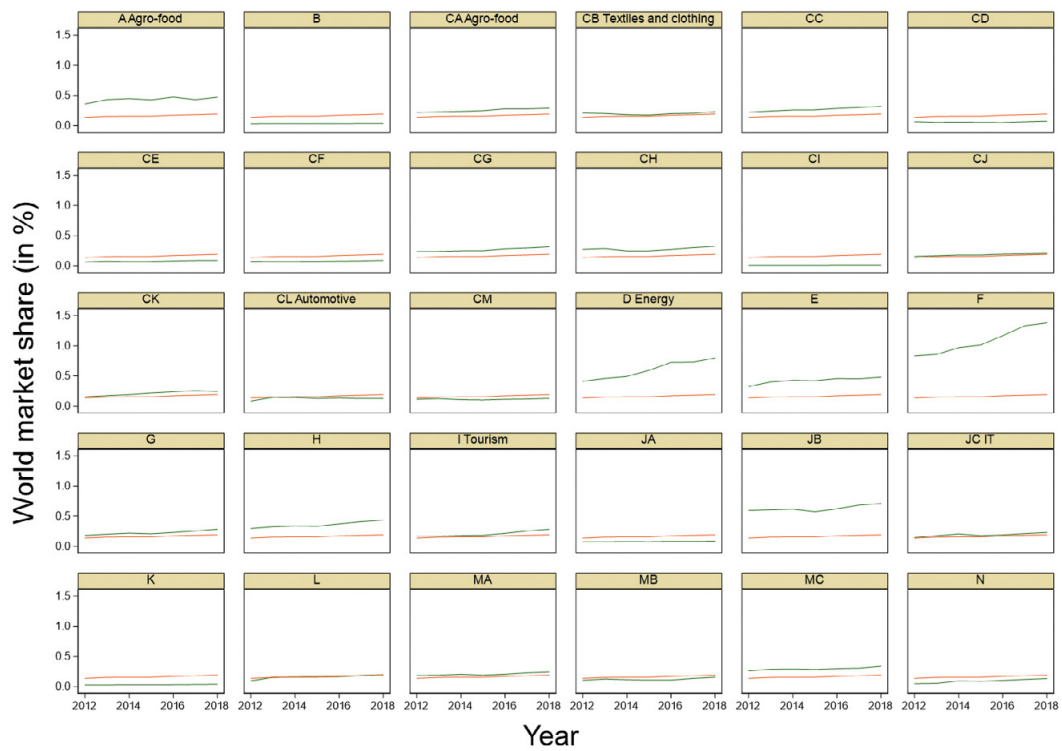
Figure C.14. Export shares in % of total exports, 2012-2018



Note: (1) See Table B.1 for list of industries. Names are included for selected industries

Sources: wiiw MC IOD (Version 11/2020); own calculations.

Figure C.15. World market shares in %, 2012-2018



Note: (1) See Table B.1 for list of industries. Names are included for selected industries. (2) The red line indicates the regions world market share.

Sources: wiiw MC IOD (Version 11/2020); own calculations.

Figure C.16. Revealed comparative advantages (in logs) by country, 2018



Note: (1) See Table B.1 for list of industries. Names are included for selected industries.

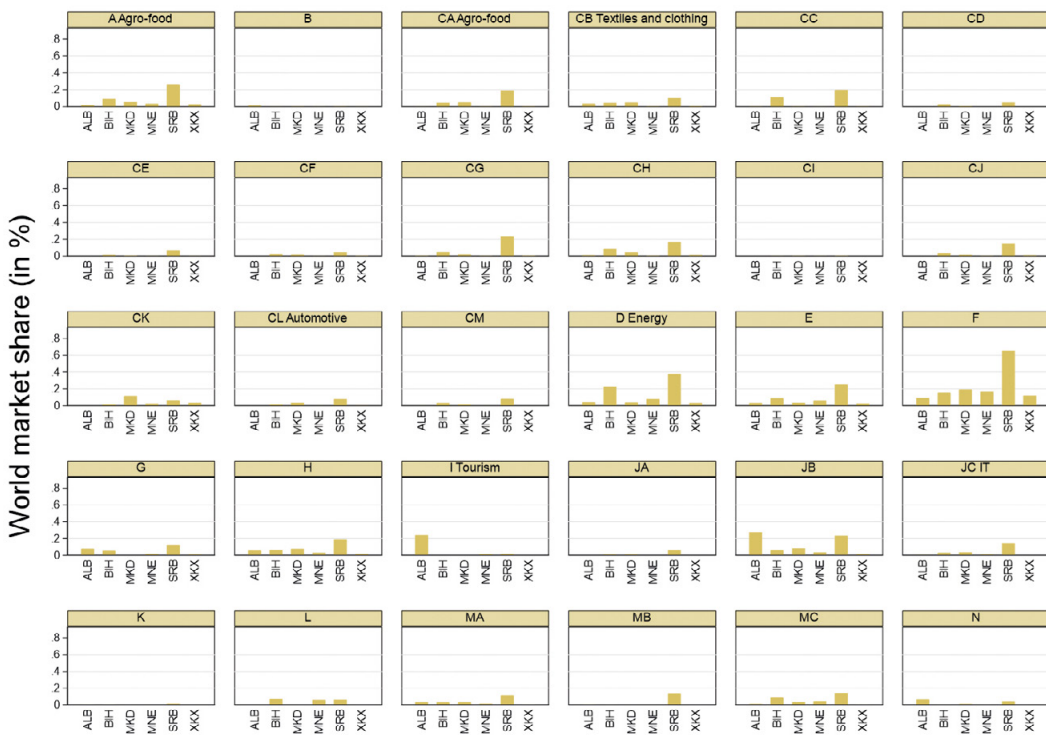
Sources: wiiw MC IOD (Version 11/2020); own calculations.

Figure C.17. Export shares in % of total exports by country, 2012-2018



Note: (1) See Table B.1 for list of industries. Names are included for selected industries.
Sources: wiiw MC IOD (Version 11/2020); own calculations.

Figure C.18. World market shares in %, 2012-2018



Note: (1) See Table B.1 for list of industries. Names are included for selected industries.
Sources: wiiw MC IOD (Version 11/2020); own calculations.

Tables C.1-C.5



Table C.1. Foreign direct investment inflows 2012-2019, in EUR million

	Albania		Bosnia and Herzegovina		North Macedonia		Serbia		Kosovo	
	mn Euro	in %	mn Euro	in %	mn Euro	in %	mn Euro	in %	mn Euro	in %
A	1.5	0.0	5.3	0.2	59.8	2.6	554.4	3.3	2.5	0.1
B	1,636.4	30.1	107.0	4.2	-125.3	-5.5	1,134.0	6.7	-105.3	-5.5
C	212.6	3.9	696.7	27.5	980.4	43.4	5,350.8	31.7	39.1	2.1
CA			113.4	4.5	-11.6	-0.5	926.9	5.5		
CB			98.1	3.9	61.8	2.7	270.8	1.6		
CC			-3.1	-0.1	1.0	0.0	124.2	0.7		
CD			186.9	7.4	-29.2	-1.3	3.7	0.0		
CE			113.0	4.5	-4.3	-0.2	325.4	1.9		
CF			2.5	0.1	6.9	0.3	279.2	1.7		
CG			5.5	0.2	27.6	1.2	630.2	3.7		
CH			97.8	3.9	0.5	0.0	1,022.6	6.1		
CI			11.3	0.4	40.2	1.8	51.1	0.3		
CJ			17.2	0.7			3.8	0.0		
CK			16.5	0.7	38.8	1.7	158.6	0.9		
CL			35.4	1.4	777.6	34.4	796.1	4.7		
CM			2.1	0.1	71.1	3.1	1.9	0.0		
D	1,965.7	36.2	133.6	5.3	188.0	8.3	127.7	0.8	140.3	7.4
E			0.7	0.0	0.4	0.0	115.6	0.7	10.4	0.5

	Albania		Bosnia and Herzegovina		North Macedonia		Serbia		Kosovo	
	mn Euro	in %	mn Euro	in %	mn Euro	in %	mn Euro	in %	mn Euro	in %
F	91.7	1.7	39.4	1.6	258.6	11.4	2,199.3	13.0	109.3	5.8
G	152.6	2.8	467.9	18.4	391.0	17.3	2,068.9	12.3	90.1	4.7
H	129.8	2.4	9.4	0.4	-2.9	-0.1	1,548.9	9.2	-3.7	-0.2
I	-14.8	-0.3	25.8	1.0	4.0	0.2	32.8	0.2	5.9	0.3
J	30.4	0.6	97.0	3.8	18.3	0.8	-449.3	-2.7	-13.6	-0.7
JA										
JB										
JC										
K	514.5	9.5	651.2	25.7	376.4	16.6	2,848.8	16.9	237.2	12.5
L	373.0	6.9	190.6	7.5	76.8	3.4	717.1	4.2	1,216.5	64.0
M	245.3	4.5	87.0	3.4	-6.1	-0.3	511.8	3.0	38.0	2.0
MA				0.0				0.0		
MB				0.0				0.0		
MC				0.0				0.0		
N	95.4	1.8	24.9	1.0	42.2	1.9	123.7	0.7	134.3	7.1

Sources: *wiiw FDI database.*

Table C.2. Foreign direct investment stocks

	Albania				Bosnia and Herzegovina				North Macedonia				Kosovo			
	2014	2019	Growth rate in %	Share in %, 2019	2012	2019	Growth rate in %	Share in %, 2019	2012	2019	Growth rate in %	Share in %, 2019	2012	2019	Growth rate in %	Share in %, 2019
A	1.7	9.9	42.1	0.1	20.8	14.5	-5.0	0.2	36.5	64.9	8.5	1.2	5.0	8.3	7.7	0.3
B	642.9	1157.6	12.5	14.4	72.4	109.2	6.1	1.5	156.4	152.5	-0.4	2.7	138.6	110.1	-3.2	3.3
C	555.2	705.1	4.9	8.8	1,699.6	2,231.7	4.0	30.5	1,281.5	2,167.3	7.8	38.7	346.3	197.0	-7.7	6.0
CA					363.2	425.5	2.3	5.8	261.1	261.1	0.0	4.7				
CB					57.1	130.7	12.6	1.8	74.4	114.8	6.4	2.1				
CC					161.6	162.5	0.1	2.2	11.5	10.5	-1.2	0.2				
CD					467.5	387.5	-2.6	5.3	63.0	64.1	0.2	1.1				
CE					94.2	197.1	11.1	2.7	32.0	24.8	-3.6	0.4				
CF						83.2		1.1	21.5	31.1		0.6				
CG					249.3	227.1	-1.3	3.1	6.2	31.2	26.1	0.6				
CH					128.9	374.4	16.4	5.1	392.7	303.1	-3.6	5.4				
CI					22.2	28.0	3.4	0.4	18.6	48.8	14.8	0.9				
CJ					20.9	37.7	8.8	0.5								
CK					17.2	34.4	10.4	0.5	5.0	43.4	36.2	0.8				
CL					92.8	112.9	2.8	1.5	264.5	1,047.0	21.7	18.7				
CM					24.7	30.6	3.1	0.4	131.1	187.6	5.3	3.4				
D	400.3	2,406.4	43.2	30.0	68.2	328.9	25.2	4.5	278.8	448.5	7.0	8.0	104.9	258.3	13.7	7.8
E	3.6	3.4	-1.0	0.0	21.2	17.3	-2.8	0.2	2.9	5.5	9.7	0.1	2.6	11.7	23.7	0.4
F	120.0	140.3	3.2	1.7	56.5	92.8	7.3	1.3	157.1	421.6	15.1	7.5	117.8	245.1	11.0	7.4
G	191.1	287.0		3.6	662.9	901.3	4.5	12.3	453.9	733.0	7.1	13.1	50.3	130.9		4.0
H	152.4	115.1		1.4	47.5	51.3	1.1	0.7	39.0	43.1	1.5	0.8	3.3	85.3		2.6
I					88.6	80.3	-1.4	1.1	41.5	40.9	-0.2	0.7	0.9	6.4		0.2
J	1,178.7	1,076.0	-1.8	13.4	838.8	917.0	1.3	12.6	158.3	166.8	0.7	3.0	149.8	139.7	-1.0	4.2
JA																
JB																
JC																
K	771.8	1,067.2	6.7	13.3	1,375.3	2,029.8	5.7	27.8	890.2	1,125.5	3.4	20.1	284.6	481.8	7.8	14.6
L	125.7	494.7	31.5	6.2	323.7	280.4	-2.0	3.8	62.2	124.0	10.4	2.2	433.4	1,557.9	20.1	47.1
M	258.8	474.8	12.9	5.9	80.0	212.7	15.0	2.9	29.1	42.6	5.6	0.8	16.5	49.5	17.0	1.5
MA																
MB																
MC																
N	28.0	79.9	23.3	1.0	9.6	38.0	21.7	0.5	53.8	61.9	2.0	1.1	1.1	25.9	57.6	0.8

Sources: wiiw FDI database.

Table C.3. Summary tables

ALBANIA						
NACE Rev. 2	Share in value added	International BL	International FL	GVCInt	RCA (Balassa)	Inward FDI stock 2019, EUR million
A	24.9	8.1	31.9	40.0	0.94	9.9
B	3.5	29.9	38.5	68.4	0.72	1,157.6
C	8.5					705.1
CA	1.3	36.4	7.3	43.7	0.13	
CB	3.0	20.4	13.6	34.0	1.62	
CC	0.6	35.6	35.9	71.4	0.24	
CD	0.0	39.8	12.9	52.7	0.02	
CE	0.2	47.3	10.9	58.1	0.01	
CF	0.1	56.6	8.1	64.7	0.02	
CG	1.2	39.5	30.1	69.6	0.31	
CH	1.4	43.7	25.4	69.1	0.56	
CI	0.1	23.0	6.8	29.7	0.01	
CJ	0.0	50.7	2.9	53.7	0.02	
CK	0.1	43.3	4.0	47.3	0.01	
CL						
CM	0.6	34.8	13.7	48.5	0.13	
D	3.7	10.8	84.4	95.1	2.41	2,406.4
E	1.2	28.7	63.4	92.1	1.47	3.4
F	12.5	28.8	35.0	63.7	5.04	140.3
G	14.5	11.1	27.1	38.3	4.11	287.0
H	4.6	23.1	14.6	37.7	3.26	115.1
I	3.3	23.2	6.4	29.6	13.32	
J	3.9					1,076.0
JA	1.1	19.6	156.5	176.1	0.11	
JB	2.0	32.6	11.4	44.0	15.41	
JC	0.8	23.0	35.4	58.4	0.37	
K	3.1	13.3	53.9	67.2	0.46	1,067.2
L	7.4	3.9	1,435.3	1,439.2	0.26	494.7
M	4.4			0.0		474.8
MA	3.8	19.8	35.0	54.8	1.88	
MB	0.2	25.9	31.1	57.1	0.57	
MC	0.4	22.4	34.2	56.7	0.82	
N	4.5	13.5	36.7	50.2	3.47	79.9

Sources: *wiwi Annual database; wiwi MC IOD; wiwi FDI database.*

BOSNIA AND HERZEGOVINA						
NACE Rev. 2	Share in value added	International BL	International FL	GVCInt	RCA (Balassa)	Inward FDI stock 2019, EUR million
A	9.3	28.5	19.1	47.6	2.79	14.5
B	2.7	26.7	81.3	108.0	0.10	109.2
C	21.0					2,231.7
CA	3.8	32.5	5.3	37.8	1.31	425.5
CB	2.5	35.6	9.8	45.4	1.22	130.7
CC	2.7	38.0	27.4	65.5	3.35	162.5
CD	0.3	70.7	4.0	74.7	0.67	387.5
CE	0.9	47.0	29.5	76.5	0.44	197.1
CF	0.5	34.1	3.5	37.6	0.61	83.2
CG	1.9	45.0	22.9	67.9	1.55	227.1
H	4.8	49.9	23.2	73.1	2.62	374.4
CI	0.1	38.3	6.6	45.0	0.03	28.0
CJ	0.5	53.2	8.0	61.3	1.03	37.7
CK	0.6	41.7	12.1	53.8	0.44	34.4
CL	0.7	49.5	7.0	56.5	0.45	112.9
CM	1.7	37.4	15.7	53.1	0.84	30.6
D	6.6	19.7	70.7	90.4	7.05	328.9
E	1.7	27.5	54.5	82.1	2.72	17.3
F	6.5	31.4	31.6	63.0	4.68	92.8
G	21.1	18.0	37.8	55.8	1.76	901.3
H	5.7	25.7	25.4	51.1	1.94	51.3
I	3.2	18.0	87.8	105.8	0.16	80.3
J	6.2					917.0
JA	0.9	15.9	34.6	50.5	0.28	
JB	3.7	16.2	41.6	57.8	1.86	
JC	1.6	18.0	27.2	45.3	0.97	
K	5.9	13.3	88.0	101.3	0.26	2,029.8
L	4.6	15.5	101.7	117.2	2.13	280.4
M	4.2					212.7
MA	3.1	19.1	43.6	62.7	1.04	
MB	0.1	19.7	25.3	45.0	0.19	
MC	1.0	23.3	21.9	45.2	2.84	
N	1.4	18.1	67.1	85.2	0.17	38.0

Sources: wiiw Annual database; wiiw MC IOD; wiiw FDI database.

KOSOVO						
NACE Rev. 2	Share in value added	International BL	International FL	GVCInt	RCA (Balassa)	Inward FDI stock 2019, EUR million
A	10.8	20.4	16.9	37.3	2.80	8.3
B	3.3	29.4	42.9	72.2	0.39	110.1
C	16.8					197.0
CA	3.6	19.4	6.7	26.1	0.76	
CB	2.0	20.9	16.0	36.8	0.96	
CC	0.7	30.0	26.8	56.8	0.74	
CD	0.0	26.6	5.7	32.3	0.00	
CE	0.2	32.8	16.0	48.9	0.13	
CF	0.6	19.9	5.3	25.2	0.63	
CG	1.3	29.5	26.8	56.3	1.02	
CH	2.3	38.9	25.2	64.0	1.55	
CI	0.2	32.9	8.3	41.2	0.04	
CJ	0.6	42.6	10.8	53.3	1.15	
CK	3.8	52.0	15.3	67.3	3.81	
CL	1.0	36.0	12.4	48.3	0.55	
CM	0.5	27.0	12.7	39.7	0.30	
D	5.3	29.6	71.0	100.6	3.41	258.3
E	1.1	30.4	42.1	72.5	2.58	11.7
F	13.4	41.1	13.4	54.5	15.09	245.1
G	19.3	19.0	34.8	53.8	1.10	130.9
H	6.0	21.9	29.6	51.5	2.44	85.3
I	2.0	17.2	81.6	98.8	0.12	6.4
J	2.8					139.7
JA	0.5	27.3	20.6	47.9	0.41	
JB	1.6	26.2	21.2	47.4	1.82	
JC	0.7	20.2	25.3	45.5	0.65	
K	5.3	11.8	106.4	118.2	0.13	481.8
L	10.9	6.8	277.3	284.1	0.42	1557.9
M	2.2					49.5
MA	1.7	21.6	35.1	56.8	1.05	
MB	0.1	21.9	14.5	36.4	0.32	
MC	0.4	32.5	28.3	60.8	1.11	
N	1.1	30.0	30.5	60.5	0.47	25.9

Sources: *wiiv Annual database; wiiv MC IOD; wiiv FDI database.*

MONTENEGRO						
NACE Rev. 2	Share in value added	International BL	International FL	GVCInt	RCA (Balassa)	Inward FDI stock 2019, EUR million
A	10.2	19.5	17.4	36.9	3.15	
B	1.6	34.9	19.3	54.2	0.37	
C	6.1					
CA	1.3	31.6	3.9	35.5	0.46	
CB	0.9	28.5	6.9	35.4	0.82	
CC	0.3	37.2	20.4	57.6	0.34	
CD	0.0	39.5	12.4	51.9	0.00	
CE	0.1	43.6	14.2	57.8	0.08	
CF	0.3	27.7	6.0	33.7	0.27	
CG	0.5	42.5	22.7	65.2	0.28	
CH	0.8	55.1	22.5	77.7	0.60	
CI	0.1	46.9	2.3	49.2	0.07	
CJ	0.2	58.1	6.7	64.8	0.31	
CK	1.0	70.7	6.0	76.7	2.13	
CL	0.4	46.9	6.7	53.5	0.30	
CM	0.2	36.9	10.9	47.8	0.13	
D	5.4	31.6	46.5	78.1	8.59	
E	2.4	18.5	37.6	56.1	6.66	
F	9.4	53.5	9.0	62.5	18.92	
G	19.1	21.6	23.5	45.1	2.18	
H	6.6	31.7	8.7	40.4	3.45	
I	11.4	21.6	39.3	60.9	1.54	
J	5.5					
JA	0.9	25.1	25.2	50.3	0.33	
JB	3.1	22.1	28.3	50.5	3.84	
JC	1.5	16.7	29.2	45.9	1.03	
K	6.2	17.5	73.0	90.5	0.27	
L	8.2	18.8	48.2	67.0	6.35	
M	4.6					
MA	3.7	27.9	28.6	56.5	2.00	
MB	0.3	22.9	18.6	41.5	0.26	
MC	0.6	40.8	8.8	49.6	4.76	
N	3.2	21.0	40.1	61.2	0.74	

Sources: wiiw Annual database; wiiw MC IOD; wiiw FDI database.

NORTH MACEDONIA						
NACE Rev. 2	Share in value added	International BL	International FL	GVCInt	RCA (Balassa)	Inward FDI stock 2019, EUR million
A	12.0	22.8	22.5	45.2	1.77	64.9
B	1.8	25.4	75.3	100.7	0.20	152.5
C	19.3					2,167.3
CA	4.4	35.7	2.8	38.4	1.62	261.1
CB	4.1	38.2	12.7	50.9	1.60	114.8
CC	1.0	44.9	71.0	116.0	0.17	10.5
CD	0.0	73.1	0.8	73.9	0.30	64.1
CE	0.2	46.5	14.0	60.5	0.24	24.8
CF	0.9	34.2	7.9	42.2	0.61	31.1
CG	1.7	46.7	15.4	62.1	0.66	31.2
CH	1.6	62.4	12.7	75.0	1.69	303.1
CI	0.3	53.6	10.2	63.8	0.11	48.8
CJ	0.4	64.9	8.7	73.7	0.53	43.4
CK	2.2	76.0	8.5	84.6	4.11	1,047.0
CL	1.8	60.1	7.8	67.9	1.09	0.0
CM	0.7	46.1	7.6	53.6	0.55	187.6
D	4.1	42.6	275.2	317.8	1.49	448.5
E	1.3	23.3	86.8	110.1	1.14	5.5
F	8.0	47.7	9.7	57.3	6.83	421.6
G	18.9	22.5	662.1	684.6	0.08	733.0
H	5.6	43.0	19.0	62.1	2.59	43.1
I	2.1	24.2	218.3	242.5	0.11	40.9
J	4.7					166.8
JA	0.7	29.7	32.9	62.7	0.35	
JB	2.3	23.3	29.7	53.0	3.01	
JC	1.7	19.7	24.8	44.5	1.31	
K	3.9	22.2	327.2	349.4	0.05	1,125.5
L	13.5	6.2	4,933.1	4939.3	0.06	124.0
M	3.1					42.6
MA	2.4	27.5	31.4	58.9	1.24	
MB	0.1	25.2	23.1	48.3	0.06	
MC	0.6	37.4	27.2	64.6	1.30	
N	1.8	30.5	46.8	77.2	0.54	61.9

Sources: *wiwi Annual database; wiwi MC IOD; wiwi FDI database.*

SERBIA						
NACE Rev. 2	Share in value added	International BL	International FL	GVCInt	RCA (Balassa)	Inward FDI stock 2019, EUR million
A	9.3	29.5	15.9	45.4	2.69	
B	2.8	25.0	176.2	201.2	0.05	
C	21.4					
CA	4.8	32.5	4.5	36.9	1.95	
CB	1.5	44.9	8.5	53.4	1.02	
CC	1.4	48.3	18.2	66.5	2.01	
CD	1.8	54.0	27.9	81.9	0.45	
CE	1.6	49.0	27.4	76.4	0.70	
CF	0.5	43.0	1.3	44.3	0.48	
CG	2.7	44.8	20.0	64.8	2.37	
CH	3.0	52.5	23.5	76.1	1.68	
CI	0.4	42.1	13.9	56.0	0.06	
CJ	0.7	55.1	6.0	61.0	1.51	
CK	0.9	54.4	10.8	65.2	0.63	
CL	1.1	59.3	5.5	64.8	0.80	
CM	1.2	41.5	10.2	51.7	0.84	
D	4.7	31.7	85.5	117.2	3.89	
E	1.6	29.9	59.4	89.3	2.61	
F	6.5	35.1	25.0	60.2	6.70	
G	16.4	24.2	35.0	59.2	1.25	
H	5.8	33.0	24.7	57.7	1.93	
I	2.0	21.3	134.7	156.0	0.19	
J	6.6					
JA	0.8	29.5	25.6	55.1	0.62	
JB	3.0	21.5	36.4	57.9	2.41	
JC	2.8	23.5	28.8	52.3	1.44	
K	4.4	12.1	102.7	114.7	0.19	
L	9.7	6.3	632.4	638.8	0.63	
M	5.6					
MA	3.8	24.3	43.9	68.2	1.17	
MB	0.7	22.1	20.7	42.9	1.36	
MC	1.0	28.4	38.1	66.5	1.46	
N	3.2	16.4	83.9	100.3	0.42	

Sources: wiiw Annual database; wiiw MC IOD; wiiw FDI database.

C.4 Innovation and science indicators

C.4.1 Patent data analysis

This analysis concerning patents is based on one of Europe's largest patent databases,⁵² which is fed from over 90 sources worldwide and tracks innovation activity in 195 countries around the world (the 'global patent universe', according to the United Nations) provided by the European Patent Office (EPO) and further processed by *Economica*. In total, the database contains over 120 million documents. The evaluable fields of patents can be differentiated to different dimensions in order to allow a more in-depth analysis based on the following criteria: chronological (priority date, publication date, date of grant); geographical (company's location or residence of the inventor); organisational (patent applicant); human-related (inventor); technological (patent classification); content (title and abstract).

There are two challenges regarding data quality that need to be addressed when performing patent analyses. On the one hand, the names of applicants and/or inventors are not verified by the patent authority. For this reason, it is possible that the same applicant/ inventor appears in the database with different spellings (duplicates). On the other hand, the database contains data from different patent authorities all over the world. Therefore, the data quality can vary depending on its origin. Particularly in the case of international studies such as this one, these challenges must be addressed and actively managed to ensure a high level of data quality. For this reason, techniques for data harmonisation of patent applicants and deduplication have been applied, and each result has undergone a manual review. In addition, the breakdown by company type could not be carried out automatically based on the patent database. Therefore, this step was carried out manually.

(52) This database is maintained by *Economica*.

The aim of the patent data analysis is to identify complementarities between the Western Balkan economies from an innovation perspective. To determine the distribution of patent families⁵³ between the WB economies, the following dimensions were used. As chronological dimension, all patents published between 2000 and 2020 were chosen. The geographical dimension was reduced to the WB economies by country affiliation. It should be noted that not all WB economies have patent applicants. Due to the focus of this study on economic effects, the organisational dimension was selected, i.e. the patent applicants. A restriction to the technological dimension was not carried out in this step.

Table C.4 shows the number of patent families by country. It should be noted that an invention may have been created by patent applicants from different countries. Therefore, the cumulative value of all countries does not correspond to the total sum. Furthermore, the patent applicants of the WB economies were determined. Apart from Kosovo, patent applicants were identified in all WB economies. Serbia has by far the largest share with 86.9%.

To obtain a more precise insight, the identified patent applicants were then divided into three different types: (1) private individuals, (2) companies and (3) institutions. *Table C.5* shows the distribution of patent families among different types of patent applicants. As one can see, private individuals account for more than 80% of the patent families, whereas the share of companies is 14% and the share of public institutions is 5%.⁵⁴

(53) Patents are intellectual property rights that grant protection in a specific country or countries. Therefore, patent applications are often filed for inventions at various national or regional patent offices or with the World Intellectual Property Organisation (WIPO). If there are several applications or publications (in different countries) for a particular invention, we speak of a 'patent family'. A patent family thus groups together all patent applications for the same invention.

(54) The name of the companies and institutions can be used in the next stage of the project.

Table C.4. Number of patents by country

	Totals		in %	
	Patent families	Applicants	Patent families	in % Applicants
AL	71	56	1.9	1.8
BA	238	229	6.3	7.3
ME	95	65	2.5	2.1
MK	99	102	2.6	3.3
RS	3,257	2,673	86.6	85.5
Total	3,760	3,125	100.0	100.0

Sources: *Economica*.

The next step was to assign the respective NACE Rev. 2 codes to the identified patent applicants. These cannot be assigned directly to the applicants and must therefore be determined via the patent class of their published patents. The patent classes of these patents are the basis for the conversion, since every patent class has at least one NACE 2-digit code assigned. It should be noted that a patent family can have one or more patent classes. Subsequently, a concordance table was used to assign the corresponding NACE Rev. 2 code to the respective patent classes. Based on the results, the distribution of patent families

among the different NACE Rev. 2 levels was calculated. *Table C.6* summarises these results.⁵⁵

According to this exercise, the patenting activities are dominated by a few industries, such as CI, CK and CM, which suggests analysing whether and how these may relate to the selected value chains (e.g. CI and JB+JC).

(55) It should be noted that the figures do not correspond to *Table C.4*. This is because a single patent can be filed by several types of patent applicants and consequently there can be multiple filings between the different types.

Table C.5. Number of patents by type

	Totals Patent families	in %
Private persons	3,011	80.9
Companies	521	14.0
Public institutions	191	5.1

Sources: *Economica*.

In order to obtain a benchmark for the WB economies, the data from the EU27 were also determined. *Table C.7* shows patent data broken down according to the NACE Rev. 2 classification, and *Table C.8* shows trademark data broken down according to Nice Classification (NCL).⁵⁶ The values of IPRs from the WB economies have been cumulated for this comparison. Based on this, the calculated shares of the WB economies were then compared with those of the EU27. It can be seen that the areas of food products, beverages and tobacco products have a larger share in the WB economies compared with the EU27.

A similar picture emerges at the level of trademarks, where the food, beverages and tobacco sectors are leading too. The Nice category 'Coffee, tea, cocoa and artificial coffee' even has the highest value among trademarks. Textiles do not perform well at the patent or the trademark level (clothing, footwear, headgear). At the trademark level it can also be seen that in the area of agriculture the WB economies perform better than the EU27. In 'Pharmaceutical and veterinary preparations' the WB economies perform best.

C.4.2 Data on scientific output

In order to evaluate scientific publications in this study, the Scopus database – one of the central scientific citation databases with about 80 million documents – is used. In addition, the analysis is supplemented with input from the Scimago Journal & Country Rank portal, which in fact accesses the data from Scopus but also offers ready-made analyses. In the Scopus database the documents are assigned to subject areas (e.g. 'Agricultural and Biological Sciences', 'Materials Science', 'Social Sciences', etc.). Each subject area is again subdivided into subject categories (e.g. the subject area 'Energy' is divided into 'Energy Engineering and Power Technology', 'Energy (miscellaneous)',

'Fuel Technology', 'Nuclear Energy and Engineering', and 'Renewable Energy, Sustainability and Environment').

The first step in this analysis is to map the NACE-categories with the subject areas and subject categories from Scopus. The results are shown in *Table C.9*. For the most part identical – or at least similar – subject areas and categories could be identified. One exception is the NACE Rev. 2 category CB, 'Textiles, apparel, leather and related products', where no corresponding subject area or subject category could be found. Therefore, a separate query was carried out directly in the Scopus database using matching keywords. Another special case are the NACE Rev. 2 categories MB, '*Scientific research and development*' and MC '*Other professional, scientific, and technical activities*' as these two categories represent the actual entirety of scientific research. Therefore, these two categories are mapped with the total scientific output (all subject categories). This is at the same time the benchmark for the further steps in this analysis.

Table C.10 shows the number of scientific publications for each Western Balkan economy as well as the total for Eastern and Western Europe and for the whole world, per category. The column 'Share WBE/global' sets the publications in the Western Balkan economies in relation to the world-wide scientific output. In total, the Western Balkan economies have a share of 0.23% of global publications. However, this value is somewhat overestimated because the sum includes double counting, as publications can have co-operations from institutions in different economies. So, the share should be interpreted as the upper limit. The last column displays the deviation from the benchmark (0.23%) in each category in percentage points. Categories with a positive deviation are particularly important in the Western Balkan economies as the scientific output in these categories is above average.

It becomes evident that the chosen value chains (highlighted in grey) are all above the benchmark. The highest positive deviation can be found in 'Tourism, Leisure and Hospitality Management',

(56) The Nice Classification (NCL) is an internationally used system to classify trademark applications. It consists of 45 classes. Classes 1 to 34 are for goods and 35 to 45 for services. For more details see: <https://euipo.europa.eu/ohportal/en/nice-classification>

where the WB economies have a share of 0.46% of the global publication output.

In the period 1996-2019 the scientific potential shows significant growth, and there is a general tendency of increasing production of scientific papers and impact of regional scientists, where Serbia is leading this group of economies.

Table C.10 shows the available data for scientific output measured by the number of documents produced, and the number of citations and productivity and impact measured by the H-index for five WB economies (data for Kosovo are not available). Regarding the representation of the total scientific output, together with citations and productivity and impact of the region, authors have the strongest position and specialisation in the field of medicine, but also in the areas of engineering, computer sciences, agricultural science and energy.

Tables C.6-C.10



Table C.6. Distribution of patent families at different NACE Rev. 2 levels and by type of patent applicant

NACE Rev. 2	Description	Total	Private persons	Companies	Public institutions
A	Agriculture, forestry and fishing	0.00%	0.00%	0.00%	0.00%
B	Mining and quarrying	0.00%	0.00%	0.00%	0.00%
CA	Food products, beverages, and tobacco products	3.48%	3.27%	3.23%	6.98%
CB	Textiles, apparel, leather and related products	0.93%	1.00%	0.67%	0.33%
CC	Wood and paper products, and printing	0.56%	0.46%	0.81%	1.00%
CD	Coke and refined petroleum products	0.41%	0.31%	0.81%	1.33%
CE	Chemicals and chemical products	9.09%	7.59%	10.77%	26.58%
CF	Pharmaceuticals, medicinal chemical and botanical products	4.40%	3.78%	4.31%	13.62%
CG	Rubber and plastic products, and other non-metallic mineral products	2.55%	2.68%	1.48%	3.32%
CH	Basic metals and fabricated metal products, except machinery and equipment	4.28%	4.32%	3.36%	5.32%
CI	Computer, electronic and optical products	13.54%	11.51%	23.01%	16.61%
CJ	Electrical equipment	8.87%	9.32%	8.08%	4.32%
CK	Machinery and equipment n.e.c.	25.71%	27.59%	21.67%	10.30%
CL	Transport equipment	6.05%	6.46%	5.25%	2.99%
CM	Other manufacturing, and repair and installation of machinery and equipment	13.93%	15.16%	10.77%	4.98%
D	Electricity, gas, steam and air conditioning supply	0.00%	0.00%	0.00%	0.00%
E	Water supply; sewerage, waste management and remediation activities	0.00%	0.00%	0.00%	0.00%
F	Construction	5.41%	5.95%	3.90%	1.33%
G	Wholesale and retail trade; repair of motor vehicles and motorcycles	0.00%	0.00%	0.00%	0.00%
H	Transportation and storage	0.00%	0.00%	0.00%	0.00%
I	Accommodation and food service activities	0.00%	0.00%	0.00%	0.00%
JA	Publishing, audio-visual and broadcasting activities	0.00%	0.00%	0.00%	0.00%
JB	Telecommunications	0.00%	0.00%	0.00%	0.00%
JC	IT and other information services	0.80%	0.59%	1.88%	1.00%
K	Financial and insurance activities	0.00%	0.00%	0.00%	0.00%
L	Real estate activities	0.00%	0.00%	0.00%	0.00%
MA	Legal, accounting, management, architecture, engineering, technical testing, and analysis activities	0.00%	0.00%	0.00%	0.00%
MB	Scientific research and development	0.00%	0.00%	0.00%	0.00%
MC	Other professional, scientific, and technical activities	0.00%	0.00%	0.00%	0.00%
N	Administrative and support service activities	0.00%	0.00%	0.00%	0.00%

Sources: *Economica*.

Table C.7. Shares of patent families at different NACE2 levels

NACE Rev. 2 Level 1	NACE Rev. 2 Level 2	Description	EU27 Share	WB Share	Difference	Share (WB/EU27)	Deviation from mean
CA	10	Manufacture of food products	1.15%	2.75%	1.61%	0.35%	0.20%
CA	11	Manufacture of beverages	0.58%	1.75%	1.17%	0.44%	0.30%
CA	12	Manufacture of tobacco products	0.10%	0.36%	0.26%	0.54%	0.39%
CB	13	Manufacture of textiles	0.34%	0.18%	-0.16%	0.08%	-0.07%
CB	14	Manufacture of wearing apparel	0.27%	0.42%	0.15%	0.23%	0.08%
CB	15	Manufacture of leather and related products	0.22%	0.30%	0.09%	0.20%	0.06%
CC	16	Manufacture of wood and of products of wood and cork, except furniture; Manufacture of articles of straw and plaiting materials	0.13%	0.08%	-0.05%	0.09%	-0.05%
CC	17	Manufacture of paper and paper products	0.26%	0.18%	-0.08%	0.10%	-0.05%
CC	18	Printing and reproduction of recorded media	0.32%	0.38%	0.06%	0.18%	0.03%
CD	19	Manufacture of coke and refined petroleum products	0.28%	0.40%	0.12%	0.21%	0.06%
CE	20	Manufacture of chemicals and chemical products	8.66%	8.88%	0.22%	0.15%	0.00%
CF	21	Manufacture of basic pharmaceutical products and pharmaceutical preparations	4.82%	4.30%	-0.52%	0.13%	-0.02%
CG	22	Manufacture of rubber and plastic products	2.14%	1.23%	-0.92%	0.08%	-0.06%
CG	23	Manufacture of other non-metallic mineral products	1.86%	1.43%	-0.43%	0.11%	-0.03%
CH	24	Manufacture of basic metals	0.71%	0.72%	0.01%	0.15%	0.00%
CH	25	Manufacture of fabricated metal products, except machinery and equipment	3.47%	3.54%	0.07%	0.15%	0.00%
CI	26	Manufacture of computer, electronic and optical products	19.36%	13.22%	-6.14%	0.10%	-0.05%
CJ	27	Manufacture of electrical equipment	9.16%	8.66%	-0.50%	0.14%	-0.01%
CK	28	Manufacture of machinery and equipment n.e.c	22.14%	25.12%	2.98%	0.17%	0.02%
CL	29	Manufacture of motor vehicles, trailers and semi-trailers	8.68%	4.06%	-4.62%	0.07%	-0.08%
CL	30	Manufacture of other transport equipment	1.91%	2.05%	0.14%	0.16%	0.01%
CM	31	Manufacture of furniture	1.06%	1.08%	0.02%	0.15%	0.00%
CM	32	Other manufacturing	9.20%	12.72%	3.52%	0.20%	0.06%
F	42	Civil engineering	0.35%	1.19%	0.84%	0.50%	0.35%
F	43	Specialised construction activities	1.97%	4.22%	2.25%	0.31%	0.17%
JC	62	Computer programming, consultancy and related activities	0.87%	0.78%	-0.09%	0.13%	-0.02%

Sources: Economica.

Table C.8. Shares of trademarks at different NACE2 levels

NACE Rev. 2	NCL Class.		EU27 Share	WB Share	Difference	Share (WB/EU27)	Deviation from mean
CE	1	Chemicals used in industry, science and photography, as well as in agriculture, horticulture and forestry	1.46%	1.30%	-0.15%	0.49%	-0.06%
CE	2	Paints, varnishes, lacquers	0.56%	0.67%	0.11%	0.66%	0.11%
CE	3	Bleaching preparations and other substances for laundry use	3.17%	3.76%	0.58%	0.65%	0.10%
CE	4	Industrial oils and greases	0.58%	0.66%	0.08%	0.63%	0.08%
CF	5	Pharmaceutical and veterinary preparations	3.48%	8.26%	4.78%	1.31%	0.76%
CH	6	Common metals and their alloys	1.41%	0.90%	-0.52%	0.35%	-0.20%
CK	7	Machines and machine tools	1.89%	0.90%	-0.99%	0.26%	-0.29%
CK	8	Hand tools and implements (hand-operated)	0.71%	0.76%	0.06%	0.59%	0.04%
CI	9	Scientific, nautical, surveying, photographic, cinematographic, optical, weighing, measuring, signalling, checking (supervision), life-saving and teaching apparatus and instruments	6.59%	3.04%	-3.55%	0.25%	-0.30%
CM	10	Surgical, medical, dental and veterinary apparatus and instruments, artificial limbs, eyes and teeth	1.28%	0.74%	-0.53%	0.32%	-0.23%
CH	11	Apparatus for lighting, heating, steam generating, cooking, refrigerating, drying, ventilating, water supply and sanitary purposes	1.86%	1.34%	-0.52%	0.40%	-0.15%
CL	12	Vehicles	1.47%	0.57%	-0.91%	0.21%	-0.34%
CH	13	Firearms	0.13%	0.20%	0.07%	0.85%	0.30%
CH	14	Precious metals and their alloys and goods in precious metals or coated therewith, not included in other classes	1.53%	0.68%	-0.85%	0.24%	-0.31%
CM	15	Musical instruments	0.17%	0.14%	-0.03%	0.45%	-0.10%
CC	16	Paper, cardboard and goods made from these materials, not included in other classes	4.28%	4.04%	-0.24%	0.52%	-0.03%
CG	17	Rubber, gutta-percha, gum, asbestos, mica and goods made from these materials and not included in other classes	0.83%	0.55%	-0.28%	0.36%	-0.19%
CB	18	Leather and imitations of leather, and goods made of these materials and not included in other classes	2.22%	1.26%	-0.96%	0.31%	-0.24%
CG	19	Building materials (non-metallic)	1.19%	0.91%	-0.27%	0.42%	-0.13%
CM	20	Furniture, mirrors, picture frames	1.76%	1.01%	-0.75%	0.32%	-0.23%
CM	21	Household or kitchen utensils and containers	1.50%	1.03%	-0.47%	0.38%	-0.17%

NACE Rev. 2	NCL Class.		EU27 Share	WB Share	Difference	Share (WB/EU27)	Deviation from mean
CB	22	Ropes, string, nets, tents, awnings, tarpaulins, sails, sacks and bags (not included in other classes)	0.36%	0.37%	0.01%	0.57%	0.02%
CB	23	Yarns and threads, for textile use	0.14%	0.15%	0.00%	0.57%	0.02%
CB	24	Textiles and textile goods, not included in other classes	1.22%	1.16%	-0.07%	0.52%	-0.03%
CB	25	Clothing, footwear, headgear	4.77%	3.25%	-1.52%	0.38%	-0.18%
CB	26	Lace and embroidery, ribbons and braid	0.43%	0.37%	-0.05%	0.48%	-0.07%
CB	27	Carpets, rugs, mats and matting, linoleum and other materials for covering existing floors	0.40%	0.30%	-0.09%	0.42%	-0.13%
CM	28	Games and playthings	1.87%	1.13%	-0.74%	0.33%	-0.22%
CA	29	Meat, fish, poultry and game	2.58%	4.85%	2.27%	1.03%	0.48%
CA	30	Coffee, tea, cocoa and artificial coffee	2.96%	8.14%	5.18%	1.52%	0.96%
A	31	Grains and agricultural, horticultural and forestry products not included in other classes	1.35%	1.96%	0.61%	0.80%	0.25%
CA	32	Beers	1.73%	4.54%	2.80%	1.44%	0.89%
CA	33	Alcoholic beverages (except beers)	2.44%	2.48%	0.04%	0.56%	0.01%
CA	34	Tobacco	0.37%	1.07%	0.70%	1.58%	1.03%

Sources: *Economica*.

Table C.9. Mapping NACE Rev. 2 classification with corresponding publication subject areas, and scientific output in the period 1996-2019

NACE Rev. 2		Corresponding Publication Fields		Number of Documents											Performance WBE		
A*38 code	Description	Subject areas	Subject categories	Global	Eastern Europe	Western Europe	Albania	Bosnia and Herzegovina	Montenegro	North Macedonia	Serbia	Kosovo ⁵⁷	Western Balkan Economies ⁵⁸	Share WBE/global	Deviation from MB+MC in %-points		
A	Agriculture, forestry and fishing	Agricultural & Biological Sciences	All subject categories except food science	3,732,331	232,221	1,090,906	521	883	655	788	9,976	122	39,205	0.35%	0.11%		
B	Mining and quarrying	Earth & Planetary Sciences	Economic Geology	49,370	6,187	10,921	8	2	1	22	68	22	123	0.25%	0.01%		
CA	Food products, beverages, and tobacco products	Agricultural & Biological Sciences	food science	598,118	31,168	182,677	102	179	75	195	2,114	19	2,684	0.45%	0.21%		
CB	Textiles, apparel, leather and related products	Materials Science	Textiles, apparel, leather & related products ⁵⁹	189,936	12,951	49,714	28	63	9	40	407	2	549	0.29%	0.05%		
CC	Wood and paper products, and printing	Materials Science	Biomaterials	333,998	15,521	91,425	3	34	0	56	291	0	384	0.11%	-0.12%		
CD+CE	Coke and refined petroleum products; Chemical and chemical products	Chemical Engineering	All subject categories	2,540,378	183,289	651,195	67	413	87	420	4,592	34	5,613	0.22%	-0.01%		
CF	Pharmaceuticals, medicinal chemical and botanical products	Pharmacology, Toxicology & Pharmaceutics	All subject categories	1,912,261	87,369	540,320	100	243	57	345	3,543	37	4,325	0.23%	-0.01%		
CG	Rubber and plastic products, and other non-metallic mineral products	Materials Science	Polymers & Plastics	539,469	48,033	126,966	14	60	20	129	790	10	1,023	0.19%	-0.05%		
CH	Basic metals and fabricated metal products, except machinery and equipment	Materials Science	Metals & Alloys	676,883	80,813	145,838	24	116	48	66	1,689	24	1,967	0.29%	0.06%		
CI+CJ	Computer, electronic and optical products; Electrical equipment	Computer Science	Hardware & Architecture	633,569	28,390	154,763	51	186	136	189	1,210	28	1,800	0.28%	0.05%		
		Engineering	Electrical & Electronic Engineering	4,058,051	265,905	965,652	89	1,093	586	1,153	6,489	120	9,530	0.23%	0.00%		
		Materials Science	Electronic, Optical & Magnetic Materials	2,211,406	207,561	591,845	24	92	50	222	2,356	10	2,754	0.12%	-0.11%		
CK	Machinery and equipment n.e.c.	Engineering	Industrial & Manufacturing Engineering	943,017	63,639	235,796	57	254	46	207	1,871	44	2,479	0.26%	0.03%		
CL	Transport equipment	Engineering	Automotive engineering	231,867	16,777	66,724	7	71	32	46	489	3	648	0.28%	0.04%		
CM	Other manufacturing, and repair and installation of machinery and equipment	Engineering	Engineering (miscellaneous)	1,864,243	137,393	361,620	103	567	266	384	3,542		4,862	0.26%	0.03%		
D	Electricity, gas, steam and air conditioning supply	Energy	All subject areas	1,808,617	126,742	427,388	115	492	192	484	3,740	36	5,059	0.28%	0.05%		
E	Water supply; sewerage, waste management and remediation activities	Environmental Science	All subject areas	3,088,322	184,850	922,084	566	651	361	574	5,281	119	7,552	0.24%	0.01%		
F	Construction	Engineering	Building & Construction; Civil & Structural Engineering,	1,121,655	47,935	299,664	118	221	132	374	2,181	85	3,111	0.28%	0.04%		

NACE Rev. 2		Corresponding Publication Fields		Number of Documents										Performance WBE		
A*38 code	Description	Subject areas	Subject categories	Global	Eastern Europe	Western Europe	Albania	Bosnia and Herzegovina	Montenegro	North Macedonia	Serbia	Kosovo ⁵⁷	Western Balkan Economies ⁵⁸	Share WBE/global	Deviation from MB+MC in %-points	
G	Wholesale and retail trade; repair of motor vehicles and motorcycles															
H	Transportation and storage	Social Sciences	Transportation	144,511	10,684	43,307	17	30	41	71	435	14	608	0.42%	0.19%	
I	Accommodation and food service activities	Business, Management & Accounting	Tourism, Leisure & Hospitality Management	71,842	2,852	21,774	14	23	56	14	213	7	327	0.46%	0.22%	
JA	Publishing, audio-visual and broadcasting activities	Arts & Humanities	Visual Arts & Performing Arts	105,642	6,247	42,050	14	19	13	19	266	3	334	0.32%	0.08%	
JB	Telecommunications	Computer Science	Computer networks & communications; Signal Processing	2,042,556	110,269	513,926	222	1,713	689	1,120	4,965	97	8,806	0.43%	0.20%	
JC	IT and other information services	Computer Science	Information systems	843,277	46,572	216,620	100	306	86	341	1,638	64	2,535	0.30%	0.07%	
K	Financial and insurance activities	Economics, Econometrics, & Finance	Finance	200,743	7,375	64,897	24	27	38	40	158	19	306	0.15%	-0.08%	
L	Real estate activities															
MA	Legal, accounting, management, architecture, engineering, technical testing, and analysis activities	Social Sciences	Law	308,700	11,793	111,280	31	126	54	132	466	80	889	0.29%	0.05%	
		Business, Management & Accounting	All subject categories except Tourism, Leisure & Hospitality Management; Organizational Behaviour & Human Resource Management	995,789	56,375	303,997	147	303	129	357	1,212	48	2,196	0.22%	-0.01%	
MB+MC	Scientific research and development; Other professional, scientific, and technical activities	All subject areas	All subject categories	58,807,729	3,688,537	18,159,200	5,214	13,884	4,717	12,815	101,388	1,545	138,018	0.23%	0.00%	
N	Administrative and support service activities	Business, Management & Accounting	Organizational Behaviour & Human Resource Management	123,605	3,510	46,474	7	26	2	17	74	11	137	0.11%	-0.12%	

Sources: SCImago, Metrics based on Scopus® data as of April 2020.

(57) Data for Kosovo were retrieved directly from the Scopus database.

(58) Due to transnational co-operation, the sum includes double counting.

(59) Data for Textiles, apparel leather & related products were retrieved directly from the Scopus database.

Table C.10. Data on the scientific output, productivity and impact (measured by the number of documents, citation and H-index for WB economies in the period 1996-2019)

	Albania			Bosnia and Herzegovina			North Macedonia			Montenegro			Serbia			Total		
	Documents	Citations	H index	Documents	Citations	H index	Documents	Citations	H index	Documents	Citations	H index	Documents	Citations	H index	Documents	Citations	H index
Medicine	1,379	20,479	55	5,704	49,568	80	3,693	64,092	98	866	7,737	34	28,240	344,481	190	39,882	486,357	457
Engineering	527	1,782	21	2,988	13,233	46	2,656	15,288	49	1,279	12,793	51	19,705	144,256	112	27,155	187,352	279
Computer Sciences	537	1,582	19	2,322	8,423	38	2,372	9,971	36	946	6,993	39	11,608	68,115	78	17,785	95,084	210
Physic and Astronomy	334	1,138	18	821	11,643	51	1,214	14,141	48	525	6,353	38	14,306	214,454	138	17,200	247,729	293
Agricultural and Biological Sciences	623	5,918	35	1,062	7,914	40	983	8377	39	730	3,882	26	9,976	84,487	89	13,374	110,578	229
Chemistry	196	1,793	24	437	3,021	26	1,283	16,400	47	191	1,149	17	11,072	135,249	104	13,179	157,612	218
Biochemistry, Genetics and Molecular Biology	334	4,780	34	785	10,549	49	996	17,358	59	248	1,772	19	10,609	136,693	113	12,972	171,152	274
Mathematics	288	1,147	17	855	3,609	27	1,058	7,402	34	473	2,918	24	9,355	90,951	92	12,029	106,027	194
Materials Sciences	186	1,535	22	542	3,304	26	766	8,311	42	232	1,786	21	9,223	89,456	87	10,949	104,392	198
Social Sciences	954	2,312	20	1,281	4,293	27	1,045	2,675	23	455	948	14	5,884	25,511	54	9,619	35,739	138
Environmental Sciences	566	4,067	29	651	4,872	35	574	6,667	35	361	1,798	21	5,281	56,378	88	7,433	73,782	208
Chemical Engineering	67	449	12	413	2,788	26	420	3,982	31	87	357	10	4,592	55,295	80	5,579	62,871	159
Energy	115	615	12	492	3,133	28	484	4,668	35	192	884	12	3,740	30,279	62	5,023	39,579	149
Earth and Planetary Sciences	417	4,311	31	347	2,247	22	473	3,135	28	226	1,176	18	3,335	30,281	69	4,798	41,150	168
Pharmacology, Toxicology and Pharmaceutics	100	1,005	16	243	2,372	26	345	4,542	31	57	536	14	3,543	42,409	69	4,288	50,864	156
Arts and Humanities	671	1,597	15	556	3,086	23	256	1,534	15	221	235	7	2,176	11,525	40	3,880	17,977	100
Immunology and Microbiology	182	3,223	29	181	3,186	26	188	4,940	30	40	534	9	2,025	36,672	76	2,616	48,555	170
Business, Management, Accounting	168	1,155	14	352	1,427	18	388	2,033	20	187	505	11	1,499	6,852	34	2,594	11,972	97
Economic, Econometrics and Finance	637	544	12	215	622	13	279	1,086	15	164	595	9	1,133	3,622	23	2,428	6,469	72
Neuroscience	30	449	10	114	1,368	19	168	2,418	26	22	87	4	1,591	24,581	61	1,925	28,903	120
Veterinary	94	674	15	166	567	10	204	818	14	17	70	4	1,356	5,396	25	1,837	7,525	68
Decision Sciences	44	137	7	206	418	10	178	315	9	75	653	11	1,168	9,462	41	1,671	10,985	78
Health Professions	54	145	8	273	990	15	142	1,124	16	121	319	9	1,061	8,280	39	1,651	10,858	87
Psychology	44	954	11	179	1,714	20	256	1,160	15	16	34	4	1,095	9,319	37	1,590	13,181	87
Multidisciplinary	57	1,398	15	86	1,923	18	123	5,286	22	24	191	7	840	16,864	40	1,130	25,662	102
Dentistry	86	783	13	84	441	12	50	346	11	8	24	3	567	6,725	39	795	8,319	78
Nursing	41	407	9	69	434	12	40	1,134	11	19	150	5	620	8,738	40	789	10,863	77
Total	8,731	64,379	523	21,424	147,145	743	20,634	209,203	839	7,782	54,479	441	165,600	1,696,331	1,920	224,171	2,171,537	4,466

Note: Data for Kosovo not available.

Sources: SCImago, Metrics based on Scopus® data as of April 2020.

C.5 Qualitative indicators

Government policies and programmes, especially in the fields of innovation and export, can play an influential role in building capacities in different sectors and thus making GVCs functionally develop and work. The analysis provided in *Table C.11* shows promotional programmes and public policies related to innovation and exports in the WB economies. Public policies in the region are partially aligned and focused in particular on industries, with certain exceptions. As can be seen from the data, the majority of economies from the region focus on industries such as Food products, beverages and tobacco products (CA); Agriculture, forestry and fishing (A); Textiles, apparel, leather and related products (CB); and IT and other information services (JC). The main reason why low value-added industries such as food, agriculture and clothing have been supported by the governments of the Western Balkans is that they have important social implications. They employ a high number of people and are thus important for keeping unemployment low. Most of the workers in these industries are also women, meaning that the industries are important for gender equality and related issues. Furthermore, these activities are usually located in poorer areas, thereby contributing to balanced regional development and to lower inequality and poverty.

Business support organisations play an important role in networking, promoting innovative activities and boosting economic development. In *Table C.12* we present the number of business support organisations across the WB economies. Based on the data from the table, the most active clusters across the region are in the sectors of IT and other information services (JC) in all economies, followed by electricity, gas, steam and air conditioning supply (D), with five clusters in all economies except Kosovo. Nevertheless, the presence of business support organisations is relatively strong in other sectors, where great potential for value-chain development has been identified.

The process of implementing Smart Specialisation Strategies (S3) varies significantly between

the economies of the WB region. While Montenegro and Serbia have finalised and adopted strategies, other economies are still in the development stage. Albania and North Macedonia are in the process of mapping, while Albania and Kosovo are still working on institutional capacity building. *Table C.13* shows the progress of S3 in the WB region. In Montenegro, Serbia and North Macedonia the focus is on food and agriculture and ICT, while Montenegro and North Macedonia have also identified energy and tourism as priority areas.

Table C.14 complements this analysis by showing the planned and ongoing S3 strategies and whether these apply to the Common Regional Market strategy. The industries that are covered by the Common Regional Market strategy are Transport equipment (CL), Electricity, gas, steam and air conditioning supply (D), Accommodation and food service activities (I) and IT and other information services (JC).

Finally, we elaborate which of the selected industries are compatible with ongoing EU agendas, and in which way. Food, agriculture and food processing are compatible with the European Green Deal because they can refer to ecological and sustainable agriculture and food production. Textiles and clothing are compatible with the European Green Deal and with the EU Textiles Strategy, as the industry is the fourth-worst for its use of primary raw materials and water and the fifth-worst for its greenhouse gas emissions and consequently offers great scope for a new, sustainable product framework. The automotive industry is compatible with the European Green Deal because it can refer to non-polluting vehicles. Energy is clearly related to the European Green Deal via sustainable energy production, energy efficiency and the like. Tourism can be also linked to the European Green Deal by being eco-friendly, natural and sustainable, while ICT is related to the Digital Agenda for Europe.

C.6 Summary

This deliverable has been devoted to selecting and describing both quantitative and qualitative criteria concerning industries and value chains that are promising for further and deeper analysis. The selection includes industries and value chains that are relevant to the future potential of the industries of the Western Balkan economies and their development and integration into regional and European value chains. Multiple criteria, including economic performance indicators, proxies for innovation and scientific output as well as qualitative indicators, have been chosen. Further aspects are the potential for regional and transnational cooperation in line with smart specialisation strategies, global megatrends and challenges already under way. Another specific aspect of this selection is also the extent to which these industries are compatible with elements of the EU's policy agendas (such as the European Green Deal), including environmental sustainability, innovation or digital aspects, which will shape industrial policies over the years to come.

Tables
C.11-C.14



Table C.11. Export and innovation promotion programmes

NACE Rev. 2	Description	AL	BA	ME	MK	XK	RS	Total
A	Agriculture, forestry and fishing	yes	no	yes	yes		no	3
B	Mining and quarrying	no	no	no	no		no	0
CA	Food products, beverages, and tobacco products	yes	yes	yes	yes		yes	5
CB	Textiles, apparel, leather and related products	yes	yes	no	no		no	2
CC	Wood and paper products, and printing	yes	yes	no	no		yes	3
CD	Coke and refined petroleum products	no	no	no	no		no	0
CE	Chemicals and chemical products	yes	no	no	no		no	1
CF	Pharmaceuticals, medicinal chemical and botanical products	no	no	no	no		no	0
CG	Rubber and plastic products, and other non-metallic mineral products	yes	no	no	no		no	1
CH	Basic metals and fabricated metal products, except machinery and equipment	no	no	no	no		no	0
CI	Computer, electronic and optical products	no	no	no	no		no	0
CJ	Electrical equipment	no	no	no	no		no	0
CK	Machinery and equipment n.e.c.	no	no	no	no		no	0
CL	Transport equipment	no	no	no	no		no	0
CM	Other manufacturing, and repair and installation of machinery and equipment	no	no	no	no		no	0
D	Electricity, gas, steam and air conditioning supply	no	no	no	no		no	0
E	Water supply; sewerage, waste management and remediation activities	no	no	no	no		no	0
F	Construction	no	no	no	no		no	0
G	Wholesale and retail trade; repair of motor vehicles and motorcycles	no	no	no	no		no	0
H	Transportation and storage	no	no	no	no		no	0
I	Accommodation and food service activities	no	no	yes	no		no	1
JA	Publishing, audio-visual and broadcasting activities	no	no	no	no		no	0
JB	Telecommunications	no	no	no	no		no	0
JC	IT and other information services	no	no	yes	no		yes	2
K	Financial and insurance activities	no	no	no	no		no	0
L	Real estate activities	no	no	no	no		no	0
MA	Legal, accounting, management, architecture, engineering, technical testing, and analysis activities	no	no	no	no		no	0
MB	Scientific research and development	yes	no	no	no		no	1
MC	Other professional, scientific, and technical activities	no	no	no	no		no	0
N	Administrative and support service activities	no	no	no	no		no	0

Sources: Republic of Serbia: <https://ras.gov.rs/program-podrske-privrednim-drustvima-za-promociju-izvoza> and <https://inovacije.srbijastvara.rs/> - Montenegro: <https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwjdz9ntj9HuAhVh6uAKHa-GAs4QFjAAegQIAhAC&url=https%3A%2F%2Fwww.gov.me%2FResourceManager%2FFileDownload.aspx%3FId%3D368882%26rType%3D2&usg=AOvVaw3ufyHTsvPGmkmxNldbKnfm> - Albania: <http://aida.gov.al/en/sme/financing-initiatives/aida-s-funds> - Bosnia and Herzegovina: <https://www.sippo.ba/en> - Republic of North Macedonia: <https://economy.gov.mk/Upload/Documents/Finalna%20Industriska%20Strategija.pdf>

Table C.12. Business support organisations

NACE Rev. 2	Description	AL	BA	ME	MK	XK	RS	Total
A	Agriculture, forestry and fishing	1		1	1		1	4
B	Mining and quarrying							0
CA	Food products, beverages, and tobacco products			1	1		1	3
CB	Textiles, apparel, leather and related products				1		1	2
CC	Wood and paper products, and printing							0
CD	Coke and refined petroleum products							0
CE	Chemicals and chemical products							0
CF	Pharmaceuticals, medicinal chemical and botanical products		1	1				2
CG	Rubber and plastic products, and other non-metallic mineral products		1					1
CH	Basic metals and fabricated metal products, except machinery and equipment		1				1	2
CI	Computer, electronic and optical products	1	1	1	1		1	5
CJ	Electrical equipment	1	1	1	1		1	5
CK	Machinery and equipment n.e.c.						1	1
CL	Transport equipment						1	1
CM	Other manufacturing, and repair and installation of machinery and equipment							0
D	Electricity, gas, steam and air conditioning supply	1	1	1	1		1	5
E	Water supply; sewerage, waste management and remediation activities							0
F	Construction						1	1
G	Wholesale and retail trade; repair of motor vehicles and motorcycles						1	1
H	Transportation and storage	1	1		1		1	4
I	Accommodation and food service activities			1	1		1	3
JA	Publishing, audio-visual and broadcasting activities						1	1
JB	Telecommunications	1		1	1		1	4
JC	IT and other information services	1	1	1	1	1	1	6
K	Financial and insurance activities							0
L	Real estate activities							0
MA	Legal, accounting, management, architecture, engineering, technical testing, and analysis activities						1	1
MB	Scientific research and development						1	1
MC	Other professional, scientific, and technical activities						1	1
N	Administrative and support service activities						1	1

Sources: Own elaboration based on <https://reporting.clustercollaboration.eu/all>

Table C.13. Overview of S3 in the Western Balkans

	AL	BA	ME	MK	XK	RS
Status	Mapping exercise	Institutional Capacity Building	Final SSS strategy	Mapping exercise	Institutional Capacity Building	Final SSS strategy
Priority Areas	Has economic potential in Manufacturing (CA, CB, CD, CG and CH),	UNKNOWN	Sustainable agriculture and food value chain	Sustainable food and beverage production and value chains	UNKNOWN	ICT
	Information and Communication (JA, JB and JC)		Energy and sustainable environment	ICT		Food for Future
	Construction		Sustainable and health tourism	Smart/ sustainable buildings and materials		Future Machines and Manufacturing Systems
	Mining and quarrying		ICT	Electrical equipment & mechanical parts		Creative Industries
				Sustainable tourism and catering		
				Energy for the future		
Most recent strategic document		Science and Technology Development Strategy 2018-2022			Information Technology Strategy	

Sources: Serbia: <https://pametnaspecijalizacija.mpn.gov.rs/publikacije/> xxx - Montenegro: <https://www.s3.me/en/s3-montenegro> - Albania and North Macedonia: Information provided by JRC.

Table C.14. S3 by industry and common regional market strategy

NACE Rev.2	Description	SSS ongoing	SSS planned	Common Regional Market Strategy
A	Agriculture, forestry and fishing	ME, RS	MK	no
B	Mining and quarrying			no
CA	Food products, beverages, and tobacco products	ME, RS	MK	no
CB	Textiles, apparel, leather and related products			no
CC	Wood and paper products, and printing			no
CD	Coke and refined petroleum products			no
CE	Chemicals and chemical products			no
CF	Pharmaceuticals, medicinal chemical and botanical products			no
CG	Rubber and plastic products, and other non-metallic mineral products			no
CH	Basic metals and fabricated metal products, except machinery and equipment			no
CI	Computer, electronic and optical products			no
CJ	Electrical equipment			no
CK	Machinery and equipment n.e.c.	RS	MK	no
CL	Transport equipment			yes
CM	Other manufacturing, and repair and installation of machinery and equipment			no
D	Electricity, gas, steam and air conditioning supply	ME	MK	yes
E	Water supply; sewerage, waste management and remediation activities			no
F	Construction			no
G	Wholesale and retail trade; repair of motor vehicles and motorcycles			no
H	Transportation and storage			no
I	Accommodation and food service activities	ME	MK	yes
JA	Publishing, audio-visual and broadcasting activities	RS*		no
JB	Telecommunications			no
JC	IT and other information services	ME, RS	MK	Yes
K	Financial and insurance activities			No
L	Real estate activities			No
MA	Legal, accounting, management, architecture, engineering, technical testing, and analysis activities			No
MB	Scientific research and development			no
MC	Other professional, scientific, and technical activities			no
N	Administrative and support service activities			no

Sources: Action plan for Common Regional Market 2021-2024, downloaded from <https://www.wb6cif.eu/wp-content/uploads/2020/11/Final.-CRM-2021-2024-AP.pdf>

ANNEX

D

D. Top 30 firms in the selected value chains

Table D.1. Top 30 companies in the Agri-food sector

Company name Latin alphabet	Country ISO code	NACE Rev. 2, core code (4 digits)	Total assets in EUR, 2019	Operating revenue (Turnover) in EUR, 2019	Number of employees in 2019	Average gross monthly salary in EUR, 2019
Coca-Cola HBC - Srbija DOO Zemun	RS	1107	422,588,558	281,128,678	837	2,603
AD Imlek	RS	1051	386,422,785	180,805,704	935	1,405
IM Matijevic DOO Novi SAD	RS	1011	188,978,868	143,956,246	1,777	690
Gebi DOO PO Cantavir	RS	1091	96,910,422	134,471,265	368	761
Dijamant A.D.	RS	1041	123,162,507	122,240,798	680	1,199
Sojaprotein DOO Becej	RS	1041	132,771,580	113,428,822	377	1,026
Victoriaoil DOO SID	RS	1041	154,348,681	113,252,521	272	897
Marbo Product DOO Beograd	RS	1089	56,993,143	113,224,072	989	1,227
Sunoko DOO Novi SAD	RS	1081	228,387,674	110,633,850	413	1,510
Frikom DOO Beograd	RS	1052	104,944,984	106,561,169	1,078	1,444
Nestle Adriatic S	RS	1089	49,980,496	103,590,456	522	1,691
Sume Republike Srpske A.D.	BA	0210	3,610,181,279	102,320,715	4,902	
Heineken Srbija DOO Zajecar	RS	1105	93,781,304	96,357,970	293	2,254
DOO Almex Pancevo	RS	0111	162,386,357	94,421,214	375	786
Atlantic Stark D.O.O.	RS	1072	90,050,359	93,652,531	1,102	1,144
Bimal DD	BA	1089	80,859,017	92,879,429	249	1,010
APA DOO Apatin	RS	1105	138,351,161	89,769,904	700	1,880
Pivara Skopje AD	MK	1107	66,872,109	86,908,921	371	1,913
Koncern Bambi A.D. Pozarevac	RS	1072	139,729,304	82,565,186	624	1,290
Pekabesko AD	MK	1089	35,084,967	81,878,295	486	788

Company name Latin alphabet	Country ISO code	NACE Rev. 2, core code (4 digits)	Total assets in EUR, 2019	Operating revenue (Turnover) in EUR, 2019	Number of employees in 2019	Average gross monthly salary in EUR, 2019
CC HBC B-H d.o.o. Sarajevo	BA	1107	38,686,695	80,959,132	287	1,938
Carlsberg Srbija D.O.O. Celarevo	RS	1105	60,307,345	77,684,311	449	2,098
Carnex DOO Vrbas	RS	1011	138,224,915	76,265,592	846	865
MADI d.o.o. Tesanj	BA	1013	36,921,406	76,018,775	587	565
Knjaz Milos AD Arandelovac	RS	1107	66,265,425	73,017,053	505	1,403
DON DON DOO Beograd	RS	1071	63,569,321	71,733,541	983	754
ZZ Trlic UB	RS	1011	19,517,204	71,257,994	724	444
Srbijasume	RS	0210	1,159,887,303	70,952,264	3,247	783
Atlantic Grand DOO	RS	1083	76,790,378	70,923,883	272	1,666
Somboled DOO Sombor	RS	1051	44,277,895	69,643,375	346	1,279

Sources: Orbis database

Table D.2. Top 30 companies in the Textiles sector

Company name Latin alphabet	Country ISO code	NACE Rev. 2, core code (4 digits)	Total assets in EUR, 2019	Operating revenue (Turnover) in EUR, 2019	Number of employees in 2019	Average gross monthly salary in EUR, 2019
Magna Seating D.O.O.	RS	1395	39,410,542	104,315,278	1,935	779
Valy DOO	RS	1431	119,729,761	85,285,058	1,836	688
Real Knitting DOO	RS	1431	92,949,069	48,702,014	628	691
Conceria Pasubio S.Pa.-Ogranak	RS	1511	11,240,014	44,159,011	310	777
Gordon	RS	1413	46,654,202	43,427,713	1,293	624
Olimpias SRB DOO	RS	1413	31,513,587	41,390,725	400	584
Flash SRB	RS	1320	39,291,990	37,692,408	217	894
Fiorano DOO Sombor	RS	1414	42,208,723	35,588,583	1,723	565
Luxury Tannery DOO	RS	1511	29,362,490	34,673,043	196	1,003
Falc East DOO Knjazevac	RS	1520	30,377,247	33,687,552	1,147	487

Company name Latin alphabet	Country ISO code	NACE Rev. 2, core code (4 digits)	Total assets in EUR, 2019	Operating revenue (Turnover) in EUR, 2019	Number of employees in 2019	Average gross monthly salary in EUR, 2019
Autostop Interiors DOO Leskovac	RS	1396	17,092,195	30,960,097	591	523
ALMA-RAS d.o.o. Olovo	BA	1414	17,669,745	30,107,472	1,080	528
Komfi Angel DOO	MK	1392	19,258,858	27,546,413	808	528
Djonson Kontrols Shtip Doel	MK	1396	24,972,436	26,278,126	2,170	663
Grammer System	RS	1392	17,902,875	25,323,593	1,619	667
Sportek D.O.O.	BA	1520	32,143,754	21,550,408	2,027	
Blockx DOO Backi Petrovac	RS	1392	12,421,832	20,589,192	276	677
OLIP-BOSNA d.o.o. Travnik	BA	1520	16,627,224	18,302,103	1,594	433
PREVENT LEATHER d.o.o. Visoko	BA	1511	43,246,513	18,246,427	342	713
Yumco A.D. Vranje	RS	1399	50,785,227	16,974,357	1,791	385
Dafar DOO Zrenjanin	RS	1511	12,764,912	16,917,689	108	1,216
Fulgar East DOO Zrenjanin	RS	1310	21,858,943	16,813,255	25	4,461
Djonson Kontrols Automotive Strumica S Svidovica Doel	MK	1396	27,432,969	16,766,251	1,603	557
Ep-Belt	RS	1396	18,633,450	16,653,999	226	721
Modital DOO Zrenjanin	RS	1431	11,742,113	16,631,932	788	533
Confezioni Andrea Serbia DOO Kocino Selo	RS	1392	21,630,977	15,613,796	428	480
SM3 d.o.o.	BA	1431	14,382,303	15,431,465	327	643
INTRAL BH d.o.o. Lukavac	BA	1520	10,753,143	15,031,006	277	661
Mona DOO Beograd	RS	1512	26,789,126	14,305,231	520	737
Jasmil DOO Arilje	RS	1413	14,708,094	14,052,390	557	563

Sources: Orbis database

Table D.3. Top 30 companies in the Automotive sector

Company name Latin alphabet	Country ISO code	NACE Rev. 2, core code (4 digits)	Total assets in EUR, 2019	Operating revenue (Turnover) in EUR, 2019	Number of employees in 2019	Average gross monthly salary in EUR, 2019
Djonson Meti Skopje Dooel	MK	2932	1,083,109,153	1,892,969,540	1,043	1,004
FCA Serbia DOO Kragujevac	RS	2910	565,478,084	543,912,668	2,195	738
Robert Bosch DOO Beograd	RS	2931	125,467,432	258,139,930	1,445	1,717
Kromberg Shubert Makedonija Dooel	MK	2931	102,082,267	247,960,771	6,458	614
Yura Corporation DOO Raca	RS	2931	170,900,704	203,965,749	6,207	568
VAN Hool Makedonija Ilinden Dooel	MK	2910	131,351,147	178,521,721	1,048	987
Johnson Electric DOO NIS	RS	2931	134,949,740	141,850,540	1,818	603
Lear Corporation D.O.O.	RS	2931	60,095,353	94,409,878	2,575	790
Markart Makedonija Dooel	MK	2931	50,693,938	81,868,124	569	732
DAD Draxlmaier Automotive DOO Zrenjanin	RS	2931	45,520,406	67,302,666	5,874	692
KI Sejfti Systems Makedonija Kichevo Dooel	MK	2932	43,605,860	66,654,532	1,438	550
PKC Wiring Systems D.O.O.	RS	2931	30,663,966	66,538,417	1,551	837
DMM Drekslmajer Manufakturing Makedonija Kavadarac Dooel	MK	2931	31,877,270	66,441,326	5,799	546
Genterm Makedonija Uvoz Izvoz E L Prilep Dooel	MK	2931	54,601,486	56,890,813	1,944	576
Yazaki Srbija D.O.O.	RS	2931	59,954,648	50,827,973	2,856	526

Company name Latin alphabet	Country ISO code	NACE Rev. 2, core code (4 digits)	Total assets in EUR, 2019	Operating revenue (Turnover) in EUR, 2019	Number of employees in 2019	Average gross monthly salary in EUR, 2019
Lear Corporation Makedonija Dooel	MK	2932	15,619,516	46,630,621	1,113	672
TMD Ai d.o.o. Gradacac	BA	2932	25,694,250	45,569,074	573	808
DOO Teklas Automotive Vladicin HAN	RS	2932	35,769,403	42,932,269	642	763
Trayal Korporacija U Re-strukturiranju A.D.	RS	2932	85,052,599	42,444,391	1,100	667
VERITAS AUTOMOTIVE d.o.o.	BA	2932	32,815,168	39,597,943	260	1,067
Kostal Makedonija Ohrid Dooel	MK	2931	89,309,564	37,416,702	408	1,078
MANN+HUMMEL BA d.d. Tesanj	BA	2932	25,451,625	36,399,379	637	968
JAJCE ALLOY WHEELS d.o.o. Jajce	BA	2932	40,406,012	34,476,767	215	1,508
Kromberg & Schubert Srbija D.O.O.	RS	2931	28,342,813	34,101,759	1,071	626
Streit Nova DOO	RS	2932	32,668,615	32,652,421	378	1,020
Shinwon DOO NIS	RS	2931	22,706,522	29,313,166	637	646
Knott-Autoflex YUG DOO Becej	RS	2920	32,090,557	28,704,488	422	862
Adient Seating DOO	RS	2932	11,179,917	26,578,256	145	1,133
ARC Automotiv Makedonija Ilinden Dooel	MK	2932	25,459,746	25,804,643	342	692
IGB Automotive Comp DOO Indija	RS	2931	21,079,666	25,472,374	2,188	639

Sources: Orbis database

Table D.4. Top 30 companies in the Energy sector

Company name Latin alphabet	Country ISO code	NACE Rev. 2, core code (4 digits)	Total assets in EUR, 2019	Operating revenue (Turnover) in EUR, 2019	Number of employees in 2019	Average gross monthly salary in EUR, 2019
JP EPS Beograd	RS	3514	8,285,536,698	2,379,714,498	24,966	1,625
JP Srbijagas Novi SAD	RS	3523	1,723,750,394	778,551,659	1,021	1,198
EPS Distribucija D.O.O. Beograd	RS	3513	2,627,623,088	702,388,749	3,414	1,579
JP Elektroprivreda BIH D.D. Sarajevo	BA	3511	2,300,161,227	532,782,171		
Elektroprivreda Crne Gore A.D.	ME	3511	1,072,482,758	324,586,327	976	1,780
JKP Beogradske Elektrane Beograd	RS	3530	492,613,717	244,833,518	2,004	1,153
JP Elektroprivreda HZ HB D.D.	BA	3511	986,685,146	237,592,256		
EVN Makedonija Skopje AD	MK	3513	390,627,305	233,721,166	222	1,227
Elektrani NA Makedonija Skopje AD	MK	3511	736,649,466	206,037,003	4,751	1,003
EMS AD Beograd	RS	3512	779,331,507	204,968,304	1,353	1,363
GEN - I DOO Beograd	RS	3514	12,792,791	198,976,967	4	8,155
EVN Elektrodistribucija Dooel	MK	3513	39,552,307	145,011,706	1,702	923
EVN Home Skopje DOO	MK	3514	74,478,596	136,627,118	31	371
GEN I Prodazhba NA Energija Skopje Dooel	MK	3514	12,288,610	135,847,100	2	1,665
Elektrokrajina A.D.	BA	3512	336,515,349	112,496,305	1,897	986
Messer Tehnogas A.D.	RS	3522	194,156,053	106,067,504	502	2,016
Eft-Rudnik I Termoelektrana Stanari D.O.O. Stanari	BA	3511	488,740,321	102,579,029	886	1,305

Company name Latin alphabet	Country ISO code	NACE Rev. 2, core code (4 digits)	Total assets in EUR, 2019	Operating revenue (Turnover) in EUR, 2019	Number of employees in 2019	Average gross monthly salary in EUR, 2019
Crnogorski Elektrodistributivni Sistem	ME	3513	435,679,155	100,779,582	1,348	1,556
Energy Delivery Solutions AD	MK	3514	24,709,722	93,964,699	29	1,567
Operator NA Elektroprenos-niot Sistem ZA Prenos NA Električna Energija AD	MK	3512	169,490,219	88,324,383	653	1,002
Novosadska Toplana	RS	3530	180,480,546	63,072,159	335	903
Elektroprenos - Elektroprijenos BIH A.D.	BA	3512	546,681,695	57,518,697	1,201	
Energija GAS and Power	RS	3514	17,897,199	56,767,050	18	1,003
EVN Make-donija Elektros-nabduvanje Skopje Doool	MK	3514	13,634,383	56,477,220	16	1,468
Energy Fi-nancing Team D.O.O.	BA	3513	9,628,129	54,894,530	3	
MH ERS ZP Elektro-Bijeljina A.D.	BA	3513	156,822,803	54,748,054	932	
Energy Deliv-ery Solutions D.O.O. Beograd	RS	3514	7,896,810	53,034,726	1	3,398
KJKP Saraje-vogas d.o.o. Sarajevo	BA	3523	87,349,110	50,307,158	312	1,429
EVN Trejding Skopje Doool	MK	3514	6,150,390	49,340,089	2	2,093
Elmako-En-ergy D.O.O. Beograd	RS	3514	8,500,637	41,956,742	1	378

Sources: Orbis database

Table D.5. Top 30 companies in the Tourism sector

Company name Latin alphabet	Country ISO code	NACE Rev. 2, core code (4 digits)	Total assets in EUR, 2019	Operating revenue (Turnover) in EUR, 2019	Number of employees in 2019	Average gross monthly salary in EUR, 2019
Nicefoods DOO Beograd	RS	5610	17,267,944	51,695,644	972	814
Klub Sport 77 Uvoz Izvoz Bitola DOO	MK	5630	6,517,221	27,630,317	438	367
Lustica Development	ME	5510	121,457,519	27,629,952	88	3,009
Hotelska Grupa Budvanska Rivijera A.D.	ME	5510	151,309,924	21,622,438	199	3,062
Hotels Group Montenegro Stars	ME	5510	97,476,928	20,432,000	619	1,175
Rubin Pojate	RS	5510	6,865,484	15,925,066	42	425
Bellevue Hotels Group D.O.O.	ME	5510	49,016,872	14,602,628	210	899
Asseko SEE Skopje Dooel	MK	5630	13,133,214	12,781,217	172	1,652
Beppler & Jacobson Montenegro	ME	5510	73,885,321	12,215,431	118	1,233
BMP AD Novi Beograd, Milentija Popovica 5	RS	5510	30,186,266	11,972,861	205	1,322
Belaga Management Company	RS	5510	49,633,527	10,651,335	191	1,384
Carine	ME	5610	68,177,241	9,043,551	79	420
Metropol Palace	RS	5510	44,446,793	8,878,881	133	899
TERMALNA RIVIJERA ILIDZA d.o.o. Sarajevo	BA	5510	38,835,845	8,428,029	112	524
Kolubara - Ugostiteljstvo DOO Vreoci	RS	5629	2,178,389	8,111,739	518	677
Multicatering D.O.O.	RS	5621	2,268,178	7,938,790	145	461
MRKULIC - COMPANY d.o.o. Sarajevo-Ilidza	BA	5510	40,993,420	7,843,175	159	526
Mkmr DOO Kopaonik	RS	5510	42,208,919	7,599,845	127	1,352

Company name Latin alphabet	Country ISO code	NACE Rev. 2, core code (4 digits)	Total assets in EUR, 2019	Operating revenue (Turnover) in EUR, 2019	Number of employees in 2019	Average gross monthly salary in EUR, 2019
UGS PRO DOO Beograd	RS	5610	1,075,077	7,589,251	198	810
UPD Stari Grad AD Beograd	RS	5610	14,818,426	7,496,636	231	536
Hotel Grand M Skopje Doool	MK	5510	1,250,398	7,469,809	162	831
SEA Trade	ME	5510	43,778,632	7,275,057	2	642
Walter BBQ	RS	5610	3,290,791	6,730,864	249	444
Moskva DOO Beograd	RS	5510	22,709,884	6,710,338	195	870
Amrest D.O.O.	RS	5610	4,898,568	6,709,963	90	1,281
GLIESE 581g d.o.o. Sarajevo	BA	5610	12,690,568	6,531,978	153	555
Hotel Crna Gora D.O.O.	ME	5510	39,529,015	6,420,933	149	819
Nemesis	ME	5510	9,867,406	6,409,113	210	423
Sendvichara 7 T P Ugostitel Jane Stojan Popov TP	MK	5610	0	6,392,518	84	345
Azimen	RS	5610	1,150,773	6,378,422	137	895

Sources: Orbis database

Table D.6. Top 30 companies in the ICT sector

Company name Latin alphabet	Country ISO code	NACE Rev. 2, core code (4 digits)	Total assets in EUR, 2019	Operating revenue (Turnover) in EUR, 2019	Number of employees in 2019	Average gross monthly salary in EUR, 2019
Telekom Srbija A.D., Beograd	RS	6110	2,757,909,204	733,814,598	6,767	1,495
Telenor DOO Beograd	RS	6120	367,556,280	385,453,998	672	2,436
VIP Mobile	RS	6110	427,911,588	285,053,004	1,151	1,903
Telecommunications of Republika Srpska A.D.	BA	6190	672,293,628	260,452,646	2,552	1,390
BH Telecom D.D	BA	6190	643,938,675	238,410,541	3,242	1,619
SBB DOO Beograd	RS	6110	551,080,852	236,440,320	1,624	1,307
M Kedonski Telekom AD	MK	6190	323,340,108	177,916,321	1,060	1,386
A1 Makedonija Dooel	MK	6120	150,574,600	126,208,832	764	1,276
JP Croatian Telecommunications INC D.D.	BA	6190	220,622,293	102,049,125	1,378	1,492
TRX - Systems	RS	6311	1,006,707	93,421,502	4	2,725
Crnogorski Telekom A.D.	ME	6190	182,615,667	80,879,774	516	1,929
Mtel	ME	6120	314,072,244	78,966,759	325	2,577
Comtrade System Integration	RS	6201	21,500,009	76,248,121	242	2,763
Telemach BH d.o.o. Sarajevo	BA	6110	108,041,197	68,576,060	578	993
Telenor	ME	6190	68,956,127	54,551,327	205	2,401
Asseco SEE DOO Beograd	RS	6201	28,346,549	47,958,963	413	2,878
Telegroup D.O.O.	RS	6202	27,713,354	44,148,782	158	1,418
Roaming Networks	RS	6110	47,742,409	44,073,996	400	1,402
Prva Televizija DOO	RS	6110	53,766,731	43,089,023	207	2,403
GMX Systems DOO	RS	6311	1,555,006	40,601,287	5	890
Microsoft Software DOO Beograd	RS	6209	17,088,272	39,830,307	250	8,579

Company name Latin alphabet	Country ISO code	NACE Rev. 2, core code (4 digits)	Total assets in EUR, 2019	Operating revenue (Turnover) in EUR, 2019	Number of employees in 2019	Average gross monthly salary in EUR, 2019
Arena Channels Group DOO Beograd	RS	6110	35,672,219	39,592,920	64	2,528
Kopernikus Technology D.O.O. Beograd	RS	6110	104,391,689	35,781,845	477	792
Orion Telekom DOO Beograd	RS	6110	43,023,939	35,357,937	147	1,624
PRO Beting Kochani DOO	MK	6311	3,775,744	34,780,772	103	409
ALL IP D.O.O.	RS	6190	2,825,209	29,109,275	15	3,130
Informatika A.D.	RS	6209	16,388,827	28,259,032	130	1,656
Schneider Electric DMS NS D.O.O. Novi SAD	RS	6201	83,054,154	28,006,966	1,013	2,844
SAP West Balkans DOO Beograd	RS	6201	31,447,992	27,151,056	93	5,225
Oracle Srbija & Crna Gora D.O.O.	RS	6201	24,909,863	25,990,420	40	6,579

Sources: Orbis database

ANNEX

FE

E. Interviews and survey

Because of time constraints the field research was carried out in a one-month time frame in March and April 2021 and complemented with data collected in May. The structure of the questionnaire is presented below. During the research we contacted the largest companies in the WB region with a request for an interview (the list of companies is in Appendix B). The selection was based on the criteria of total assets in 2019 in six industries: agri-food, textiles, automotive, energy, tourism and ICT. Parallel to this we approached the regional chambers of commerce of the individual WB economies with the request for additional data on the companies, which to their knowledge were suitable for participation in the research. After receiving the contacts of the identified companies, we complemented the initial list. We offered the companies two ways to participate in our research, depending on their affiliation. They could have an online interview or, if they were unable to participate, they had the option of filling out an online questionnaire. The questions were identical

in both the interview and in the questionnaire, but during the interviews company representatives had the opportunity to expand the conversation. Interviews and surveys with companies were further complemented with the relevant research of representatives from government, civil-society sectors and universities. The interviews were conducted with leading researchers, government officials, business organisations and other supporting organisations.

By Tuesday, 18 May 2021, we had approached a total of 480 companies. We conducted 13 interviews with companies from the region, while 40 companies completed the questionnaire. Also, 20 meetings were held with representatives of associations and eight meetings with representatives from the scientific community. This means that in total 81 respondents and 53 companies from the WB region participated in the research.

It should be noted that the research was carried out in extremely difficult and challenging circumstances, since many of the economies from the region were strongly affected by the COVID-19 crisis. This refers especially to Montenegro, which was in lockdown during the research period, when a large number of companies closed their businesses either temporarily or permanently. Also,

Table E.1. Statistics on the participants in the interviews and surveys

	Agri-food	Textiles	Automotive	Energy	Tourism	ICT	Total
No. of companies contacted	105	119	65	45	78	68	480
No. of surveys received	9	6	4	6	6	9	40
No. of interviews with companies	6	1	1	2	1	2	13
No. of interviews the representatives of business support organisations	4	1	5	2	6	2	20
No. of interviews the representatives of scientific community	1	1	2	1	1	2	8

Sources: Own elaboration.

most companies in the region worked with reduced capacity because employees – including managers, who were our potential interviewees – were on sick leave due to COVID-19. These circumstances led to a reduced response from companies and account for their inability to participate in the research. Since we covered a limited number of companies operating across the chosen sectors, the survey results should be interpreted with caution.

Questionnaire for interviews and survey

SECTION I - Company Details (filled/answered by all companies):

1. Name of the company _____

2. Please indicate the year the company began operations _____

3. Please indicate the number of employees (choose one)
 - a. 1-10
 - b. 11-50
 - c. 51-250
 - d. More than 250
4. Please indicate up to three main product/services your company offers
 - i.
 - ii.
 - iii.
5. What percent of your company is foreign owned?
 - a. Mostly foreign owned (more than 50 percent)
 - b. About half (50 percent)
 - c. Less than half
 - d. 0%

6. Approximately what is the share of exports in total production of your company _____

7. What proportion of your inputs are imported from WB region? _____

8. Are you a member of any association, cluster or business network?
 - a. Yes
 - b. No
9. (If YES on previous) Which associations, clusters or business networks are you a member of (name 3)? _____

SECTION II – GVC

[GVC is defined as a network of companies head by mother firm, where the different stages of the production process are located across different countries]

10. Are you a member of a global value chain (GVC) [a network of companies head by mother firm, where the different stages of the production process are located across different countries]?
 - a. Yes
 - b. No

If YES, go to next question (11). Otherwise, go to the section IV.

11. What is the role of your company in the GVC?
 - a. head of a trans-national corporation
 - b. subsidiary of a trans-national corporation (majority stake owned by the corporation)
 - c. affiliate of a trans-national corporation (majority stake owned by the corporation)
 - d. subcontractor

- 12.** If you have a mother company, in which country is it located? _____

- 13.** What is the position of your company in the value chain?
- Inbound Logistics
 - Operations (inc. production)
 - Outbound Logistics
 - Marketing and Sales
 - Service
 - Procurement
 - Human Resource management
 - Technological Development
 - Infrastructure (inc. accounting, finance etc)
- 14.** How big part of the total value in your GVC owes to your company?
- minor (less than 1%)
 - small (between 1 and 5%)
 - medium (between 5 and 15%)
 - large (more than 15%)
- 15.** How has your position changed in your GVC in recent years?
- it has upgraded
 - it has downgraded
 - it has remained unchanged
- 16.** Please indicate which of these actors are the most significant in your local VC (multiple answers possible):
- suppliers
 - users of product/services (buyers)
 - service providers (transport, marketing, post-sale, consulting, financial services, insurance, etc.)
 - business associations
 - trade unions
 - research institutions
 - governmental institutions
 - other _____
- 17.** Please assess the level of cooperation between major GVC actors:
- excellent
 - good
 - not satisfactory,
- 18.** Please state up to three barriers and bottle necks in the GVC
-
 -
 -
- 19.** Please indicate your GVC key partner actors and the countries of their origins (companies, universities, business support organizations such as clusters, other institutions) [list the 3 most important]
-
 -
 -
- 20.** Please indicate if you have GVC partners from following countries (multiple answers possible):
- Albania
 - Bosnia and Herzegovina
 - Kosovo⁶⁰
 - Montenegro
 - North Macedonia
 - Serbia

(60) This designation is without prejudice to positions on status, and is in line with UNSCR 1244/1999 and the ICJ Opinion on the Kosovo declaration of independence.

21. Do you plan to scale up GVC operations in future?

- Yes
- No

22. What factors influenced your decision to set up or join GVC operations in this country? (Please indicate up to 5):

- a. geographical location
- b. political stability
- c. customs, tariffs and trade regulations
- d. infrastructure
- e. incentives provided by the Government
- f. cost of energy/supplies
- g. protection of intellectual property rights
- h. low taxes
- i. macroeconomic environment
- j. availability of skilled labor
- k. availability of cheap labor
- l. flexibility of labor market
- Other _____

23. What are the most important factors that constrain your activities in the GVC (Please indicate up to 5):

- a. complicated Customs, tariffs and trade regulations
- b. transparency in rules and regulations
- c. technical facilities for standards compliance
- d. transport and logistic infrastructure or services
- e. political stability (domestic)
- f. security and safety
- g. geographical location
- h. unfair competition
- i. red tape or bureaucracy
- j. lack of skilled labour

k. legal uncertainty

l. emigration

Other _____

SECTION III - Labour Issues (filled/answered by all companies):

24. What is the average educational attainment of a typical worker employed in your company?

- a. No education
- b. Primary education
- c. High school education
- d. College/university education
- e. Other, please specify _____

25. What is the occupation of the typical worker your company employs?

- 1 - Managers
- 2 - Professionals (including science and engineering professionals, ICT professionals, etc.)
- 3 - Technicians and associate professionals (including science and engineering technicians, ICT technicians, etc.)
- 4 - Clerical support workers
- 5 - Service and sales workers (including waiters, sales workers etc)
- 6 - Skilled agricultural, forestry and fishery workers (including market-oriented skilled agricultural workers etc)
- 7 - Craft and related trades workers (including building, food processing, wood working, garment and other craft and related trades workers)
- 8 - Plant and machine operators and assemblers (including stationary plant and machine operators, drivers etc.)
- 9 - Elementary occupations (including cleaners, agricultural, forestry and fishery labourers, food preparation assistants etc)
- 10 - Armed forces occupations

26. What kind of skills do your workers have to possess mostly (chose 3 and rank them)?

S1 - communication, collaboration and creativity

S2 - information skills

S3 - assisting and caring

S4 - management skills

S5 - working with computers

S6 - handling and moving (including agriculture, cleaning etc.)

S7 - constructing

S8 - working with machinery and specialised equipment

27. Does the country where you operate provide enough of the occupations and skills that you require?

a. Yes

b. No

c. Partly

28. What are the key labour constraints (please rank in descending order of importance: 1 = very important; 5 = least important):

a. Lack of skilled workers _____

b. Labour discipline _____

c. High and rigid wages

d. Wage and labour regulations _____

e. Emigration

f. Other, please specify _____

SECTION IV – Domestic companies not included in GVC (filled/answered only by companies that are NOT part of GVC):

[GVC is defined as a network of companies head by mother firm, where the different stages of the production process are located across different countries]

[Answer this question only if you are a domestic company that exports not included in the GVC].

29. What are the key factors preventing your company from becoming involved in a GVC (please indicate up to five most important):

a. limited production/operational capacity

b. lack of finance

c. lack of skilled workers

d. lack of quality standards

e. lack of modern or clean production technology

f. poor infrastructure in the country?

g. limited access to input raw materials

h. high price of input raw materials

i. uncompetitive market price

30. Have you tried becoming part of GVC in the last 5 years?

- Yes

- No

31. Will you try becoming part of GVC in the future?

- Yes

- No

SECTION V – Impact of COVID-19 and Economic Outlook and Prospects (filled/answered by all companies):

32. How was your output affected in 2020?

a. Declined more than 20%

b. Declined by 10-20%

c. Declined by 0-10%

d. Remained about the same

e. Increased

f. Other, please specify _____

33. How do you expect sales growth to fare over the next three years?

- a. Increase strongly
- b. Increase slightly
- c. Decrease
- d. Remain about the same
- e. Other, please specify _____

34. Do you think that these megatrends will have influence on your work in the coming years?

a. Demographic changes and migration:

- big negative influence
- small negative influence
- no major influence
- small positive influence
- big positive influence

b. Green transformation

- big negative influence
- small negative influence
- no major influence
- small positive influence
- big positive influence

c. Industry 4.0 (digitalization, automation etc.)

- big negative influence
- small negative influence
- no major influence
- small positive influence
- big positive influence

d. Geopolitical changes (rise of China, Russian influence, rise of protectionism etc)

- big negative influence
- small negative influence
- no major influence
- small positive influence
- big positive influence

35. Is there anything you would like to tell, that we didn't ask you?

.....

Thank you for your time, we will make sure you receive a copy of a consolidated analysis of the survey results.

GETTING IN TOUCH WITH THE EU

IN PERSON

All over the European Union there are hundreds of Europe Direct information centres. You can find the address of the centre nearest you at: https://europa.eu/european-union/contact_en

ON THE PHONE OR BY EMAIL

Europe Direct is a service that answers your questions about the European Union. You can contact this service:

- by freephone: 00 800 6 7 8 9 10 11 (certain operators may charge for these calls),
- at the following standard number: +32 22999696, or
- by email via: https://europa.eu/european-union/contact_en

FINDING INFORMATION ABOUT THE EU

ONLINE

Information about the European Union in all the official languages of the EU is available on the Europa website at:

https://europa.eu/european-union/index_en

EU PUBLICATIONS

You can download or order free and priced EU publications from EU Bookshop at: <https://publications.europa.eu/en/publications>. Multiple copies of free publications may be obtained by contacting Europe Direct or your local information centre (see https://europa.eu/european-union/contact_en).

The European Commission's science and knowledge service

Joint Research Centre

JRC Mission

As the science and knowledge service of the European Commission, the Joint Research Centre's mission is to support EU policies with independent evidence throughout the whole policy cycle.



EU Science Hub
ec.europa.eu/jrc



@EU_ScienceHub



EU Science Hub - Joint Research Centre



EU Science, Research and Innovation



EU Science Hub

