

New Challenges for the European Union's Industrial Policy:

**CLIMATE CHANGE
SERVITISATION
DIGITALISATION**

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PREFACE

This book, entitled ‘New challenges for the European Union’s Industrial Policy: climate change, servitisation, digitalisation’, has been prepared within the framework of a research project conducted in the Collegium of World Economy at the Warsaw School of Economics in 2019. The main objective of the research was to identify and evaluate major challenges and opportunities, as well as threats and dangers for the future EU industrial policy.

The European Union has been involved in industrial policy to a rather limited extent. Firstly, the Treaty provisions in this area are little precise. Pursuant to Article 173 of the Treaty on the Functioning of the EU, the European Commission may only take any useful initiative to promote the coordination of Member State activities in this area, in particular initiatives aiming at the establishing of guidelines and indicators, the organisation of exchange of best practice, and the preparation of the necessary elements for periodic monitoring and evaluation. The above-mentioned indicators and guidelines to be met and followed by the Member States would need prior political approval at the EU level. Secondly, the system as described in the Treaty has not yet been put in place. The principal reason was the approach to the industrial policy concept ranging between two extreme views: from hard liberalism and free market without state intervention represented mainly by the Scandinavian countries to the interventionism and protectionism-based egalitarian approach to non-EU competitors (although also affecting the EU Member States) approved and supported by France and Belgium and in some formats also by Germany, Italy, and Spain.

As a result, despite many political statements made by the European Council, the European Commission has failed to work out any coherent stance in this field. Only the European Council of March 2019 indicated that ‘in view of the importance of a globally integrated, sustainable, and competitive industrial base, the Commission is invited to present, by the end of 2019, a long-term vision for the EU’s industrial future, with concrete measures to implement it. It should address the challenges European industry faces, touching upon all relevant policy areas.’ Finally, on 10 March 2020, the European

Commission issued a communication on 'A new Industrial Strategy for a globally competitive, green and digital Europe'. It presented a vision of industrial policy that combines transformation towards climate-neutral industry and servitisation, which should be stimulated by the EU service market without barriers, as well as digitalisation.

These visions of challenges and how they should be approached were identified a few years ago. The interrelated processes of climate change, servitisation and digitalisation are not new and the European economy has been looking for joint solutions for a long time. On the one hand, the EU witnesses an increasing share of services in the value added at the expense of, above all, industry (with a very small share of agriculture). It is due to offering industrial goods in combination with services to customers. Hence, consumers may always enjoy access to information, knowledge, transport instead of just having the equipment which enables such access as was previously the case. It is an evidence that the market has been changing from product consumption to result-oriented demand. Partially, this can be taken as an explanation why after the crisis period of 2008–2010, as customers struggled with scarcity of financial sources, servitisation became an important topic in a discussion on the European economic policy. Therefore, it seems that the trend should be reflected in a deepening liberalisation of the service sector within the Single European Market. That, however, has not happened because of the negative stance of a number of EU Member States on the liberalisation of the provision of services within the EU Internal Market.

Despite legal limitations stemming from the lack of political will, such a shift in consumer and manufacturer approaches brings about relevant changes in relations between the two groups: first, the flow of information about consumer expectations vis-à-vis products they have and use speeds up; second, manufacturers can adapt to consumer expectations more quickly. These relationships reduce manufacturing lead times, shorten product series, and, as a result, reduce the time-to-market for new, sometimes slightly modified products. The catalyst for those changes lies in the digitalisation of relations between manufacturers of components and finished goods, service providers, and in relations with consumers. Its rapid progress forces further servitisation which calls for more advanced digitalisation. Thanks to the connectivity platforms offered by the industrial Internet, mature or traditional industries are now facing a transformation towards a digitalised era, where machines, devices and products can be interconnected to adapt themselves and be flexible to quickly attend to market changes. This approach should also assist transformation towards a climate-neutral economy, including industry and services. New ambitious goals set by the EU will push companies to modify their technologies of production and product offer. On the one hand, they can face an increase in energy prices, especially in carbon economies, thus leading them towards lower competitiveness in the global market. On the other hand, new

business models and new clean energy technologies will emerge, which can be seen as new opportunities for innovative firms that can compete in the international markets.

In order to grasp all the most important impacts of recent challenges on the EU industrial policy, we have decided to analyse a new concept of the EU industrial policy, and its shifts towards three new dimensions: climate change, servitisation, and digitalisation.

As E. Kawecka-Wyrzykowska wrote in her chapter, the EU industrial policy has recently become a widely discussed issue. The objective of her chapter is to identify the reasons for the significantly greater interest in industrial policy, as well as to assess whether and to what extent the new industrial policy concept constitutes a novelty compared with the traditional approach to sectoral and/or horizontal industrial policy. The focus is on a new concept of industrial policy in the EU, but the analysis is relevant in many aspects to all developed countries. The main conclusion is that the new industrial policy approach is characterised by so many fresh elements that we can talk about an emerging new paradigm of this policy. This paradigm involves a more business-friendly regulatory environment and more intensive use of state aid, mainly of a horizontal character. Support should aim at concrete tasks and contribute not only to improved competitiveness of the EU economy but also to the achievement of social goals. It should not only address industrial sector but also the whole economy.

In the next three chapters, we have focused on the aforementioned three dimensions: climate change, servitisation, and digitalisation. As regards the first one, M. Błaszczuk-Zawiła has observed that the European Green Deal (EGD), aimed at transforming the EU economy towards climate neutrality by 2050, is the EU's successive growth strategy comprising environmental protection goals. However, unlike the previous ones, environment-related goals are central to its implementation that reflects the growing importance of environmental issues to the EU's economic policy. The EGD has a potential to strengthen the competitiveness of European industry. The world-wide demand for green technologies has been growing, with EU firms gaining international leadership in clean technologies (first-mover advantage). Measures to promote green transformation on a global scale contained in the new strategy are intended to accelerate this process. The study aims to discuss and provide a preliminary assessment of the EGD measures that concern the EU's relations with third countries.

The second facet of a new industrial policy is the servitisation of economic activities of various manufacturers. As A. Szypulewska-Porczyńska has noted, an effective services sector generates economic growth, especially in a modern interlinked world where services play a crucial role in global value chains. Services benefit consumers, jobseekers and businesses, including the industry sector. Impediments to trade in services hamper the competitiveness of European services providers, hence the importance

of reducing barriers to services flows within the EU internal market. The European Union has markedly intensified its efforts to integrate the EU Member States' services markets in the last two decades. The nature and outcome of the removal of barriers on trade in services in the EU is assessed in this study.

The next sphere of industrial policy deals with digitalisation. As A.A. Ambroziak has underlined, digitalisation, together with the above-mentioned challenges, leads to the new industrial revolution – Industry 4.0. Its main components are integration and networking taken together, dependent of each other and supporting each other via the Internet. The Industry 4.0 revolution has triggered a clearly more economical and socially responsible use of resources to meet consumer needs. The above-mentioned needs are identified at individual level and in real time, which surely accelerates the meeting of individualised consumer expectations and needs. As a result, by networking and the exchange of data between products and consumers in the fourth industrial revolution, companies can make their production processes more economical, taking account of the environmental, economic, and social aspects. Therefore the chapter is aimed at assessing the readiness of the EU and its Member States' economies to embrace the fourth industrial revolution.

February 2020

Adam A. Ambroziak

1 A NEW INDUSTRIAL POLICY IN THE EU: IN SEARCH FOR A NEW PARADIGM OF PUBLIC INTERVENTION*

Elżbieta Kawecka-Wyrzykowska**

Introduction

For a long period after World War II, an increasing share of services in GDP (at the expense of a decreasing proportion of manufacturing/industry¹) was considered a positive aspect of economic growth. It was assessed as a reflection of ‘modern’ growth. Since the financial and economic crisis of 2008–2009, this opinion has radically changed. The global crisis showed that markets were incapable of overcoming problems. The stagnating or even declining share of manufacturing in GDP in some countries and deteriorated international competitiveness of the sector, as well as high rates of unemployment, became a source of worries for policy makers in the EU (and in other countries). They started to argue for an increased importance of industry and the need for a greater role of public support on the grounds that enhanced industry would create growth and

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¹ The two terms are not identical. The notion of ‘industry’ is broader than that of ‘manufacturing’ and also includes, *inter alia*, mining, water supply, electricity, waste management. In this paper, the terms ‘manufacturing’ and ‘industry’ are used synonymously.

new jobs. A broad consensus emerged among political leaders in many countries and in academia that strong government intervention was necessary to help recover from the crisis and improve long-term competitiveness of national industries. In addition, a number of new rationales for state intervention were presented. The industrial policy idea became one of seven flagship initiatives included in the Europe 2020 strategy to foster growth and job creation in the EU (European Commission, 2010a, pp. 5–6). In the following years, the concept of this policy was elaborated in many other documents.

The objective of this paper is to identify: a/ the reasons for the significantly greater interest in industrial policy among scholars and policy makers, b/ whether and to what extent the new industrial policy measures constitute a novelty compared with the traditional approach to sectoral and/or horizontal industrial policy.

The focus is on the concept of and rationales underlying a new industrial policy in the EU but the analysis is relevant in many aspects to the majority of developed countries.²

We conclude that the significant change in the traditional approach to the role of the state in the economy and far-reaching changes in many developed countries' policies show that a new paradigm of industrial policy is emerging.

Before we start the analysis, let us notice that there is no commonly accepted definition of 'industrial policy' (Warwick, 2013, pp. 14–18; Ambroziak, 2017, pp. 3–37). Owing to the limited scope of the article, we exclude the differences in defining industrial policy and adopt – after Rodrik – a general definition according to which industrial policy means 'policies that stimulate specific economic activities and promote structural change' (Rodrik, 2008, p. 2).³

The paper is structured as follows. Section 1 presents the development of the approach to the concept and role of industrial policy in the EU from the creation of this organisation. In Section 2, the evolution of the notion of a new industrial policy from the perspective of EU documents is discussed. Section 3 covers main types of instruments of industrial policy applied at the EU level. Section 4 identifies the reasons for renewed interest in the policy under examination. Section 5 characterises main elements of a new industrial policy concept as elaborated in the economic literature. Section 6 summarises the analysis.

² Industrial policy has also been implemented in a number of developing countries. In fact, the recent economic successes of some emerging countries (e.g. China, India) have been regarded as results of such policies. Industrial policy in such countries has, however, its own specific characteristics.

³ Even more general definition was proposed by Owen (2012, p. 4). According to him, the term 'industrial policy' refers 'to measures taken by governments to bring about industrial outcomes different from those that would result if markets were allowed free rein'. For an overview of definitions of the term 'industrial policy', see: Aiginger, 2007.

1. Stages of the evolution of the approach to industrial policy in the EU

Most researchers agree that after the end of World War II the evolution of industrial policy thinking and practice in the EU (and in most other developed countries) can be divided into **three stages**: from the 1950s to the late 1970s, from the early 1980s to the late 1990s and from the early 2000s to date (Warwick, 2013, p. 18; Pellegrin et al., 2019, pp. 26–32).

The first period that can be identified in the beginnings of European integration organisations (from the 1950s to more or less the end of the 1970s) was characterised by quite intensive sectoral support for restructuring (in the form of subsidies, tax exemptions, etc.). It was offered mostly to industries which could not cope with increased foreign competition resulting from successive integration steps (e.g. the elimination of border barriers among the EEC countries) and worldwide liberalisation at the GATT forum. **Extensive sectoral support was granted**, for example, to steel and textile industries to help them restructure and deal with intensive competition from abroad. In the 1960s, the favoured sectors included high-technology industries such as aerospace and computers; the main motivation was to narrow the ‘technology gap’ between Europe and the USA (Owen, 2012, p. 2).

The most popular theoretical case for industrial policy at that time was that it was necessary to offset market failures (Owen, 2012, p. 4). The market failure theory justifies public intervention in the economy only if it is used to fix situations in which markets fail to efficiently allocate resources. The five key sources of market failures include imperfect competition, information failures, negative externalities, public goods and coordination failures. The market failure approach suggests, in particular, that governments intervene (mostly by investing public money) in areas with public goods characteristics where costs and benefits are not reflected in the price system and where profit-maximising firms do not lead to economic efficiency (Stiglitz et al., 2013, pp. 7–8; Mazzucato, 2015a, p. 121).

In the second phase, gradual departure from sectoral intervention, the elimination of regulations of many sectors of EEC economies and **neo-liberal policies were introduced**. In the 1980s and 1990s, it became fashionable to only attribute economic success to liberalisation, privatisation, and deregulation (Stiglitz et al., 2013, p. 6). Criticism was expressed about sectoral intervention as an ineffective tool of fostering structural changes, and horizontal measures were proposed instead (Ambroziak, 2014, p. 43; Pellegrin et al., 2015, p. 25). The term ‘industrial policy’ almost disappeared from

the political debate.⁴ Especially in the 1980s, a strong neo-liberal trend dominated in economic theory and in policies of developed countries, as practised firmly by President R. Reagan and Prime Minister M. Thatcher. That approach was largely followed by the majority of EEC Member States. Strong deregulation of many national sectors, combined with decreasing costs of transportation and technological progress in communication, contributed significantly to globalisation.

Simultaneously, during that phase, for the first time provisions relating to industry (but not to industrial policy) were included in an EU treaty, as part of the Maastricht Treaty (which entered into force on 1 November 1993). Competitive industry became important from the point of view of the crucial objective of the Maastricht Treaty, i.e. the creation of a monetary union, and was supposed to indirectly serve the meeting of the convergence criteria of the monetary union. The new provisions created a legal basis for concrete measures to address the situation in industry. The Lisbon Treaty did not change much as regards laws on industry, apart from the adoption of more precise rules on the powers of EU institutions in that area. The broad goal of the EU actions is to 'ensure that the conditions necessary for the competitiveness of the Union's industry exist' (Article 173 TFEU)⁵. Such an approach was fully compatible with the liberal approach to public intervention which dominated in the 1990s. The competence to conduct industrial policy and to implement concrete measures is conferred on Member States and the role of the EU is 'to support, coordinate or supplement the actions of the Member States' (Article 6 TFEU). The main Treaty instrument for the coordination of economic policies of Member States is that of 'broad guidelines' adopted by the Council (Article 5 TFEU).

The third stage started at the beginning of the 21st century. A number of factors contributed to the renaissance of the idea of industrial policy. The most important one was undoubtedly the global crisis of 2008–2009 and the severe recession that followed. Concerns appeared that manufacturing production had declined too much in some Member States, leading to a reduction in the number of jobs and slower economic growth

4 However, the 1990 Communication of the Commission entitled 'Industrial Policy in an Open and Competitive Environment: Guidelines for a Community Approach' was one of the first official documents in which the expression 'industrial policy' was used. A stronger focus on industry was to be associated with the 'openness of markets' and a 'horizontal approach' to any type of intervention (European Commission, 1990).

5 More detailed objectives of industrial policy are contained in the present Article 173 of the Lisbon Treaty: '— speeding up the adjustment of industry to structural changes, — encouraging an environment favourable to initiative and to the development of undertakings throughout the Union, particularly small and medium-sized undertakings, — encouraging an environment favourable to cooperation between undertakings, — fostering better exploitation of the industrial potential of policies of innovation, research and technological development.'

(Warwick, 2013, pp. 11–13; Stöllinger et al., 2013, pp. 1–2; Owen, 2012, p. 3). In addition, a number of other arguments for strengthened industrial policy were presented by prominent researchers and in the EU documents (see point 5).

2. A new industrial policy concept in the light of EU documents

Numerous documents were presented by the EU institutions (mostly by the Commission, authorised to ‘take appropriate initiatives’ in ‘the general interest of the Union’, Article 17 TEU) to address the necessity to revive industrial policy. As already mentioned, the idea of industrial policy found strong reflection in the **Europe 2020 strategy** of 2010 in order to help successfully recover from the crisis and to ensure ‘smart, sustainable and inclusive growth’ of the European economy. Concrete targets were accepted at the EU level to be achieved in order to meet the goals of the strategy, e.g. 3% of the EU’s GDP to be invested in R&D (European Commission, 2010a, pp. 10–11). Member States had to adopt national targets based on the EU targets.

Among the seven flagship initiatives provided for by the Europe 2020 strategy, at least four proposals directly concerned the idea of industrial policy (European Commission, 2010a, pp. 5–6). The foremost one was ‘An industrial policy for the globalisation era’ to improve the business environment, notably for SMEs, and to support the development of a strong and sustainable industrial base able to compete globally. The three other concepts supplementary to this proposal were:

- ‘Innovation Union’ to improve framework conditions and access to finance for research and innovation so as to ensure that innovative ideas can be turned into products and services that create growth and jobs;
- ‘A digital agenda for Europe’ to speed up the roll-out of high-speed Internet and to reap the benefits of a digital single market for households and firms. The concept aims at reducing barriers to the free flow of data and providing more opportunities for business in the EU internal market (through the modernisation of the copyright framework and bringing clearer rules for all online players, ensuring better Internet connectivity for all citizens and businesses).
- ‘Resource efficient Europe’ to help decouple economic growth from the use of resources, support the shift towards a low-carbon economy, increase the use of renewable energy sources, modernise the transport sector and promote energy efficiency. An inclusive green economy generates growth, creates jobs and helps reduce poverty through sustainable management of resources.

Monitoring the implementation of this strategy in Member States became one of the elements of the European Semester introduced in December 2011 and undoubtedly stimulated states to make progress in implementing the strategy targets.

The Commission suggested the priority of a horizontal approach to industrial policy development, combining different policy instruments such as ‘smart’ regulation, modernised public procurement, competition rules and standard setting (European Commission, 2010b, pp. 5–6, 20). The strategy also mentioned the need to ‘promote the restructuring of sectors in difficulty towards future oriented activities, including through quick redeployment of skills to emerging high growth sectors and markets and support from the EU’s state aids regime and/or the Globalisation Adjustment Fund’ (p. 16). This target especially concerned highly innovative low-carbon technologies.

A few months later, the Commission issued a Communication in which a ‘fresh’ approach was presented to ‘underpin the recovery of growth and jobs, restore health and sustainability to the EU economy’ (European Commission, 2010b, p. 3). The document stressed that ‘a vibrant and highly competitive EU manufacturing sector’ was a vital element for solving societal problems ahead and for a ‘more sustainable, inclusive and resource-efficient economy’ (European Commission, 2010b, p. 4). Among the goods and activities worth supporting, the Commission listed ‘nanotechnology and other key enabling technologies, electric cars, health technologies, energy-efficient products, renewables, and other environmental technologies, and business services’ (European Commission, 2010b, p. 12).

According to **the 2012 Communication** on a more comprehensive industrial policy (European Commission, 2012), a **strengthened role of industry was to be based on the following four main elements**: stimulating new investments in technologies and innovation; improving the internal market; enhanced access to finance; increased investment in human capital and skills. In particular, the document emphasised the necessity to invest in a low-carbon economy, clean vehicles and vessels, and smart grids, i.e. areas which are directly or indirectly related to the environmental protection and the mitigation of climate change. Moreover, a quantitative target was proposed in the programme ‘to reverse the declining role of industry in Europe from its current level of around 16% of GDP to as much as 20% by 2020’ (European Commission, 2012, p. 4), see Box 1.

In September 2017, the European Commission outlined ‘**A Renewed EU Industrial Policy Strategy**’, a continuation of the previous documents from the 2010s. The communication defined six pillars of EU activities in order to make industry stronger and more competitive (European Commission, 2017, pp. 6–16). Those included the following topics: a low-carbon and circular economy (green economy), digitalisation, innovation, a deeper and fairer single market (standards and rules), investment (especially in infrastructure and new technologies) to support industrial transformation, the

international dimension (open and fair trade, including strengthened trade defence instruments). The quantitative target ‘to bring industry’s weight in the EU GDP back to 20% by 2020’ was repeated (European Commission, 2017, p. 2). The document again referred to an earlier idea that job creation and growth should be driven by innovation and investment. Apart from enhanced competitiveness, sustainable growth should be an important goal of the EU. As declared by the Commission, the EU should contribute to a low-carbon and circular economy and tackle increasing global competition in green production and clean energy technologies. The transformation of companies towards more sustainable and resource-efficient activities will not only help protect the environment, but also offer cost savings and can create new jobs and opportunities for workers and undertakings. The traditional horizontal approach to industrial policy was complemented by sector-specific measures relating, *inter alia*, to the space and defence industries (European Commission, 2017, pp. 4–5).

Box 1

Critical assessment of the quantitative target for EU industrial policy

Apart from strong support for the renewed industrial policy, the Commission adopted the quantitative target to increase the share of industry in EU GDP by 2020 to 20% (from 16% in 2011). This goal is, however, difficult to justify on economic grounds, at least for the following reasons:

- a/ this target has no economic justification, either in theory or in empirical studies; e.g. why is the target set at 20% rather than 21% or 22%? Furthermore, at the expense of which sector will the share of industry increase, considering that industry, agriculture and services add up to 100% of GDP? Finally, the faster increase in demand for services than for tangible goods is assumed to continue over the next years, which makes the achievement of the quantitative target extremely unlikely.
- b/ A related issue is that there is no explanation in the EU documents why such a ceiling was suggested.
- c/ The artificially specified quantitative goal proposed by the EU results in a contradiction between the industrial policy declarations to make the EU economy more competitive (by promoting R&D) and to create new jobs. Rather, it is very likely that improved competitiveness of manufacturing based on new technologies will be associated with job losses due to new technologies which often involve labour savings.
- d/ By the same token, improved competitiveness may be in conflict with other goals supported by the EU, such as climate, social or ecological policies which require costly solutions (investments) to achieve the respective targets for reducing or mitigating pollution, global warming, non-renewable energy resources, etc.

In sum, as Ambroziak has rightly stressed, ‘the adoption of artificial, unrealistic indicators, which, when achieved, would most probably hamper the development of the sectors of the economy which produce the highest value added (services)’; see also (Ambroziak, 2014, p. 45; Pellegrin et al., p. 66; Heymann, 2013, pp. 3–5).

In March 2020, a next industrial policy strategy was presented by a new Commission (European Commission, 2020). It was focused on preparing European industry to challenges related to digitalisation and green transition, as well as on strengthening of the competitiveness of the EU industry globally. There were also references to the importance of the ‘development of artificial intelligence and next-generation mobile technologies of ‘strategic importance’ including measures to go beyond 5G, towards 6G’

(European Commission, 2020, pp. 3–6). An instrument that is to be used more extensively is Important Projects of Common European Interest (IPCEI) as a possible vehicle for risky investment (Box 2). This Treaty provision allows for easier use of state aid which is – in general – forbidden (see the next point). This strategy is a continuation of previous documents but with stronger focus on innovations of ‘strategic importance’. Also, more ambitious climate policy goals are addressed as the strategy should be ‘one of the main drivers contributing to the objective of a climate-neutral economy by 2050’.⁶

Box 2

Important Projects of Common European Interest

IPCEI is an instrument provided by the Treaty on the Functioning of the European Union (Article 107(3) (b)). This provision reads: ‘The following may be considered to be compatible with the internal market: ... (b) aid to promote the execution of an important project of common European interest or to remedy a serious disturbance in the economy of a Member State. This instrument has been hardly applied to date.

This provision was used for the first time by the Commission, which has extensive competences in the area of state aid rules, in 2014. The Commission wanted to encourage Member States to finance, from their public money, large innovation projects that contribute clearly to growth and competitiveness in the EU, require coordinated efforts at the transnational level but entail significant risks for the private sector. Member States can overcome such market failures and fill the funding gap. Such state aid can be applied under strict conditions.

The first project that was approved by the Commission (in 2018, that is, 4 years after submitting the proposal) covered microelectronics and involved four countries (France, Germany, Italy and the UK) and around 30 companies and research institutions. It was worth EUR 1.75 billion of public investment and unlocked an additional €6 billion of private investment for research and innovation in microelectronics.

https://ec.europa.eu/commission/presscorner/detail/en/IP_19_6204

The above-mentioned documents reveal that interest from the EU institutions (mostly from the Commission) in industrial policy increased after the 2008–2009 crisis. The goals and the whole concept of the new EU industrial policy presented in those documents followed to a great extent the recent ideas of academia which called for a need for governments to intervene more in the economy and to pursue stronger objectives considered as crucial for the long-term economic development and well-being of societies (see point 5). All documents concentrated on the necessity to promote new areas of innovations and broadly defined environment-friendly projects. They were legally non-binding provisions but paved the way to more detailed programmes and concrete laws (see the next point).

⁶ The objective of achieving a climate-neutral EU by 2050, in line with the objectives of the Paris Agreement, was endorsed by the European Council in December 2019. One country that did not commit to implementing this objective at that time, was Poland. Therefore, ‘the European Council will come back to this in June 2020’; European Council Conclusions, 2019.

3. Instruments of industrial policy at the EU level and related measures

From its inception, the EEC had several types of **binding legal provisions** which were very important from the point of view of the business environment and fair competition in the EU internal market. Those included trade defence instruments (as part of the common commercial policy), protecting European companies against injurious imports of goods. In recent years, those rules have been considered (by Member States as well as by the Commission) insufficient and suggestions have appeared to modify them. In particular, there is ongoing discussion on strengthening the already applied Trade Barriers Regulation (TBR), in force since 1995, aimed at helping EU businesses overcome trade barriers overseas.⁷

Another important legal tool is competition policy, covering rules on agreements between undertakings (merger control) and on state aid (from national budgets). Both areas of that policy should ensure maintaining a level playing field for all firms in the EU internal market (including foreign businesses). The underlying assumption is that a 'free and fair' market increases pressure to realise the necessary efficiency gains to become and remain competitive. As a rule, state aid is banned under EU law insofar as it affects trade between Member States (in order to avoid distortion of competition). However, there are a number of exceptions to this rule in EU law which allow Member States to grant quite large amounts of state aid to domestic companies (Ambroziak, 2017, pp. 113–143). So far, the Commission has been quite restrictive as regards issuing approvals on mergers (e.g. in the case of the proposed Siemens–Alstom rail merger).⁸ Some Member States, especially France and Germany, argue that the rules should be relaxed (for more see: EU industrial, 2019, pp. 4–5).

In order to meet the new objectives of the successive strategies, more measures were adopted at the EU level. Considering the limited powers of the EU in the field of industrial policy (see point 1), those measures were primarily of a **regulatory nature** and included legislation which mainly provided for the creation of framework rules for economic operators. The new instruments also comprised guidelines to be followed by Member States, roadmaps and the monitoring of commonly accepted indicators,

⁷ The TBR is specifically designed to remove obstacles to trade in third countries as well as to tackle unfair foreign trade practices that cause injury within the EU internal market, see: Regulation (EC) No 3286/94.

⁸ On February 2019, the European Commission took a decision to prohibit Siemens' proposed acquisition of Alstom. This decision caused critique of the EU competition policy, particularly in Germany and France. The Commission's decision intensified debate in the EU on industrial policy (see more: EU industrial, 2019, p. 2).

programmes, etc.⁹ The list of such measures is very long and examples include several legal acts aimed at implementing the idea of a digital single market, as announced in the Europe 2020 strategy and presented in 2015.¹⁰ Another area of numerous laws aiming at a ‘greener’ industrial policy is energy policy, as reflected in the 20/20/20 energy goals¹¹ and in the roadmap for 2050.¹²

Apart from the regulatory framework, the EU offers **limited financial support (funded from the common budget)** which influences the development of EU industry. Priorities for spending the money are set up every few years in multiannual financial frameworks and assigned mostly to investment (not to current consumption). Traditionally, potential beneficiaries could apply for funds allocated to research and development (through competitions). Since the global crisis, more funds have been assigned from the common budget to new goals of industrial policy, e.g. to the digital market, to facilitate access to finance for innovative ideas¹³; to R&D within Horizon 2020 and COSME – a programme which aims to facilitate access to finance for small and medium-sized enterprises (SMEs) in all phases of the product lifecycle – creation, expansion or business transfer. Another programme of access to substantial funds (in the form of loans and guarantees) has been offered to enterprises since the end of 2014 within the so-called Juncker Investment Plan to stimulate strategic projects (albeit not only in the

⁹ Comprehensive information on EU activities in this field is presented at: https://ec.europa.eu/growth/industry/policy_en

¹⁰ As part of the Digital Single Market strategy, two legal acts were adopted and implemented: the General Data Protection Regulation (GDPR), applicable as of May 2018, and the Regulation on the free flow of non-personal data (which entered into force in May 2019). Both acts provide for a stable legal and business environment on data processing. The main aim of the former Regulation was to help individuals gain more control of their personal data. The latter Regulation prevents EU Member States from enacting laws that groundlessly force data to be held solely inside their respective national territories; for more see: https://europa.eu/rapid/press-release_IP-19-2749_en.htm or https://ec.europa.eu/commission/priorities/digital-single-market_pl#documents; https://ec.europa.eu/commission/priorities/digital-single-market_pl#documents

¹¹ The 2020 package is a set of binding legislation to ensure the EU meets its climate and energy targets for the year 2020. The package sets three key targets: (a) 20% cut in greenhouse gas emissions (from 1990 levels); (b) 20% of EU energy from renewables; (c) 20% improvement in energy efficiency. The targets were set by EU leaders in 2007 and enacted in legislation in 2009. They are also headline targets of the Europe 2020 strategy for smart, sustainable and inclusive growth (see: https://ec.europa.eu/clima/policies/strategies/2020_en).

¹² In November 2018, the Commission presented its strategic long-term vision for a climate-neutral economy by 2050. The document is in line with the Paris Agreement objective to keep the global temperature increase to well below 2°C and pursue efforts to keep it to 1.5°C (see more: https://ec.europa.eu/clima/policies/strategies/2050_en).

¹³ According to the Commission, an amount of approximately EUR 21.4 billion from the European Structural and Investment Funds (ESI Funds) is available for ICT (information and communications technology) investments over the 2014–2020 funding period (https://ec.europa.eu/commission/publications/contribution-european-structural-and-investment-funds-digital-single-market_pl).

industrial sector).¹⁴ Furthermore, cohesion policy funds contribute substantially to the improvement of the industrial base, especially in less developed regions and countries in the EU. A separate fund was established as the Connecting Europe Facility (CEF)¹⁵ with a budget of EUR 50 billion for the period 2014–2020. The fund confirms an important role of modern infrastructure, necessary for the development of the whole economies and for all their respective sectors. Altogether, the vast majority of funds from the 2014–2020 multiannual budget were earmarked for the implementation of the EU 2020 strategy through the objectives of smart, inclusive and sustainable growth (Pellegrin et al., 2015, p. 30). Most of them were managed at the national level and only a few projects – at the Commission’s level (including the above-mentioned Horizon 2020 and CEF).

More recent decisions include an **Innovation Fund** to support the development of breakthrough technologies and a **Modernisation Fund** to modernise the energy sector in the lower income Member States, both created under Directive (EU) 2018/410 and related to the modification of the EU Emissions Trading System.

Apart from horizontal measures (of a legal and financial nature) proposed to support broadly-defined development of industry, a number of ‘thematic’ areas were also referred to in the Commission’s documents as deserving support. The recent 2017 Industrial Policy Strategy mentioned, *inter alia*, the following areas important to digital transformation: big data, artificial intelligence and robotics, the Internet of Things (European Commission, 2017, p. 8). The strong focus on these areas should be complemented by sector-specific measures like in the case of steel, space and defence. All those areas were repeated in the 2020 industrial strategy.

A broad set of measures and areas addressed in the EU documents under the umbrella of industrial policy and their implementation has required **strong coordination**, both at the EU level (mainly between the Commission’s Directorates-General), at the Member States’ level as well as between both levels. Under the treaties, a key role is played in the coordination process by the European Commission, preparing strategic guidelines, dedicated budgets and initiatives that should encourage Member States to take concrete steps. It is, however, the responsibility of Member States to implement those policies in a coherent way. Apart from the activities initiated at the EU level and implemented by all countries (although sometimes to a varying degree), there are also initiatives undertaken by individual Member States pursuing their own industrial priorities (see Box 3).

¹⁴ https://europa.eu/rapid/press-release_IP-18-6484_en.htm

¹⁵ The CEF is intended to co-finance projects in three sectors: energy infrastructure, broadband infrastructure and transport infrastructure.

Box 3**Renaissance of the industrial policy concept in selected EU Member States**

In February 2019, Germany presented its 'National Industrial Strategy 2030'. The document proposed that a more active role of the state in the economy should be adopted. It should 'build on the technological lead enjoyed by Germany and the EU'. A central field of action of the Strategy 2030 is 'the strengthening of key enabling technologies such as digitisation, artificial intelligence and battery cell manufacturing' (see: <https://www.bmw.de/Redaktion/EN/Artikel/Industry/nationale-industriestrategie-2030.html>).

At the same time, in February 2019, a 'Franco–German Manifesto for a European Industrial Policy Fit for the 21st Century' was published. The document also put a strong focus on massive investments in innovation and improving the regulatory framework for business (see: <https://www.gouvernement.fr/en/a-franco-german-manifesto-for-a-european-industrial-policy-fit-for-the-21st-century>).

Earlier, in December 2018, Friends of Industry Group adopted a document calling for 'a new political impetus in favour of industry at European level to face challenges', such as maintaining EU competitiveness, 'while taking into account the energy transition to a safe, sustainable and low-carbon and circular economy and the digital transformation of the industry' (Joint Statement by France, Austria, Croatia, Czech Republic, Estonia, Finland, Germany, Greece, Hungary, Italy, Latvia, Luxembourg, Malta, Netherlands, Poland, Romania, Slovakia, Spain (see: https://www.bmw.de/Redaktion/DE/Downloads/F/friends-of-industry-6th-ministerial-meeting-declaration.pdf?__blob=publicationFile&v=6)).

Coordination mechanisms were strengthened significantly after the recent crisis. Since 2011, the main coordination mechanism of national economic policies (including a number of elements concerning industrial issues) has been the European Semester. Undoubtedly, it is a useful instrument, albeit still of limited effectiveness (partly due to the non-binding character of country-specific recommendations prepared by the Commission and adopted by the Council within the mechanism), for more see: Kawecka-Wyrzykowska, 2017, pp. 241–265.

A better regulatory framework has also been ensured by strengthened **macroeconomic surveillance** (since the 2008 crisis), the creation of the banking union and other new institutional arrangements.¹⁶

It is not possible to assess the effects of the new EU-level industrial policy in this short paper. However, at least two broad factors suggest that those **effects are still limited**. One is the above-mentioned recent Industry Strategy of 2020.¹⁷ If the effects of implementing the existing strategies had met the expectations of Member States,

¹⁶ <http://www.europarl.europa.eu/factsheets/en/sheet/90/macro-economic-surveillance>; https://ec.europa.eu/growth/industry/policy_en

¹⁷ The Strategy was preceded by a document adopted by the Ministerial Meeting of Friends of Industry on 18 December 2018. This group includes the following countries: France, Austria, Croatia, the Czech Republic, Estonia, Finland, Germany, Greece, Hungary, Italy, Latvia, Luxembourg, Malta, Netherlands, Poland, Romania, Slovakia, Spain. They called for 'a new political impetus in favour of industry at European level' to face global challenges and to 'act quickly to maintain its [industry's] competitiveness, while taking into account the energy transition to a safe, sustainable and low-carbon and circular economy and the digital transformation of the industry', see: <https://www.gouvernement.fr/en/6th-ministerial-conference-friends-of-industry>

probably no new Strategy would have been necessary. The other confirmation of unsatisfactory effects of the EU-level activities is the recent renewal of the idea of industrial policy in key Member States, including Germany and France (see Box 3). Again, if the industrial policy conducted at the EU level had been efficient and ensured the achievement of the targets set, national policies would have been needless.

4. Reasons for renewed interest in industrial policy

A number of factors influenced the revision of industrial policy assessment in the 21st century. They were indicated both by researchers of the issue and by the European Commission. The main arguments for a modern industrial policy are as follows:

- a) **Negative implications of the 2008–2009 crisis**, given the importance to the EU of industry in general, and of manufacturing in particular. Industry is considered the backbone of the EU economy. It contributes much to economic growth, employment and innovation activities. Moreover, due to spill-over effects on other sectors, it benefits significantly the overall economy. During the crisis and in its aftermath, the share of industry in GDP decreased¹⁸ in many countries and there was a rise in unemployment.¹⁹ Concerns were expressed that manufacturing production had declined too much, market forces were not sufficiently efficient to restore pre-crisis levels of growth and employment, and public support should counteract the negative effects of the crisis (European Commission, 2010a, pp. 1 and 7; Warwick, 2013, p. 7). In particular, public policy was supposed to help recover from economic stagnation through a substantial increase in demand, which could come from an EU-wide investment (Pianta, 2015, p. 140).

At the same time, observations were made that countries which maintained larger manufacturing sectors seemed to perform better during and after the crisis. It was perceived that without strong government intervention the economies of many developed countries would experience long-term and deep recession with hardly foreseeable consequences. Thus, a dynamic manufacturing sector came to be considered a prerequisite for an innovative and fast-growing economy (Stöllinger et al., 2013, p. 1).

¹⁸ Let us add that the decreased share of manufacturing in GDP was related not so much to economic recession as to a faster increase in that of services (enabled by new technologies, deeper specialisation, etc.). This development – as such – cannot be assessed negatively (especially in view of an important contribution of services to manufacturing growth), as it reflects structural trends of economies.

¹⁹ In 2009–2013, industrial employment dropped by 1.8 million (5.4%) in the EU-27 (European Commission, 2017, p. 3).

- b) Another aspect of economic worries about industry and the resulting implications was the **deteriorating international competitiveness** of manufacturing in the majority of EU countries. According to Heymann and Vetter (2013, pp. 1–10), only Germany and the Scandinavian countries remained highly competitive, whereas other EU countries lagged behind (see also European Innovation Scoreboard, 2017). Therefore, a strong industrial sector was to create a competitive advantage for European companies and thus help increase the number of jobs, incomes and exports (European Commission, 2010a, p. 12).
- c) Although technological progress and innovation have always been important goals of industrial policy, the argument of a crucial role of innovation has gained in significance. The main reason is that the majority of **R&D activities take place in the industrial sector**. According to the Commission, 80% of all private sector research and development efforts are undertaken in industry (European Commission, 2010b, p. 3). Therefore, manufacturing is considered a key place of technological progress and an instrument to improve competitiveness (Stöllinger et al., 2013, pp. 4–5). Some examples referred to in EU documents with regard to technological activities that should be promoted at the EU level include digital innovation, clean energy technologies, the Internet of Things, high-performance computing, etc. (European Commission, 2010b, p. 23; European Commission, 2017, pp. 8–9).
- d) **Manufactured goods dominate exports**, accounting for more than 80% of total EU exports²⁰. It is attributable to the fact that the tradability of manufactures (and of all tangible goods) is much higher than that of services. Thus, hopefully, a stronger manufacturing base will create additional benefits resulting from higher growth rates of sales addressing external markets.
- e) To some extent, the recent interest in industrial policy in developed countries is a response to the **successful industrial policies of fast-growing economies**, in particular China and India.²¹ Those economies pose an increasing challenge to the EU and other developed countries, not only in lower value-added activities but also in activities involving highly processed goods (European Commission, 2010a, pp. 7–8; Stiglitz et al., 2016, pp. 15–16). Positive effects of industrial policy in emerging countries have encouraged similar programmes (more public intervention) in the EU and other developed countries.

²⁰ https://ec.europa.eu/eurostat/statistics-explained/index.php/Extra-EU_trade_in_manufactured_goods

²¹ Both countries have been implementing bold programmes of strengthening their industrial base: the Made in China 2025 programme (implemented since 2015; the Chinese government declared to transform the country into a global leader in high-tech products and services), and the Indian National Manufacturing Policy (adopted in 2011), see: Pellegrin et al., 2013, p. 13; European Commission, 2017, p. 4.

f) The discussion on the need for a stronger industrial policy has been intensified by implications of a relatively new phenomenon of production **outsourced** from developed countries to other economies where production costs are lower, and the resulting fragmentation of production. In the 21st century, a substantial portion of international trade is based on global value chains (GVCs) which include complex international flows of goods, services, ideas, capital and persons, and create a new source of advantages for companies. One effect of this development is the emergence of concerns relating to **negative employment effects** (particularly for low-wage and low-skilled workers as outsourcing goes mostly to poorer countries). As a result, there have been calls to 'bring manufacturing home' which aim at relocating previously outsourced production activities' (Stöllinger et al., 2013, p. 2).

Another implication of outsourcing for industrial policy is that it has substantially modified the nature of international trade specialisation and affected the role of economic policy to support the competitiveness of domestic goods and services. An increasing share of trade delivered within GVCs means that strong positions of countries (companies) in international trade result not only from domestic inputs (as was the case previously) but – to a great extent – also from imported value added (i.e. design, technology, know-how, services) which is necessary to produce a new competitive product and to export it to other markets. A practical implication is that 'one nation's exports become competitive based not so much on the easier movement of goods, but on the easier cross-border movement and combination of several nations' technology, labour and capital in the context of internationalised production networks' (Baldwin, 2014, p. 17).

In order to take account of value added at different stages of manufacturing and implications for economic policy, the stages of product specialisation are sometimes presented in the form of the 'smile curve'. This concept explains that the highest value added to the product (and benefits for producers) is offered at the two ends of the value chain: pre-production intangible stage (product design, R&D) and post-production intangible stage (sales, marketing and after-sales service) and not so much at the manufacturing stage itself (production involving tangible activities) (Ambroziak, 2017, p. 173; Baldwin, 2012, p. 18; Warwick, 2013, p. 12). The logical conclusion from this observation is that the task of the modern industrial policy should be to support not so much the production stage but first of all the higher value-adding activities of the pre-production and post-production phases (i.e. R&D to develop innovative technologies, the design of new products, as well as their patenting, marketing and promotion).

Some authors argue that 'the governmental intervention within the framework of a modern industrial policy should mainly focus on the pre-fabrication stage' (Ambroziak, 2017, p. 180). This approach seems to be quite radical as arguments can also be found for government policy in the post-production stages of the smile curve. In any case,

researchers agree that the government's task should be **to help domestic producers to hold the best position in the global value chains**, i.e. one that offers the highest value added and improves the country's position in global value chains.

To recapitulate, the perception of the role of manufacturing has changed. 'A "manufacturing imperative" in the EU' has appeared. 'A dynamic manufacturing sector is again considered to be a prerequisite for an innovative and fast-growing economy' (Stöllinger et al., 2013, p. 1).

Having concluded that, it is necessary to add that there are also strong arguments **against industrial policy**. Those usually stress that governments do not have proper information and capability to design effective industrial policies, which involves a risk of rent-seeking behaviour from economic operators (Warwick, 2013, pp. 23–24; Rodrik, 2008, pp. 7–8). However, in view of the rationales presented above for the new industrial policy, the arguments against this policy have lost in importance.

5. A new industrial policy concept in economic literature

After the period of neglect of public intervention in industry in the 1990s and the dominance of a liberal approach, re-emerging attention for a greater role of manufacturing and more active involvement of public authorities in this sector has been observed. A review of the literature shows that while detailed concepts of individual authors are not the same, a number of similar features of those proposals can be identified. In various aspects, the proposals are similar to the approach of the European Commission discussed before.

The most common element of the different concepts is probably that a future-oriented industrial policy should be very different from those in place in the past. Differences refer to the rationales and goals of industrial policy, its coverage and instruments. More common and different aspects are discussed below.

A) A new industrial policy is considered by many authors a necessary tool to address pressing global challenges. One of those is a hugely accelerated **process of innovation** (technological race). Innovation plays a crucial role in determining the EU Member States' competitive position in world trade and helps find new markets, fuel GDP growth, etc. At the same time, market competition among private firms cannot guarantee investment in research at a socially desirable level. One reason is that private firms investing in R&D do not derive all possible benefits since innovation is relatively easily imitated, patent systems are not always effective, etc. (Owen, 2012, p. 4). Underinvestment also results from the fact that innovation involves high uncertainty about the final output: the process of developing new technologies takes

a long time and, sometimes, does not bring the expected results. Thus, industrial policy should contribute to the creation and dissemination of innovation as a base for modern industrial production (Pianta, 2015, pp. 139–145). Also, all EU documents stress that innovation should be a **key driver of socio-economic development**, as it improves the competitiveness of goods and services, helps expand into new markets and contributes to GDP growth (European Commission, 2017, p. 2).

Another and relatively new rationale for industrial policy, mentioned in many papers and in the Commission's documents, is related to **environmental and climate challenges** (first of all, climate warming and significant pollution of the environment). The intensification of these global challenges has recently strengthened the perception that without government intervention negative externalities (drought, floods, deforestation, migrations, etc.) would intensify and lead to environmental disasters (Aghion et al., 2011, p. 4). On their own, markets are not able to cope with huge problems which require substantial funds and broad coordination of different activities undertaken by individual EU Member States. Therefore, a new industrial policy is considered to be an instrument of achieving **desirable social goals**, including lowering CO₂ and other greenhouse gas emissions, reducing the use of non-renewable energy (European Commission, 2010a, pp. 8–9, 11, 14; European Commission, 2017, pp. 2, 4–6; Aiginger, 2014, p. 11; Pianta, 2015, pp. 140–142). In this way, a new industrial policy would not only contribute to GDP growth but also to increased welfare and improved quality of life (thus supporting sustainable growth). In other words, a new industrial policy offers the so-called double dividend, e.g. improved competitiveness of economies and reduction of greenhouse emissions.

Some researchers argue that these social targets go beyond the emergence of specific environmentally friendly new activities. In fact, '[i]t is a transformation that concerns the whole economy and all of society' (Pianta, 2015, p. 141) and reflects ambitious goals which have become important to societies and, at the same time, are not properly reflected in market prices. Therefore, the 'beyond-GDP goals' (the idea seems to be close to the concept of sustainable development) should be a priority for the formulation of industrial and other policies in the EU (Aiginger, 2014, p. 9, 17–18).²² In this context, some economists argue for a 'green industrial policy' and stress big potential of growth of technologies and products aimed at energy savings, mitigation of climate changes, etc. (Rodrik, 2014, pp. 469–491). EU documents

²² The reflection of those broad goals of a new industrial policy presented in EU documents can be found in form of the proposals of important role to be played by increased investments in such areas, as low-carbon economy, clean vehicles and vessels, and smart grids. All of them are directly or indirectly related to the protection of the environment.

also ‘express the ambition that a green industrial policy should foster both better prospects for economic growth while at the same time contributing to the achievement of environmental goals’ (Waltz, 2015, p. 146).

- B) In discussing this new approach to objectives of a new industrial policy, we can identify **some inconsistencies** as regards the goals of this policy (see also Box 1). In particular, the aim to supply and apply more innovative products may be in conflict with the desire to increase employment, as technological progress often results in labour-saving technologies. For example, robots in the automotive industry allow to replace a substantial part of human labour with machinery and to boost labour productivity, thus resulting in a reduction in the number of persons needed to produce the same number of vehicles as before (see more: Aiginger, 2014, pp. 11–12; Pellegrin et al., 2015, p. 21).

A more important conflict can result from the parallel implementation of pro-competitive actions and achievement of sustainable growth. As Aiginger (2014, p. 12) has noticed: ‘If competitiveness is understood as cost competitiveness (which is the dominant implicit interpretation in some documents), this calls for low energy costs, while sustainability requires higher energy prices for fossil energies to incentivise greater efficiency or switching to renewable energy sources.’ Subsidies – to mitigate negative effects of higher energy prices – (if accepted) would in turn discourage efforts to save energy. This potential conflict has neither been addressed in EU documents nor discussed much by scholars.

- C) Most researchers agree that, contrary to policies pursued by many countries after World War II which often supported particular companies, the new industrial policy ‘should not be about picking winners’ (Rodrik, 2014, p. 472). ‘It should target activities and broad sectors, never firms; it should promote new activities ... to follow markets instead of leading them’ (Aiginger, 2014, p. 9). Stöllinger et al. (2013, p. 2) argue that a new industrial policy should be ‘pro-competition-oriented, favouring **general framework policies** (such as the proper functioning of the Internal Market and competition rules) and ‘**horizontal**’ **policies over sector-specific** interventions.’ The approach of the Commission to this issue is different as it stresses ‘bringing together a horizontal basis and sectoral applications’ (European Commission, 2010a, p. 4)’. It also underlines that sometimes sector-specific measures are required (European Commission, 2017, p. 8).
- D) Some authors indicate that the new industrial policy should be not so much (or not only) about horizontal approaches (e.g. in the form of creating a friendly business environment) but first of all about concrete **tasks** (Warwick, 2013, p. 16) or **missions** (similar to ‘mission-oriented feats that led to putting a man on the moon’) (Mazzucato, 2015b, p. 1). ‘Achieving those missions required the public and private

sectors to work together to create new technologies and sectors' (ibidem, p. 1). Concrete missions should be 'problem-specific, but not overly narrow.' (ibidem, p. 1) The idea is that such missions would indicate what governments want to achieve.²³ In this context, the Commission used the expressions 'new activities' or 'thematic activities' that should be supported (European Commission, 2010a, p. 4). Examples include artificial intelligence, the Internet of Things, digitisation.

- E) Industrial activities should have important positive '**spill-over effects**' in linked activities and provide 'important inputs for other activities which one might not want to entirely lose to imports' (Stöllinger, 2013, p. 48). Spill-over effects related to innovation transfer are of particular importance. One example of such activities is electronics production, nowadays considered essential to the whole industrial sector and to the digital economy (Landesmann, 2015, p. 137; Warwick, 2013, pp. 19 and 21).
- F) Some authors stress a crucial role played by education in supporting innovation-based growth and **investment in skills**. In conditions of extremely rapid changes in economies, national education systems should emphasise creativity rather than mechanical memorising of information which becomes outdated quickly and can be easily found online (Aiginger, 2014, pp. 8, 10, 18–19, 22; Warwick, 2013, p. 24; Pellegrin et al., 2019, pp. 23, 35, 42). The necessity for national education systems restructuring in order to meet the industrial policy's goals is also analysed by Schwabe and Nyga-Łukaszewska (2017, pp. 205–226).
- G) A number of scholars stress that discussion on any support for the manufacturing sector needs to be considered in the context of increasing inter-linkages between manufacturing and services (Stöllinger et al., 2013, pp. 5–6; Pellegrin et al., 2019, p. 14). The reason is a development referred to as **servitisation**, i.e. a growing number and amount of service-related jobs and value in the manufacturing sector. Servitisation means that manufacturing firms increasingly produce and provide services associated with traditional physical products. The Commission stresses that new technologies, especially, make services more and more relevant to manufacturing.²⁴ It is expected that expanded manufacturing will create additional jobs not only in this sector but also in the service sector. The present share of service-related jobs in EU manufacturing employment is around 40%. EU documents touch upon this issue, underlying that '[a]n open single market for services must be created on the basis of the Services Directive, whilst at the same time ensuring the quality of

²³ In the EU law, there seems to be a proper legal basis for such 'tasks'. We mean here Article 107(3) (b) of the Lisbon Treaty providing for the possibility to conduct 'Important Projects of Common European Interest' – a tool that so far has been hardly applied.

²⁴ Especially, '[w]ith the advent of digital technologies, the service component of industry is becoming ever more important' (European Commission, 2017, p. 8).

services provided to consumers. The full implementation of the Services Directive could increase trade in commercial services by 45% and Foreign Direct Investment by 25%, bringing an increase of between 0.5% and 1.5% increase in GDP' (European Commission, 2010a, p. 20). More concrete proposals are only addressed, however, to selected types of services such as online services,²⁵ or other new services²⁶ which are not so controversial as some other areas, equally important to the competitiveness of the internal market, and where the EU market is still very fragmented, e.g. in transport, professional, construction services, etc.

Therefore, it seems that more can be done to stimulate service development. First of all, the objective should be to complete the single market for services as the present rules in this area are far from a truly free supply of services in the markets of EU Member States.

- H) Different names to characterise this 'new' industrial policy have been suggested by academia. For example, Rodrik (2013) proposed a 'green industrial policy'. Aiginger (2014, p. 8) formulated the idea of a systemic industrial policy (based on strategies combining innovation, education and openness). Pellegrin et al. (2019) also used the term 'systemic approach' which 'emphasises market creation, strategic and mission-oriented objectives ...' and 'requires effective integration of the complex web of horizontal and vertical mechanisms of stakeholder coordination' (ibidem, p. 9). According to these authors, systemic approach 'overcomes the opposition between two historically radical positions: a sectoral approach ... and a horizontal approach ... aimed at improving framework conditions' (ibidem, p. 9).

Conclusions

As shown by the brief presentation of significant changes in the EU and academia approach to the role of the state in the economy and by the overview of main features of the new industrial policy concepts presented by academic scholars, a new paradigm of industrial policy has emerged (Pellegrin et al., 2019, pp. 13–14; Warwick, 2013, p. 10). It is not a fully-fledged idea yet, but we can see that it differs from the paradigm underlying the traditional sector-oriented industrial policy concept in the period after World War II.

²⁵ Within the concept of digital Europe, Member States need 'to promote deployment and usage of modern accessible online services (e.g. e-government, online health, smart home, digital skills, security)' (European Commission, 2010a, p. 14).

²⁶ 'The emergence of new services (e.g. content and media, health, smart energy metering) shows huge potential, but Europe will only exploit this potential if it overcomes the fragmentation that currently blocks the flow of on-line content and access for consumers and companies' (European Commission, 2010a, p. 20).

Following years of disregard, in the past two decades the concept of industrial policy has attracted interest from economists and policy makers in the EU and in many other industrialised and emerging countries. However, a renewed strong interest in greater public intervention in the industrial sector did not emerge until the deep and long-lasting recession which started in the end of 2007 and resulted in numerous negative implications. A new industrial policy came to be seen as a key instrument to recover from the crisis. Also, a number of new desirable objectives were set for EU industrial policy. Those primarily included technological transformation (production and dissemination of innovation improving the competitiveness of goods and services, basing on the fact that the manufacturing sector is the major source of technological progress) and sustainable development (energy efficiency, renewable energy sources, less polluted air and water, etc.). Those trends imply that policy makers attach importance not only to purely economic goals but also to the objectives and actions which contribute to social welfare.

Recently, more ambitious goals have been formulated, including the transition to a climate-neutral EU economy by 2050.

The main elements of the new industrial policy may be characterised in the following way: 'It should favour the evolution of knowledge, technologies and economic activities in directions that improve economic performances, social conditions and environmental sustainability' (Pianta, 2015, p. 142). In other words, the general goal consists in supporting the supply of innovation and new activities which contribute to the improvement not only of economic indicators (incomes, cost competitiveness) but also of social aspects of economic growth (e.g. climate protection). In that sense, the new industrial policy should serve transformation of the whole economies and not only to enhance industry. Thus, it should be a policy 'that targets society's ultimate goals' (Aiginger, 2014, p. 1).

A new approach to the industrial policy takes into account the fact that modern manufacturing production is characterised by its close interrelation with services (servitisation). In order to offer new products and charge higher prices, manufacturing firms increasingly depend on sophisticated service inputs. At the same time, the manufacturing sector provides more and more services associated with traditional tangible products. Both aspects highlight the fact that goods and services often complement each other. Thus, a new industrial policy should also promote the supply of services.

Let us notice that even those who argue against a broad industrial policy admit that such policies are implemented in one form or another by most countries, albeit on a different scale and in varying forms. Therefore, 'the question is not *whether* any government should engage in industrial policy but *how* to do it right' (Stiglitz et al., 2013, p. 9;

see also Aghion et al., 2011, p. 8; Rodrik, 2008, p. 2). In a nutshell, ‘[t]he “*how*” rather than the “*why*” of industrial policy is important’ (Warwick, 2013, p. 18).

In this context, it is striking to notice that even strong supporters of liberalisation have rediscovered the benefits of firmer public intervention. In 2009, the chief economist at the World Bank stressed the advantages of industrial policy and recommended its implementation in developing countries (Lin and Chang, 2009, pp. 484, 486). In August 2010, *The Economist* magazine (2010) debated the possible ways of implementing industrial policy.

Due to the limited EU powers in the field of industrial policy, practical effects mostly depend on the activities of individual Member States. Still, the EU has a supplementary and coordinating role defined in the TFEU. It carries out its tasks mainly through regulatory actions (laws in the field of competition policy, trade instruments against unfair foreign practices, the general business environment-friendly laws, etc.) and through decisions on priority investments from the EU budget (e.g. on research). In recent years, much has been done in the EU to enhance its regulatory framework, in order to make business activities easier and faster (digitalisation process, access to new funds for SMEs, etc.) and to promote new objectives of industrial policy (e.g. adoption of the Innovation Union agenda). Since 2011, stronger governance has been exercised within the European Semester.

In the light of the above considerations, the term ‘industrial policy’ is obviously too narrow and does not properly reflect the present approach to the role and essence of this policy. First of all, the expression ‘industrial policy’ suggests an exclusive focus on industry and takes no account of the much broader approach to objectives and tools of the new version of industrial policy as presented above. Other names for a pro-competitive approach to industrial policy have been already suggested in the literature, e.g. knowledge-based, knowledge-oriented, innovation policy, growth policy, competitiveness policy or structural policy, etc. (Pellegrin et al., 2015). None of them has been commonly accepted and, as a result, we usually just read about a ‘new’, ‘modern’, ‘fresh’ or ‘smart’ industrial policy.

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2 EFFECTS OF THE EUROPEAN GREEN DEAL ON EXTERNAL RELATIONS OF THE EUROPEAN UNION

Marzenna Błaszczuk-Zawiła*

Introduction

Since 12 December 2019, achieving climate neutrality by 2050 has been the European Union's official objective.¹ The implementation of the project will be supported by a new growth strategy – the European Green Deal (EGD), presented by the European Commission on 11 December 2019 (European Commission, 2019a). The EGD mostly 'aims to transform the EU into a fair and prosperous society, with a modern, resource-efficient and competitive economy where there are no net emissions of greenhouse gases in 2050 and where economic growth is decoupled from resource use'. In addition, it aims 'to protect, conserve and enhance the EU's natural capital' and to 'protect the health and well-being of citizens from environment-related risks and impacts' (European Commission, 2019a).

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¹ Poland was the sole Member State to decide not to commit to implement this objective, but the European Council is supposed to return to the issue in June 2020. Cf. European Council, 2019.

The European Green Deal is the EU's successive growth strategy comprising environmental protection goals. Those were first incorporated into the socio-economic development programme for 2000–2010, i.e. the so-called Lisbon Strategy. The European Council added such goals in June 2001, to confirm the EU's commitments made in the Kyoto Protocol and readiness for its quick ratification (Piotrowski, 2012). A following strategy – 'Europe 2020', intended for implementation in 2010–2020 – integrated environmental objectives as one of the three priorities². In both strategies, however, environmental goals only supported the achievement of overarching socio-economic objectives. The Lisbon Strategy focused on increasing the efficiency and competitiveness of Europe's integrated economy to make it a leader in the world economy (Piotrowski, 2012), whereas 'Europe 2020' stressed economic growth and employment. In this context, the EGD introduces a new quality. Environment-related goals are central to its implementation, which reflects the growing importance of environmental issues to the EU's economic policy as well.

The implementation of more stringent environmental regulations will threaten the competitiveness of the Union's industry, as long as international partners do not share the same ambition as the EU or European companies do not become international leaders in clean technologies. It is clear that in a short run China or India will not be going carbon neutral and compliance costs will not be offset. Hence, the Commission is planning numerous actions that have a potential to accelerate and mitigate the transformation process for enterprises, but also force changes outside the EU.

It is hardly difficult to notice that the measures proposed in the European Green Deal primarily concern the internal market (Member States' economies) – EU-wide rules, national policies or corporate activities. The European Commission announces a review of all rules and regulations to make them aligned with the new climate objectives, accelerating the creation of a circular economy, a significant pollution reduction, the preservation of ecosystems and biodiversity, the development of organic farming and reducing emissions from the transport sector. It also intends to finance the regions and sectors most vulnerable to the transition as well as research and innovation relevant to the EGD implementation. Due to the EU's economic potential, its actions will have indirect effects on third (non-EU) countries. For the EU's efforts to improve global environmental quality to be effective, it is necessary to involve other countries (the EU accounts for less than 10% of the world's greenhouse gas emissions). Owing to the global and cross-border nature of the causes of climate change and environmental

² It defined the 'sustainable growth' priority as promoting a more resource-efficient, greener and more competitive economy. Cf. European Commission, 2010, p. 11.

degradation, in its document the Commission also presented proposals that address non-EU countries directly.

This study aims to discuss and to provide a preliminary assessment of the most important proposals contained in the EGD that concern the European Union's relations with non-EU countries. Those are compared to the previous external actions of the European Union for environmental protection.

1. Previous international environmental actions of the European Union

Taking measures to promote sustainable development has been an official objective of the European Union since the adoption of the Treaty of Amsterdam (1997). It applies to both the internal market and relations with the rest of the world. As laid down in the Treaties, the Union must work for the sustainable development of Europe, including a high level of protection and improvement of the quality of the environment (Article 3(3) of the TEU)³, and integrate environmental protection requirements into the definition and implementation of the Union's policies and activities (Article 11 of the TFEU)⁴. The EU's external relations should include fostering the sustainable economic, social and environmental development of developing countries (mostly with a view to eradicating poverty) and help develop international measures to preserve and improve the quality of the environment and the sustainable management of global natural resources (to ensure sustainable development) (Article 21(2) of the TEU). Global sustainable growth should be promoted by incorporating environmental protection issues into the EU's external relations and commercial policy and by integrating them into areas such as the enlargement process or development policy.

With the aim of executing those tasks, the European Union takes various actions in multilateral, regional and bilateral forums. As a matter of primary importance, for many years the EU has been engaged in the development, ratification and implementation of multilateral environmental agreements (MEA), whether global (multilateral agreements negotiated under the auspices of the United Nations), regional (e.g. within the competence of the UN Economic Commission for Europe – UNECE)) or sub-regional (e.g. with regard to the management of border seas and rivers). Such agreements address a wide variety of climate and environmental protection issues⁵.

³ Treaty on European Union, 2012.

⁴ Treaty on the Functioning of the European Union, 2012.

⁵ E.g. biodiversity and nature protection, climate change, protection of the ozone layer, desertification, chemicals and waste management, transboundary water and air pollution, industrial accidents, mari-

Environmental provisions constitute an integral part of the EU's agreements with third countries (e.g. association agreements with the Eastern Neighbourhood and Southern Neighbourhood or with the Western Balkan countries). They include commitments to develop cooperation for combating degradation of the environment and improving environmental quality, pollution control and efficient use of natural resources⁶, as well as provisions indicating the need to ratify and implement the Kyoto Protocol. In addition, such agreements stipulate cooperation for the creation of appropriate administrative structures and procedures to facilitate better strategic management and environmental action coordination for partner countries as well as gradual alignment of their legislation to the *acquis* and more effective implementation of environmental protection rules. They also comprise the EU's commitments to provide assistance in designing climate policy and incorporating environment-related issues into other (energy, transport, industrial, agricultural, education, etc.) policies.

An important dimension of EU actions is its multilateral and plurilateral engagement in the World Trade Organisation (WTO). As regards multilateral environmental measures, the EU is mostly involved in the work of the regular Trade and Environment Committee. It contributes to identifying and understanding the relationship between trade and the environment (as initially adopted in 1995); further, it examines the effects of environmental measures on market access, intellectual property rights and biodiversity as well as labelling for environmental purposes (as extended under the Doha negotiating mandate (WTO, 2001)⁷). During special sessions of the Committee, additional talks are conducted on the relationship between the WTO's agreements and MEAs and the liberalisation of market access for environmental goods and services⁸.

The DDA talks on the above-mentioned issues aim to achieve a 'win-win-win' situation – for trade, the environment and development (WTO, 2020a). Firstly, the reduction or elimination of tariff and non-tariff barriers is expected to facilitate the acquisition and dissemination of more cost-effective environmental technologies. It should translate into increased innovation and accelerated technology transfer. Secondly, the dissemination of high-quality environmental goods should directly lead to improved

time and river protection, and environmental liability. Cf. European Commission – Environment, 2020. For a detailed list of the EU's MEAs as at the end of August 2017, see: *Multilateral Environmental Agreements to which the EU is a Contracting Party or a Signatory*, 2019.

⁶ Specifically, the following issues should be subject to cooperation: desertification, air and water quality, emission control and pollution prevention, waste management, salinity, environmental management, education and environmental awareness, environmental monitoring methods and supervision, environmental impact assessment, industrial plant safety, effects of agriculture on soil and water quality, biodiversity protection, the development of renewable energy sources, greater engagement in international and regional actions for climate change mitigation and adaptation.

⁷ Paragraph 32 of the Doha Ministerial Declaration.

⁸ On the basis of paragraph 31 of the aforementioned Declaration.

quality of life for citizens (a cleaner environment, better access to safe water, sanitation or clean energy) and increased energy efficiency. Finally, the liberalisation of trade in environmental goods and services is seen as an opportunity for accelerating development in developing countries through easier access to technologies necessary to address their key environmental issues. It is very difficult to achieve the above-mentioned goal due to differences in the positions of the WTO's individual members⁹. As a result, the progress in multilateral talks has been limited so far.

Therefore, in January 2014, the EU and 13 other members of the WTO started negotiations on the plurilateral Environmental Goods Agreement (EGA) within the organisation. It mainly aims to eliminate tariffs on trade in environmental goods and to liberalise the provision of environmental services. It should also help achieve climate and energy objectives included in the Paris Agreement¹⁰. The EGA talks are in progress.

Another EU's action to pursue environmental policy is the inclusion of relevant provisions in regional and bilateral trade agreements (as a separate chapter entitled 'Trade and sustainable development'). From the point of view of international trade rules, those are the so-called WTO-X provisions or provisions outside the WTO mandate (Horn, Mavroidis, Sapir, 2007). Similar provisions were included in agreements with both developed (e.g. South Korea, Canada, Singapore, Japan) and developing countries (Vietnam, Mercosur). The first indications thereof were contained in the commercial policy strategy 'Global Europe – Competing in the world' of October 2006. It was subsequently confirmed in the commercial and investment policy strategies 'Trade, Growth and World Affairs – Trade Policy as a core component of the EU's 2020 strategy' of November 2010 and 'Trade for All – Towards a more responsible trade and investment policy' of October 2015.

The environmental commitments contained in the EU's free trade agreements are twofold. Some of them are very general, indicating the orientation of measures to be taken by the parties to the agreements concerned. Specifically, such provisions include

⁹ Those result, *inter alia*, from difficulties with the adoption of a common definition/list of environmental goods, different environmental protection standards, inconsistencies between certain MEAs with WTO agreements, but also from limited engagement of developing countries as they doubt the possibility to benefit from the liberalisation of trade in environmental goods, characterised by high capital and technology intensity. For more on the factors hindering multilateral talks, see, e.g., Błaszczuk-Zawiła, M., 2015, pp. 17–20.

¹⁰ The Paris Agreement – a global climate change agreement concluded in Paris during the 21st session of the Conference of the Parties (COP 21) to the United Nations Framework Convention on Climate Change (UNFCCC) in December 2015. Its main long-term goal is to keep the average global temperature rise well below 2 degrees Celsius above pre-industrial levels and to limit the temperature increase further to 1.5 degrees. Governments agreed to declare, every 5 years, the so-called nationally determined contributions (national action plans for emission reduction) to enable setting more ambitious targets. *Paris Agreement*, 2016.

commitments: 1) to support international and mutual trade while promoting sustainable development objectives; 2) to effectively implement ratified MEAs; 3) not to waive or derogate from any national environmental laws in a manner affecting mutual trade and investment (non-application of environmental dumping); 4) to ensure a high level of the environmental protection (in compliance with international standards and agreements) in any national legislation adopted or amended; 5) to promote corporate social responsibility (CSR); 6) to engage civil society in the implementation of the environmental provisions of such agreements; 7) to enhance regulatory transparency. Other commitments include: 1) reducing fossil fuel subsidies; 2) cooperation with regard to trade-related aspects of the international strategy for combating climate change (e.g. the global carbon market or measures promoting low-carbon technologies and energy efficiency); 3) the conservation and sustainable management of biodiversity (including biofuels); and 4) the use of forests and fishing grounds in a manner maintaining ecological balance (mostly in order to combat illegal logging and illegal catches). Such provisions have been criticised, particularly due to difficulties with the monitoring and assessment of the degree of implementation as well as with their enforcement.

Other provisions are of a specific nature. Those comprise liberalisation schedules for trade in environmental goods and services (e.g. accelerated reduction or elimination of tariffs and non-tariff barriers) and related foreign direct investment as well as the promotion of environmentally friendly public procurement. In connection with entering into the Paris Agreement, the EU's most recent trade agreements with Japan and Mercosur also include binding commitments to ratify and effectively implement the provisions thereof.

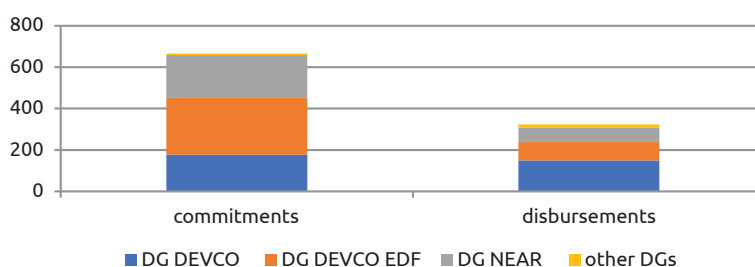
For environmental purposes, the EU also makes use of its Generalised Scheme of Preferences. For example, it promotes countries that ratify and implement international environmental conventions, by granting them greater reduction of duties (under the GSP+ scheme) (GSP, 2020).

Environmental aspects are incorporated into commercial policy making. Since 1999, the Commission has carried out sustainability impact assessments (SIAs) for all negotiated trade agreements. Such documents assess, *inter alia*, an environmental impact of the agreement concerned in the EU, the partner country and in developing countries. They are prepared during negotiations and feed into the work of the negotiators as the negotiations evolve.

Another relevant EU measure is financial support for environmental changes in developing countries. In particular, the Union provides it with the aim to assist in the fulfilment of their commitments under the Paris Agreement (emission reduction and climate change adaptation), as it committed to do when signing the Agreement (European Commission, 2019a). In 2018, as part of Official Development Assistance (ODA),

the Commission allocated commitment appropriations for general environmental protection of EUR 664 million (4.2% of total commitments in the ODA budget). In the same year, relevant disbursements amounted to EUR 324 million, i.e. almost half of the commitments. Commitments were dominated by funds from the European Development Fund (EDF), whereas disbursements were mostly funded by the Directorate-General for International Cooperation and Development (Figure 1).

Figure 1
Commitments and disbursements for general environmental protection as part of Official Development Assistance (managed by the European Commission) (2018, EUR million)



Notes: DG DEVCO – Directorate-General for International Cooperation and Development; EDF – European Development Fund; DG NEAR – Directorate-General for European Neighbourhood Policy and Enlargement Negotiations. Source: prepared by the author on the basis of: European Commission, 2019b, pp. 37, 39.

In addition, the EU has gradually incorporated climate change issues into other areas of cooperation (e.g. the agricultural policy, food safety and energy) where it provides financial support as well¹¹.

2. EGD proposals concerning the EU's external relations

The proposals contained in the European Green Deal and directly concerning third countries can be divided into several groups (Table 1). One group comprises measures intended by the EU to encourage other countries to promote sustainable development. Those seem to be mainly addressed to powerful countries such as the United States and China on whose policies the European Union has little or no influence. At the same time, they are the world's largest CO₂ emitters. A key tool for such tasks will be envi-

¹¹ In 2014–2017, approx. 55% of the EU's contribution to climate action resulted from integrating climate change measures into the agricultural policy, food safety and energy. Cf. European Commission, 2019b.

ronmental diplomacy at the multilateral and plurilateral levels (in the forums of international organisations, during global conferences – e.g. the UN, G7, G20 and WTO) as well as during bilateral meetings (e.g. the 2020 EU–China summits). The Union also plans to engage in international work on the creation of economic incentives to take climate action. Previous efforts to promote sustainable development will be reinforced through close cooperation of the Commission and the High Representative with the Member States’ diplomatic missions.

Another group of measures involves closer bilateral and regional cooperation as well as supporting environmental efforts of other countries. Those are mostly targeted at countries covered by the enlargement policy (the Western Balkans), the neighbourhood policy (the Eastern Neighbourhood and the Southern Neighbourhood) and the development policy (Africa, Latin America, the Caribbean, Asia and the Pacific). In the execution of such tasks, the Commission intends to rely on the EU’s economic power. In relations with weaker countries, it allows to exert pressure to intensify environmental efforts (e.g. to adopt regulations based on EU ones). For the purpose of increasing the effectiveness of such influence, the Commission intends to support such countries through both financial aid (targeting funds at environmental protection) and technical assistance (e.g. sharing ‘green’ regulation expertise). In particular, assistance is intended to promote the creation of relevant rules, the analysis and implementation of national commitments under the Paris Agreement and the design of ambitious long-term strategies tailored to the needs of individual countries.

Yet another set of measures proposed in the EGD concerns commercial policy. Those are as follows: 1) stepping up efforts to implement and enforce the environmental commitments contained in EU trade agreements (the execution of the task will be supported by a newly appointed Chief Trade Enforcement Officer); 2) making the respect of the Paris agreement an essential element for all future comprehensive trade agreements; 3) intensifying measures to facilitate trade in environmental goods and services and promoting their presence on EU and global markets. The Commission will also work to ensure undistorted, fair trade and investment in raw materials necessary for green transition, to eliminate harmful practices, to enhance regulatory cooperation, to promote EU standards and to remove non-tariff barriers in the renewable energy sector.

A fourth group comprises measures limiting access to the EU market for goods and services that do not comply with relevant environmental standards and promoting low-carbon production in third countries. The objective is to be achieved through more stringent standards for goods produced in the EU and the taxation of the ‘carbon content’ of imported products (on the basis of their carbon footprint).

Table 1**EGD proposals directly relating to the EU's external relations**

Task planned	Implementation tools/measures planned
Convincing other countries to promote sustainable development	multilateral, regional and bilateral diplomatic measures; encouraging countries to end global fossil fuel subsidies in line with G20 commitments, phasing out financing by multilateral institutions of fossil fuel infrastructure, strengthening sustainable financing, phasing out all new coal plant construction, and action to reduce methane emissions; work with global partners to develop international carbon markets as a key tool to create economic incentives for climate action
Stepping up bilateral engagement with partner countries to support their environmental efforts	developing tailor-made geographic strategies reflecting different contexts and needs of partner countries, including the Comprehensive Strategy with Africa; the summit between the African Union and the EU (2020); the Africa–Europe Alliance for sustainable investment and jobs; a 'NaturAfrica' initiative to protect wildlife and offer employment opportunities in green sectors; building 'green alliances' with Africa, Latin America, the Caribbean, Asia and the Pacific and making them part of the EU's relations with those regions; cooperation in implementing the Paris Agreement (helping partner countries to revise and implement their nationally determined contributions to emission reduction and devise ambitious long-term strategies); development assistance; a 'green' agenda for the Western Balkans, strong environment, energy and climate partnerships with the neighbouring countries
Support for transition through trade policy	integration of sustainable development commitments and the respect of the Paris Agreement into trade agreements; stepping up efforts to implement and enforce the climate and environmental commitments of partner countries (including the appointment of a Chief Trade Enforcement Officer); taking measures to facilitate trade in environmental goods and services and supporting EU and global markets for sustainable products; preventing harmful practices, enhancing regulatory cooperation, promoting EU standards, removing non-tariff barriers in the renewable energy sector
Establishment and promotion of international environmental standards	developing and disseminating new environmental standards for goods and services; cooperation with global partners to ensure the EU's resource security and reliable access to strategic raw materials; carbon border tax (CBT)
Financing of transition	coordination of the EU's and Member States' support; appropriate targeting of funds (including EU funds); support for action to improve the investment climate and achieve contributions from the private sector, including measures to de-risk investments (funding guarantees, blended financing); participation in coordinating international efforts towards building a coherent financial system that supports sustainable solutions and mobilising international investors (based on the International Platform on Sustainable Finance)
Prevention of adverse effects of climate policy	cooperation with partners in order to increase their alignment with climate change and environmental objectives; integration of climate policy implications into the EU's external actions e.g. into the Common Security and Defence Policy

Source: prepared by the author on the basis of: European Green Deal (European Commission, 2019b).

The Commission expects that setting environmental standards for EU goods will help disseminate them in other countries (as well as in the case of REACH and EU RO IV

standards (Charveriat and Kettunen, 2019)). The size of the EU market (comparable to those of the US and Chinese markets) should provide a strong incentive for third-country producers to change their production processes. In particular, this concerns countries included in the global value chains of EU firms. In order to encourage other countries to design equally ambitious rules, the Commission declares the willingness to share its expertise on ‘green’ regulations.

The second measure proposed is intended as a response to reduced competitiveness of EU businesses as a result of the EU’s tighter climate policy. The planned extension of the EU’s Emissions Trading System (EU ETS) and a rise in non-covered emission costs will push up operating expenses for enterprises located in the EU. Consequently, their price competitiveness in the internal and international markets will decline. This may result in: 1) partial relocation of EU production to countries characterised by less strict regulations (the so-called carbon leakage)¹² and 2) the replacement of EU products with imported goods whose production involved higher emissions. The solution considered by the Commission in order to maintain the competitiveness of EU undertakings is the introduction of a mechanism for price adjustment on external borders in the form of carbon border tax (CBT, also referred to as border carbon adjustment – BCA)¹³. Its purpose would be to ensure equal treatment of all goods consumed in the EU (whether produced in the EU or imported). An additional objective of the instrument would be pressure on other countries to take decarbonisation measures. It would also enable EU exporters to recover emission costs included in their products to prevent their competitive disadvantage in the sale of products outside the Union (a type of subsidy for low-carbon exports).

Another group of measures concerns the financing of weaker partners’ environmental transition. In that regard, the Commission intends to act in two ways – through adequate targeting of (public and private) appropriations from EU funds and mobilising additional private contributions. According to the budget proposals for 2021–2027, 25% of EU support for the countries concerned (under the Neighbourhood, Development and International Cooperation Instrument) is to be allocated to climate-related objectives. Private investors should be encouraged to contribute through opportunities to de-risk investments (funding guarantees, blended financing), cooperation within the International Platform on Sustainable Finance (IPSF)¹⁴ and the EU’s coordination

¹² It is worth pointing out that the scale of the phenomenon in the sectors covered by the ETS has not been significant so far. Cf. Claeys, Tagliapietra and Zachmann, 2019, p. 5.

¹³ The measure is intended as an equivalent of the instruments limiting carbon leakage within the EU’s Emissions Trading System (an alternative to the current free allocation of allowances to undertakings in selected sectors).

¹⁴ For more, see: European Commission, 2020.

of international efforts towards building a coherent financial system supporting sustainable solutions.

In addition, the European Green Deal refers to risks involved in ecological transition. As assessed by the Commission, the resulting change in geopolitics (including global economic, trade and security interests) will create challenges for many states and societies. Therefore, it declares the willingness to cooperate with all partners to prevent any conflict, food insecurity, population displacement and forced migration stemming from environmental changes. Such adverse effects should also be mitigated by the inclusion of climate policy implications in various aspects of EU's external actions (e.g. the Common Security and Defence Policy). Furthermore, the Commission declares its willingness to support a just transition worldwide.

3. A preliminary assessment of the EGD proposals

The Commission's proposals for measures towards third countries vary in the degree of detail, the possibility to actually influence their economies and policies as well as in the legal status (binding or declarative in nature). The EGD is very vague about large economies, accounting for a dominant share of global emissions. In contrast, proposals for weaker countries are more detailed. It reflects the EU's varying capability to influence its trading partners' policies.

Most of the measures planned for external relations follow up on previous initiatives. However, the Commission has focused on their intensification and development as well as on better coordination between entities engaged in the implementation. This concerns measures such as environmental diplomacy and financial support for environment-related projects.

The vague or insufficient nature of certain proposals gave rise to criticism. In particular, this concerns commercial policy, intended in the EGD as an instrument supporting environmental transition, despite the lack of evidence to prove its effectiveness¹⁵. Critics of the tool are aware that any structural changes initiated as a result of provisions contained in the EU's trade agreements will only materialise in a longer term. Therefore, rather than departing from the use of commercial policy for environmental purposes, they advocate for increasing its effectiveness, for example by¹⁶: 1) making the conclusion of agreements dependent on the ratification and implementation of

¹⁵ Specifically, to prove that sustainable development provisions contribute to reducing negative effects of trade expansion on the environment. Cf. Charveriat and Kettunen, 2019.

¹⁶ It is suggested that a more favourable solution would be a smaller number of better agreements. Cf. Bjerkem, 2019.

the Paris Agreement; 2) seeking efficient methods for measuring and monitoring the implementation of commitments and their effects; or 3) introducing sanctions in the form of temporary suspension of trade preferences for infringements of the provisions of agreements. It is also argued that the EU's trade agreements should not promote exports and consumption of high-carbon agricultural products (articles of animal origin, especially pigmeat and milk products); instead, they should focus on eliminating fossil fuel subsidies or fostering low-carbon and resource-saving technologies (Charveriat and Kettinen, 2019). However, such proposals give rise to questions about alternative ways of supporting agriculture as a major sector of the EU economy, also for social reasons. The current talks with Australia and New Zealand are seen as an opportunity to test new solutions and to create a model for future negotiations (Bjerkem, 2019).

A much debated and new proposal is the introduction of carbon border tax (CBT). Some commentators point out that its implementation is impracticable for technical reasons (Wolff, 2019). They consider measuring the carbon content of products manufactured in third countries to be virtually infeasible due to differences in production technology, the necessity to introduce a reporting obligation and making such information reliable, or due to the operation of global value chains. Others argue that – although it is feasible to calculate the carbon content of imports – the difficulty is the necessity to take account of emissions along the value chain (Claeys, Tagliapietra and Zachmann, 2019, p. 5)¹⁷. But the risk of retaliation measures taken by trading partners is regarded as a more serious argument against the tax¹⁸. Although the Commission intends CBT to be consistent with the WTO rules¹⁹, the EU's experience shows²⁰ that even in a situation of formal compliance certain countries may consider such a tax to be a protectionist measure, with an excessive downward effect on imports (as a form of green protectionism). As a result, this may lead to threats or actual introduction of retaliation measures. It is stressed that on account of political difficulties CBT should not play a major role in the EU's climate policy and it should not be introduced until the scale of carbon leakage becomes alarming (Claeys, Tagliapietra and Zachmann, 2019). On the other hand, CBT is seen as an impulse likely to speed up multilateral negotia-

¹⁷ Such calculations may rely on standards created for the purpose of measuring the carbon footprint of products (e.g. ISO 14067). For more on various methods, their strengths and weaknesses, see e.g. Łasut and Kulczycka, 2014.

¹⁸ It is pointed out that the EU's trading partners, including the United States and China, may introduce retaliation measures even where a measure is WTO-consistent and objectively non-discriminatory against foreign producers (Horn and Sapir, 2019).

¹⁹ For more on the possibility to introduce WTO-consistent BCA, see e.g. Cosby et al., 2012 and Hillman, 2013.

²⁰ In 2012, the EU's intentions to introduce charges on emissions from intercontinental flights raised strong opposition from the United States and China, threatening to no longer purchase Airbuses. Cf. Claeys, Tagliapietra and Zachmann, 2019, p. 6.

tions on the global 'green agreement' and the introduction of innovation and modernisation of production processes in third countries (Wolff, 2019).

The implementation of particular measures proposed by the Commission in the European Green Deal will have varying influence on third countries. Effects should be expected from solutions such as the liberalisation of trade in environmental goods and services under trade agreements and increased financing of climate and environmental projects (resulting from targeting 25% of EU aid funds for third countries or a broader inclusion of such issues in other areas of cooperation). Third-country adjustments as a consequence of new standards for products and services in the EU are very likely as well. The results of the EU's trade agreements with third countries may also be enhanced by activities of the Chief Trade Enforcement Officer. In contrast, it is difficult to predict the effects of environmental diplomacy measures.

Due to the great number and variety of measures undertaken so far, the Union is perceived as the greatest advocate of international environment-related efforts on a global scale and a leader in climate and environmental actions. In the European Green Deal, the Commission assumes making use of and reinforcing the position, e.g. by being at the forefront of international initiatives and building alliances for climate and the environment. The starting point for the EU's external action is to be the EU's transition. Reliable measures are supposed to encourage partner countries to change their policies. However, doubts arise whether the EU is able to consistently act on its intentions.

First and foremost, it must be noted that the EU Member States' positions on environmental effort differ, even widely with regard to certain issues. For example, Poland – as the only Member State – refused to accept the objective of achieving climate neutrality by 2050 during the most recent December summit of the European Council (European Council, 2019). Furthermore, the EU's emission reduction efforts are not very convincing. In some sectors (e.g. transport) emissions went up, other sections face considerable problems (industry), whereas electricity production continues to be coal-based to the same degree (Claeys, Tagliapietra and Zachmann, 2019, p. 3).

The Union's reliability is also undermined by certain commercial policy measures such as an attempt to re-open trade negotiations with the United States, intending to withdraw from the Paris Agreement (Charveriat and Kettunen, 2019), or making the EU-Mercosour Agreement independent of the Amazon rain forest fires²¹. The effectiveness of development assistance granted to environmental projects is low as well. Neither do the WTO data on environment-related measures provide an unambiguous picture. They show that although the Union is ahead of the United States in terms of the number of

²¹ A statement by Ignacio Ybáñez, the EU's ambassador to Brazil (Charveriat and Kettunen, 2019).

notifications of such measures (699 against 606), it remains behind with regard to the number of measures applied (1848 in comparison with 1927)²².

The reliability of the EU's international actions should be enhanced by better coordination of technical support for developing countries granted by the EU institutions and Member States (Tagliapietra and Zachmann, 2020).

In addition to measures directly addressed to third countries, the EU's external relations will be influenced by certain actions by the Commission directly relating to the internal market. Apart from limitations on the use of fossil fuels or the introduction of the above-mentioned environmental standards, other examples include the 'Farm to Fork' strategy and the new regulations on packaging. The former solution concerns reducing the use of fertilisers in agriculture. The relevant provisions will primarily affect EU producers, i.e. the main suppliers to the EU market (Box 1). But they will also apply to third countries, including Russia, Egypt and Belarus, the most important non-EU suppliers of artificial fertilisers to the EU (Figure 2). In 2018, the EU imported 18 million tonnes of fertilisers (approx. 35% of total supplies). Imports played the greatest role in the case of deliveries of phosphorus fertilisers (almost 59%) and blended and potassium fertilisers (nearly 45%) – Figure 3.

Box 1

Structure of fertiliser deliveries to the EU market in 2018

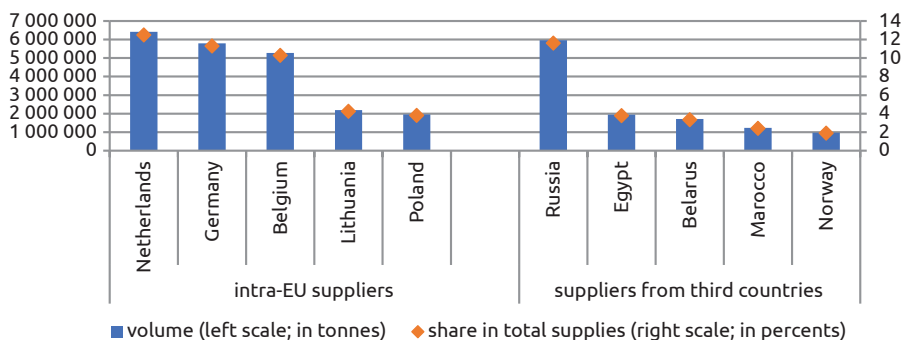
The main suppliers of fertilisers (HS 31) to the EU market are EU producers. In 2018, they delivered nearly 33.4 million tonnes of fertilisers, i.e. approx. 65% of total supplies. Deliveries were dominated by nitrogenous fertilisers (accounting for approx. 60% of intra-Community supplies), compound/blended fertilisers (19%) and potassium fertilisers (11%). The main suppliers were the Netherlands, Germany and Belgium.

Imports represented the remaining share of 35% (18 million tonnes). The main suppliers to the EU-28 were as follows: Russia (approx. 33% of supplies from third countries in 2018), Egypt (nearly 11%), Belarus (9.5%), Morocco (almost 7%) and Norway (5.5%). The EU Member States imported from non-EU countries nitrogenous fertilisers (48%, primarily from Russia, Algeria, the United States, Trinidad and Tobago), compound/blended fertilisers (29%; mainly from Russia, Morocco, Belarus, Serbia and Tunisia) and potassium fertilisers (16%, mostly from Belarus, Russia, Canada, Israel and Jordan). Therefore, imports were dominated by the same types of fertilisers as in the case of intra-EU supplies.

Source: prepared by the author on the basis of EUROSTAT-Comext data.

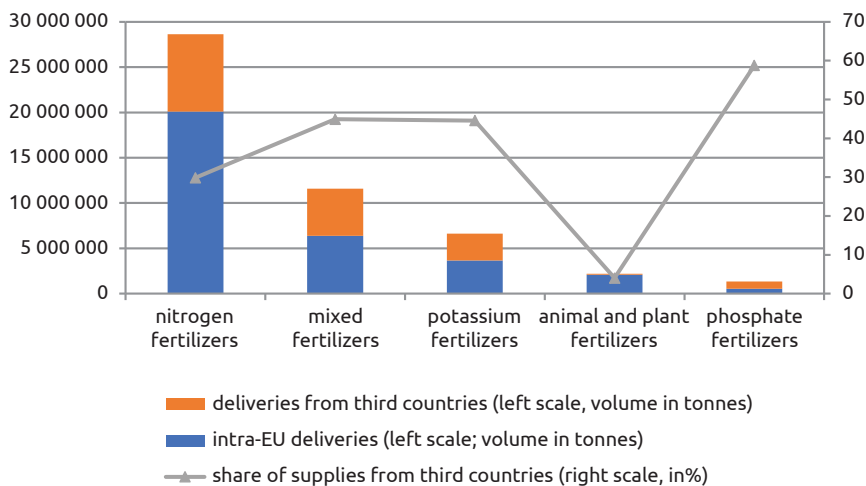
²² The two countries are followed by China in terms of the number of notifications (257) and by Australia in terms of the number of measures (754). Cf. WTO, 2020b.

Figure 2
Major suppliers of fertilisers (HS 31) to the EU-28 market in 2018



Source: prepared by the author on the basis of EUROSTAT-Comext data.

Figure 3
Structure of deliveries of selected types of fertilisers to the EU-28 market in 2018



Source: prepared by the author on the basis of EUROSTAT-Comext data.

Another example of products whose exporters to the EU market will be affected by the new regulations is plastic packaging. In the EGD, the Commission announced the follow-up on the 2018 plastics strategy (European Commission, 2018a). It concerns, *inter alia*, work on developing requirements to ensure that all packaging in the EU market is reusable or recyclable in an economically viable manner by 2030. The Commission

will also prepare a regulatory framework for biodegradable and bio-based plastics and implement measures to reduce the consumption of single use plastics. The steps planned by the Commission should push down the demand for new products of that type, also for imported ones. Imports of plastic packaging would be additionally hindered by the adoption of a Plastic-based Own Resource for the EU budget, directly proportional to the quantity of non-recycled plastic packaging waste in every Member State (European Commission, 2018b). As in the case of artificial fertilisers, the EU market is dominated by supplies from EU Member States (Box 2). Imports from third countries account for less than one-fourth of total deliveries. Nevertheless, the main suppliers – China, Vietnam and Turkey (Figure 4) – will be affected by the EU’s new policy.

Box 2

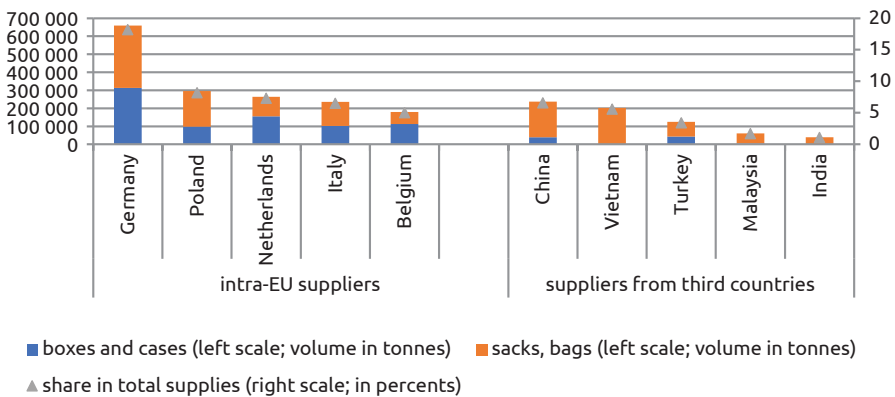
Structure of plastic packaging deliveries to the EU market in 2018

In 2018, EU undertakings supplied to the EU market 3.6 million tonnes of plastic packaging, i.e. more than three-fourths of total deliveries. As regards boxes and cases of other plastics (HS 392329), their share was 87%, whereas in supplies of sacks and bags – two-thirds. The largest suppliers were Germany (over 24% of intra-EU supplies), Poland (almost 11%), the Netherlands (9.7%) and Italy (8.7%). Imports from third countries represented less than one-fourth of total deliveries to the EU market. Third-country suppliers were mostly China (more than 26% of deliveries from third countries in 2018), Vietnam (22.5%) and Turkey (nearly 14%).

Source: prepared by the author on the basis of EUROSTAT-Comext data.

Figure 4

Major suppliers of plastic packaging (HS 392310, 392321, 392329) to the EU-28 market in 2018 (in tonnes)



Source: prepared by the author on the basis of EUROSTAT-Comext data.

Conclusions

The European Green Deal presented by the Commission contains proposals for actions intended to facilitate the transition of the EU economy towards climate neutrality by 2050. It comprises diplomacy, commercial policy, development policy, neighbourhood policy and enlargement policy measures aimed to convince/encourage other countries to promote sustainable development. Not only would changes in other countries' policies contribute to the achievement of EU objectives, but they would also respond to the need for intensified environmental efforts on a global scale. Some of the proposals contained in the document are not entirely new; rather, they follow up on measures taken before.

The EGD is an opportunity for European industry to modernise and become more competitive. Although implementation of an ambitious environmental policy may deteriorate the competitiveness of the EU's industry in the short run, the compliance costs should be offset in longer perspective. In the meantime, the European Commission will support the transformation and in extreme cases use WTO-compatible cross border tax adjustments to deal with problems when they arise.

To strengthen the competitiveness of European industry, EGD's environmental regulations must lead to higher productivity and input savings, as well as trigger innovations that lower overall production costs, improve export performance and market share. Desirably, the world-wide demand for green technologies grows and EU firms gain international leadership in clean technologies (first-mover advantage). Measures to promote green transformation among third countries are intended to serve also this purpose.

The European Green Deal includes proposals addressing all countries in the world, varied depending on the economic power of partner countries, thus on the possibility to influence their policies. With regard to economically strong countries, enhanced diplomatic efforts promoting sustainable development and the incorporation of environmental commitments into various aspects of international relations are mostly proposed. In order to achieve that objective, the Union intends to be more active in forums such as the UN, WTO, G7 and G20.

The measures planned for weaker countries, in particular immediate neighbours, seem to be more concrete, whereas steps to be taken towards their implementation appear to be more resolute. In relations with such countries, the Commission intends to use not only diplomatic tools, but also enlargement policy, neighbourhood policy and development policy measures as well as other external policy dimensions. The effectiveness of measures addressing that group of countries is to be ensured by the EU's economic power (attractiveness) and its willingness to support specific environmental

efforts by partner countries (in financial terms, but also through technology transfer, technical assistance).

The tool of implementing the policy towards all third countries will be the commercial policy, including efforts to liberalise international trade in environmental goods and services and fostering EU and global markets for sustainable products. In addition, the EU's promoting more stringent environmental standards (e.g. in the course of work on the UN conventions on biodiversity and climate) will also be relevant to other countries. Concrete effects can be provided by carbon border tax (if introduced).

The document presented is general in nature, but it shows the Commission's determination for the EU to remain the world's leader of environmental transition. The most significant challenge faced by the Commission is to obtain all the Member States' political consent to detailed measures for implementing such an ambitious agenda. Another challenge is the capacity of the EU administration to execute the tasks stipulated in the EGD in connection with its implementation. In addition to reviews of and amendments to the applicable rules and regulations, it will be necessary to undertake new tasks, both in technical terms (e.g. the establishment of general principles concerning the future CO₂ emission costs or the methods of measuring the carbon content of particular products) and with regard to the regulatory framework (developing coordination mechanisms for efforts by various entities engaged in 'greening' the EU economy). After all, higher prices of carbon dioxide emissions should encourage changes in consumer and corporate behaviour and facilitate growth in sustainable public and private investments. They should serve as an incentive to switch to alternative products, with a lower carbon content.

The primary determinants of the effectiveness of measures taken by the EU in relations with third countries will be as follows: 1) setting a reliable example by changes introduced within the single market and indicating benefits to be derived from ecological transition; 2) determination in executing the tasks stipulated in the EGD; and 3) the Union's real capability to influence third countries' economies and policies (depending on the partner country's development level and the type of tool intended for achieving a specific objective). It will also be crucial to ensure coordinated diplomatic efforts and technical support for developing countries as well as cooperate with other countries and building coalitions for concrete international measures.

It should be expected that – in addition to environmental measures directly addressed to non-EU countries – an important role in the external relations of the EU will be played by the Commission's actions concerning the internal market, especially those of a mandatory nature (the directives on artificial fertilisers or plastic packaging). Policies pursued by individual Member States will also be of relevance, as they can adopt their own and more ambitious goals in areas outside the Commission's exclusive competences.

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3 REMOVAL OF BARRIERS ON TRADE IN SERVICES IN THE LAST TWO DECADES: A CASE OF THE EU*

Alina Szypulewska-Porczyńska**

Introduction

In a modern globalised and interlinked world, services play a crucial role including forming global value chains, thus the importance of reducing impediments to international services flows. A recent study commissioned by the European Commission on the potential of servitisation of the EU SMEs, contains a list of the main barriers perceived by EU SMEs as very important for servitisation (European Commission, 2018). Regulatory barriers occupy the third place there, which highlights the importance of the subject under examination in this chapter. The progress in integrating services markets in the European Union has no parallel anywhere else in the world, but even there the removal of barriers on trade in services remains a major challenge. Work on one of the major pieces of legislation in this area, i.e. Directive 2006/123/EC and subsequent regulations improving its implementation, was accompanied by a lively discussion. The

* The study is an updated, revised and extended part of statutory research KGS/S19/2/2019 carried out by the author in Jean Monnet Chair of European Integration at Warsaw School of Economics.

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final shape those regulations assumed, if any, illustrated a significant problem which the process of European integration had faced: the integration of countries on various levels of development.

It can be theoretically and empirically demonstrated that such economic relations may be beneficial for both parties. Benefits and opportunities from a developed country's point of view include, among others, access to cheaper workforce that drives the development of a modern form of globalisation based on global chains (see, e.g., Baldwin, 2013, pp. 13–59), while from the point of view of a developing country – access to capital and credibility (see, e.g., Kawecka-Wyrzykowska, 2015, pp. 77–97). However, no less abundant literature is available on the threats related to the integration of economically unequal countries. It addresses, in particular, the problem of the cost of adjustments related to the development of intra-industry trade¹.

Not only does the economic balance of unequal countries include such items as costs and risks, but, in addition, trade in services, along with the physical flow of service providers, enhances the competition of different models of national social policies, causing tensions within an integrating area. Competition from service providers from countries with lower labour costs to countries with higher wages and social standards has been called in the European Union 'social dumping'. Discussions on this issue have been triggered on many occasions but particularly at the time of the largest EU enlargement in 2004 (see, among others, Kittel, 2002). The literature on the European Social Model also provides many examples on this point (see, e.g., Jepsen, Serrano Pascual, 2005, pp. 231–245; Wickham, 2002; Hyman, 2005, pp. 9–40). The debate on 'social dumping' has come to the fore again in the post-crisis discussion on EU social regulations regarding posted workers or road transport². The EU countries' heterogeneity in this area appears to be consolidating at the expense of the earlier liberal vision of the internal market, as well as the vision of supporters of closer EU integration leading to the European Social Model³. This trend can be found in the shape of the provisions on the posting of workers (in the framework of the provision of services) and posted drivers in the road transport sector (European Commission, 2017; Directive (EU) 2018/957, pp. 16–24).

In the context of the topic undertaken in this study, and the problems touched upon above, the literature on methods of integrating national legal systems in order to cre-

¹ In Polish literature this problem has been raised, e.g., by E. Czarny (Czarny, 2013) and Ł. Ambroziak (Ambroziak, 2017).

² See, e.g., publications of the European Trade Union Confederation, such as Bernaciak, 2014.

³ The European Social Model (EMS) is understood here as an EU project (see, e.g., Jepsen, Serrano Pascual, 2005). In the literature on the EMS, this term can also be understood as a collection of diverse national varieties of the EMS that share common characteristics. In Polish literature, this approach can be found in D. Rosati (see Rosati, 2009).

ate a European single market for services deserves particular attention. G. de Búrca and J. Scott raised the problem of a new approach in the field of EU governance under which, according to the Authors, milder, more flexible and less hierarchical regulations were being adopted (de Búrca, Scott, 2006, p. 3). In Polish literature, I. Kawka listed such new practices as the application of soft law, creation of informal networks of Member State authorities, electronic databases and information exchange systems as well as the procedure for mutual evaluation of national instruments (Kawka, 2015). The problem of a new approach to governance in the European Union was reflected in the literature shortly after the European Commission published its white paper on this subject in 2001, i.e. 5 years before the adoption of the Services Directive (European Commission, 2001). An example would be the publication by A. Héritier under the meaningful title 'New Modes of Governance in Europe: Policy Making without Legislating?' (Héritier, 2002). According to V. Hatzopoulos, after the traditional approach based on 'harmonisation' and the new one based on 'mutual recognition', the EU 'new governance' is the third generation of governance methods used in the EU to regulate the internal market (Hatzopoulos, 2012). All methods are still used in the EU (Szypulewska-Porczyńska, 2014).

Against this background, the nature and outcome of the barrier removal referred to in the title will be assessed in this study. Thus, we investigate, firstly, a softer character of EU actions undertaken to remove barriers on trade in services in the last twenty years, and secondly, the restrictiveness of remaining barriers on trade in services in the UE. The first part of the study is based on a critical review of EU documents, especially legislative acts, whereas the second includes also an analysis of data provided by the OECD on restrictiveness of services trade barriers. Its Intra-EEA Services Trade Restrictiveness Index (Intra-EEA STRI) is the best for examining existing restrictions on trade in the EU internal market. The main advantage of Intra-EEA STRI is that the data relate to the intra-EU trade and are up to date. The main limitation of this data source is that it covers only a short period (from 2014).

1. Softening of EU actions to remove barriers on trade in services

The adoption of the new approach to creation of the EU internal services market coincided with a time when services became a priority area on the EU political agenda. In his report on the single market for services prepared at the request of the European Parliament in 2019, J. Pelkmans identified ten steps leading to the integration of services markets placing the time when services became a priority to the Union in the seventh step around 2000 (Pelkmans, 2019). It was then that the most ambitious plan

in terms of scope was outlined in the framework of the Lisbon Strategy⁴. For the first time in the EU history, a legislative act of horizontal character was introduced aiming at liberalising and harmonising Member States' domestic measures regulating services trade (for more details, see Szypulewska-Porczyńska, 2014). Its transposition resulted in the biggest number of implementing acts⁵. It is the Services Directive 2006/123/EC, remaining unchanged since its adoption, and only supplemented by new regulations. Most legislation to improve the functioning of the Services Directive has been adopted in the EU in recent years as part of the 2015 Strategy on Upgrading the Single Market (for details, see European Commission, 2015). Several years later, competition in the services market would be also included in the national structural reform programmes as a part of the European Semester – the main framework for coordination of EU countries' economic policies.

Table 1 shows the progress in implementing the actions outlined in the EU's 2015 Strategy. Some of them entered into force in a limited form, some are awaiting further consideration, some have been rejected by legislative institutions.

As the first, least problematic proposal for a legal act implementing the 2015 strategy action in the services sector, the Commission has submitted a proposal for a Regulation of the European Parliament and of the Council on addressing geo-blocking. Adopted two years later, Regulation 2018/302 refers to barriers introduced in the EU internal market by traders in the form of restricting access to their internet interfaces or unjustified application of different general conditions of access to goods and services that hinder or prevent concluding cross-border transactions with customers from other Member States. Both consumers and businesses are now protected from discriminatory practices, with the latter being covered only in case of purchases for end use (Regulation (EU) 2018/302, recital 16). Regulation 2018/302 defines situations in which geo-blocking is unjustified. Thus, among others, a trader, for reasons related to the customer's nationality, place of their residence or place of business, must not limit their access to an online interface or redirect them to another version of the interface without the customer's consent (Regulation (EU) 2018/302, Article 3(1) and 3(2)).

⁴ It is worth mentioning that during the 2000–2020 period the European Union implemented two ten-year strategies: the Lisbon Strategy and Europe 2020. Both of them fell on challenging times: enlargement of the Union by the countries of Central and Eastern Europe, global financial and economic crisis and debt crisis in the euro area.

⁵ The number of domestic acts required to transpose the Services Directive given by the European Commission in its response to the European Court of Auditors report *Has the Commission ensured effective implementation of the Services Directive?* amounted to 1 584. See European Court of Auditors, 2016, p. 46.

Table 1.

Progress in implementing the actions outlined in the EU 2015 Strategy as at the end of the third quarter of 2019

Area	Document	Stage	Key provisions
Entry and conduct restrictions in regulated professions	<i>Directive (EU) 2018/958 of the European Parliament and of the Council on a proportionality test before adoption of new regulation of professions</i>	Act adopted in June 2018	Defining the methodology for assessing the proportionality of regulations
	<i>Proposal for a Regulation of the European Parliament and of the Council introducing a European services e-card and related administrative facilities</i>	Procedure stopped in the Council at first reading. The proposal for a regulation was not supported by a parliamentary committee.	Introduction of a passport confirming compliance with the requirements in the country of origin
Retail establishment and daily operations	<i>Communication from the Commission</i>	Published in April 2018	Identifying best practices in the EU and developing guidelines for EU countries
Electronic commerce and other forms of cross-border shopping	<i>Regulation on addressing unjustified geo-blocking</i>	Act adopted in February 2018	Introduction of legal provisions prohibiting geo-blocking
Notification procedure established by Directive 2006/123/EC	<i>Directive on the enforcement of Directive 2006/123/EC</i>	The proposal is awaiting consideration at first reading	<ul style="list-style-type: none"> ▪ Unconditional nature of the obligation to notify requirements 3 months before introduction ▪ Suspension of requirements for 3 months if the Commission issues a warning ▪ The possibility for the Commission to issue a legally binding decision requesting the state to suspend or repeal requirements

Source: Author's elaboration.

In early 2017, the European Commission presented further legislative proposals regulating three service areas. The Commission's proposals related to: the adoption of a notification procedure for authorisation schemes and requirements related to services, the implementation of a proportionality test before adoption of new regulation of professions, and the introduction of the European services e-card (for details, see European Commission, 2016a; European Commission, 2016b; European Commission, 2016c; European Commission, 2016e). In addition, in 2018, in its Communication on the European retail sector to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, the Commission provided

legal guidance and best practices to help Member States assess their legal framework and introduce less restrictive measures.

Only one proposal from this 'service package'⁶ has been implemented in EU law so far. It was the proposal for a Directive of the European Parliament and of the Council on a proportionality test carried out when reviewing existing provisions restricting access to professions or before adopting new regulations on professions. Adopted in 2018, EU Directive 2018/958 established the main criteria that Member States should consider when assessing the proportionality of requirements restricting access to or the exercise of regulated professions (Directive (EU) 2018/958). Those criteria include among others: the type of threats related to the achievement of public interest objectives, the possibility of applying less restrictive measures, the relationship between the required qualifications and activities, the effects of measures (Directive (EU) 2018/956, Article 7). The principle of necessity has also been clarified in EU Directive 2018/958. The catalogue of overriding reasons of public interest justifying the existence of barriers on the access to or on the exercise of professions contained in EU Directive 2018/958 includes such considerations as: 'preserving the financial equilibrium of the social security system; the protection of consumers, of recipients of services, including by guaranteeing the quality of craft work, and of workers; the safeguarding of the proper administration of justice; ensuring the fairness of trade transactions; the combating of fraud and the prevention of tax evasion and avoidance, and the safeguarding of the effectiveness of fiscal supervision; transport safety; the protection of the environment and the urban environment; the health of animals; intellectual property; the safeguarding and conservation of the national historic and artistic heritage; social policy objectives; and cultural policy objectives' (Directive (EU) 2018/958, Article 6).

In the third quarter of 2019, after more than two years from the time the Commission submitted its proposal, the debate on the draft Directive of the Parliament and the Council defining the notification procedure established by Directive 2006/123/EC has been not completed as part of the trialogue. The Commission proposal would introduce, in particular, the obligation to notify draft legal acts, and extend it to other regulatory requirements not covered by the notification procedure under the Services Directive (e.g. professional liability insurance, restrictions on multidisciplinary activities), and empower the Commission to decide on the compatibility of a national measure with provisions of the Services Directive and increase the severity of the consequences of non-compliance with the obligations arising from the Services Directive. The proposal

⁶ The term 'service package' is used with regard to various EU initiatives, e.g. to the initiatives of the European Commission of 2012 (European Court of Auditors, 2016) or those launched in 2017 (Council of the EU, 2017).

to tighten enforcement measures of the Services Directive received a negative opinion from the European Economic and Social Committee (EESC), which considered the approach based on consultation and implementation of best practices to be more effective in the context of the political crisis in some Member States (European Economic and Social Committee, 2016b). The EESC has concluded that the proposal for a notification procedure did not strike a balance between the implementation of the economic freedoms contained in the Services Directive and the maintenance of a high level of workers' rights and consumer protection contained in primary EU law, in particular the Charter of Fundamental Rights. The EESC suggested that extending the scope of the notification procedure and law enforcement measures, as well as the complexity of the proposal, would limit the discretion of national legislators. The EESC did not agree that the Commission's negative decisions regarding the compliance of draft national measures should be binding. Instead, the EESC proposed a positive approach in the form of granting 'compliance guarantees' for national draft measures. It is worth adding that the Commission proposal also received negative opinions from some national parliaments, i.e. in France and Germany, accusing the proposal of violating the principles of subsidiarity and proportionality (European Parliament, 2020).

At the European Parliament's first reading stage, the Committee on the Internal Market and Consumer Protection proposed amendments limiting the scope of the notification obligation, minimum notification time and introducing some exceptions (European Parliament, Legislative Observatory, 2016). Since the mandate of the European Parliament and the Commission was limited to 2019, discussions within the tria-logue will be conducted in other configurations of these EU institutions. In February 2019, the European Commission opposed the compromise proposed by the Council.

Due to the negative result of voting in the same parliamentary committee, another draft regulation did not come into force, which would allow easier and faster confirmation of compliance with standards in the host country by service providers from other Member States (European Commission, 2016f). Also the proposal for a European directive accompanying this regulation has remained at the stage of first reading in Council. Similarly to the European professional card adopted in 2015 for five regulated professions (for more details, see Szypulewska-Porczyńska, 2017). the e-card was to be voluntary and enable a wider inclusion of the country of origin in the procedure for recognising professional qualifications. The Commission's proposal provided for an e-card of services for both cross-border activities and the secondary establishment (branch, agency, office) (European Commission, 2016d). In its resolution on the Single Market Strategy adopted in 2016, the European Parliament highlighted three aspects related to this tool. According to the European Parliament, there is a need, first of all, to adapt the passport to the tools already operating in the internal market, such as The

Internal Market Information System and One-Stop Administrative Shops; secondly, to take into account regulations restricting EU freedoms permitted by the Court of Justice on grounds of overriding public interest. Thirdly, Parliament expressed its opposition to the introduction of the country of origin principle (European Parliament, 2016b). The last issue was also later raised by the EU legislative advisory bodies and lobbying groups such as the European Construction Industry Federation and the European Trade Union Confederation (European Committee of Regions, 2018; European Economic and Social Committee, 2016a; FIEC, 2018; ETUC, 2018). According to e-card critics, the proposed changes would lead to the introduction of the country of origin rule, and thus to the limitation of the host country's competence. In their view, the host country should be fully responsible for checking national requirements. In its opinion, the EESC also referred to the revision of the Posting of Workers Directive by EU legislative institutions, calling for the introduction of the principle of '*equal pay for equal work at the same workplace*'. This principle referred directly to the so-called 'social dumping' issue raised two years earlier, i.e. in 2016, by the European Parliament in its resolution (European Parliament, 2016a).

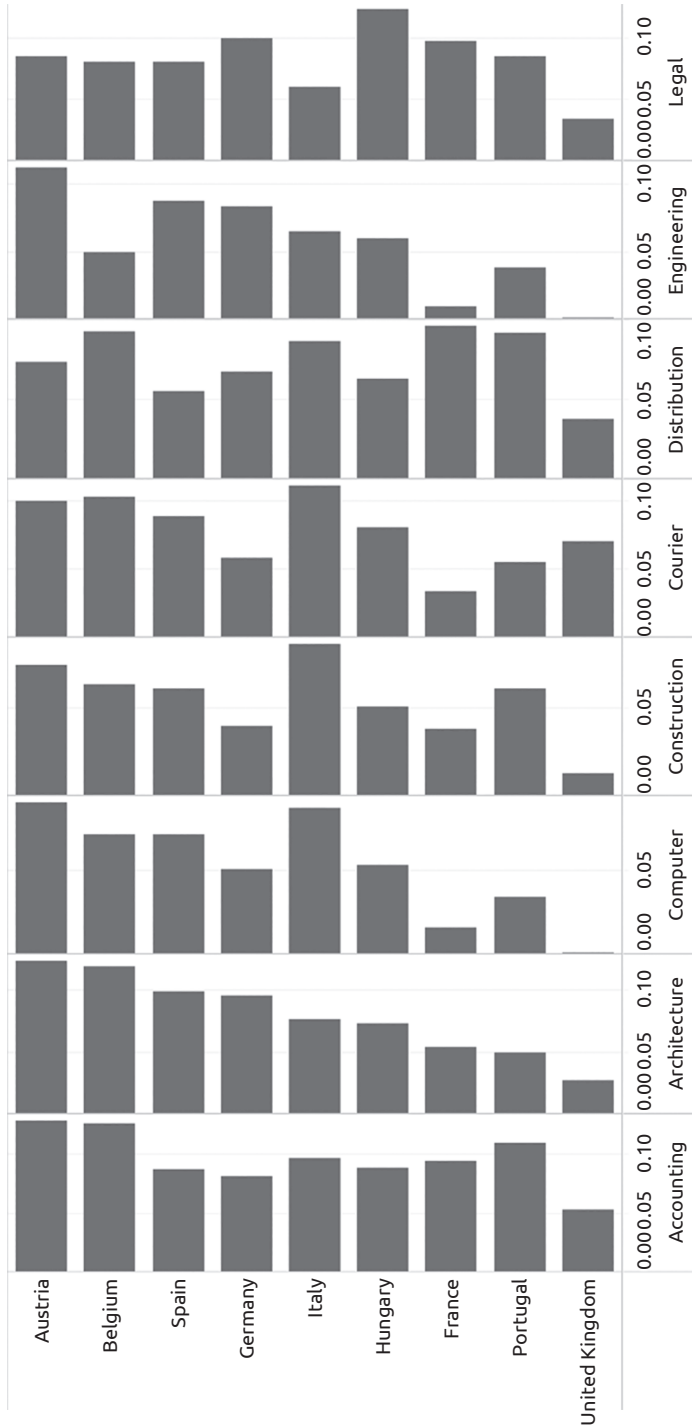
The implementation of the 2015 strategy also included other horizontal measures, such as the adoption in December 2018 of a regulation on cooperation between national authorities responsible for enforcing consumer protection laws (Regulation (EU) 2017/2394), or providing guidelines to EU countries as part of the European Semester.

2. Restrictiveness of barriers on trade in services in the UE

Looking at the last Council recommendations made under the European Semester in July 2019, the overall view that emerges is that although in a minority of EU Member States (MSs) competition in the services sector has been recognised as insufficient, the list of these countries contains the biggest EU economies and services traders. These countries are Austria, Belgium, Germany, Spain, France, Croatia, Hungary, Italy and Portugal (European Commission, 2019). Except for Croatia for which there are no data, these countries will be subject to a more detailed analysis.

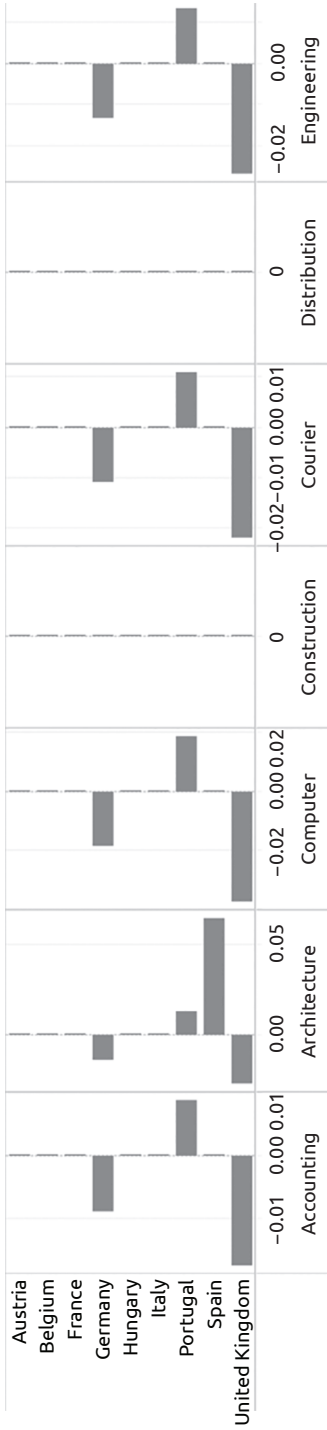
Figure 1 shows the level of restrictiveness of barriers on the provision of services in the analysed EU MSs for sectors covered by Directive 2006/123/EC. The analysis indicates that services sectors such as construction, computer and engineering showed the lowest (the least restrictive) score in 2019. The sectors that showed the most restrictive impediments in the analysed group were accounting, legal and architecture.

Figure 1
Restrictiveness of intra-EU services trade barriers in 2019 in selected EU MSs



Note: The STRI indices take values between zero and one, one being the most restrictive.
Source: Author's elaboration based on OECD Intra-EA STRI database, accessed on 27 February 2020.

Figure 2
Changes in restrictiveness of intra-EU services trade barriers between 2014 and 2019 in selected EU MSs



Source: Author's elaboration based on OECD Intra-EEA STRI database, accessed on 27 February 2020.

Austria, Belgium and Italy recorded the highest values of the STRI index (the most restrictive) in 2019. The UK, used as a benchmark, showed the least restrictive environment for services providers among EU MSs in 2019, with exception for courier services. Engineering and computer services showed no restrictions in this country (including those on foreign entry, movement of people and competition).

A comparative analysis of changes in levels of Intra-EEA STRI indices taking place between the years 2014 and 2019 leads to the conclusion that in the majority of countries considered, those levels have not changed over the last six years (Figure 2). The major exceptions were Germany, where all services sectors recorded a lower (less restrictive) value of the Intra-EEA STRI index, and Portugal that recorded a higher (more restrictive) score on the Intra-EEA STRI in 2019 except for distribution and construction for which the STRI index has remained unchanged in both countries over the period covered by the data. It may be worth mentioning that the UK, having the lowest score on the Intra-EEA STRI in 2019, has experienced the biggest services market liberalisation since 2014.

Conclusions

The European Union has markedly intensified its efforts to integrate the EU MSs services markets over the last twenty years. The period covered by this study witnessed the adoption of the broadest piece of legislation in UE history, i.e. Directive 2006/123/EC, and many successive legislative acts and other documents of nonbinding nature.

These actions have followed the changes that occurred in modern developed economies where services had dominated gross and value-added exports and accounted for the largest part of their GDP and employment. What is more, reducing impediments to services flows help to unleash the potential of servitisation.

However, unfavourable macroeconomic conditions that occurred in parallel with the largest enlargement of the grouping have impacted the methods of services markets integration by shifting them towards softer tools of governance. Moreover, some EU initiatives have been postponed or rejected in the EU legislative process.

Hence, one cannot expect significant reductions in the level of restrictiveness of EU domestic measures concerning services trade in the EU internal market. The empirical analysis presented in this study has confirmed that.

The two exceptions were Germany and the UK, which liberalised their services markets – without, however, having in place, especially the UK, the most restrictive measures related to services trade in the group concerned. It should also be observed that even in these countries the changes were minor, as the overall level of Intra-EEA STRI index was not very significant.

Further analysis extended to other EU MSs as well as to non-preferential treatment could shed additional light on the problem.

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4

INDUSTRY 4.0. CHALLENGES FOR EUROPEAN INDUSTRY DERIVING FROM SERVITISATION AND DIGITALISATION

Adam A. Ambroziak*

Introduction

A new concept of the Industry 4.0 revolution is completely different from the previous ones. At this point, it is worth reminding that mechanisation, i.e., the invention and use of the steam engine, marks the beginning of the industrial age Industry 1.0. The next step included electrification which replaced less efficient steam engines with electric engines able to continuously manufacture products at relatively low energy cost (Industry 2.0). Compared to the previous revolution, waiting for Industry 3.0 based on narrowly interpreted digitalisation (digital input of data into machines) took much longer. Over this period, we could observe the development of increasingly more powerful computers that control manufacturing processes. Machines became more productive, precise, and flexible while digitalisation enabled reaching further advancement in

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automation. New planning and control systems started to emerge, intended to coordinate production activities.

The main components of Industry 4.0 are integration and networking taken together, dependent of each other and supporting each other via the Internet. It is considered a new industrial scenario in which the convergence of different emerging technologies strengthened by the Internet of Things (Rong et al., 2015) results in cyber-physical and intelligent systems that can create value for the industrial activities. Partially, it describes a new industrial scenario dominated by information technologies and connectivity, and, in consequence, it is focused on the establishment of intelligent products and production processes by integrating modern information and communication technologies, and they emphasise different faces of the new industrial challenges (Frank, 2019).

Firstly, the point is to connect consumer behaviour, expectations, and priorities with manufacturers' offerings. To this end, consumers often get not only a finished product but also a communicating device taking the form of software which enables real time monitoring of how available options are utilised and facilitates filing orders for new products. This solution, through *de facto* integration of people with available systems, helps in current adjusting of an offered product (or service) with consumer expectations.

Secondly, within the framework of Industry 4.0, we can identify relations between machines through digital control over the Internet and IT technologies. That concept leads to the Internet of Things and remote monitoring (Grubic, 2014). In this case, the goal is to ensure the manufacturing of goods or the provision of services (also linked with industrial products), supply and assemble indispensable components that communicate with one another at the manufacturing stage. A reverse flow of information takes place between machines engaged in production and the production system of a company (Liao et al., 2017; Reischauer, 2018; Yin et al., 2018). A more advanced level of cooperation needs cloud computing (Wen and Zhou, 2016), big data (Opresnik and Taisch, 2015) and predictive analytics (Ardolino et al., 2017).

Taking into consideration the aforementioned issues, the Industry 4.0 revolution has triggered clearly more economical and socially responsible use of resources to meet consumer needs. The above-mentioned needs are identified at individual level and in real time, which surely accelerates the meeting of individualised consumer expectations and needs. As a result, by networking and the exchange of data between products and consumers in the fourth industrial revolution, companies can make their production processes more economical, taking account of the environmental, economic, and social aspects.

It is worth noting that previous discussion on the EU industry was focused especially on some old-fashion problems: protectionism v. interventionism, sectoral v. horizontal

approach, (Ambroziak, 2014, 2017a, 2017b; Gawlikowska-Hueckel, 2016) while rarely on new technological challenges. This is an evidence of very rapid changes in innovations implemented in industry, including those related to digitalisation. Therefore, the goal of this chapter is to assess the readiness of the EU and its Member States' economies to embrace the fourth industrial revolution in the field of digitalisation. To this end, the engagement of European companies in digitalisation was assessed by carrying out a multilevel analysis of: a) changes in the share of companies using the ERP software package to share information between different functional areas, b) the use of software solutions, such as Customer Relationship Management or Customer Relationship Management to analyse information about their clients for marketing and business purposes, as well as, c) the use of cloud computing services, d) big data, and e) their digital integration with third partners, taking into account their host Member States, size of companies and economic activity sectors. All data were received from Eurostat.

The above listed business management packages and systems used by companies to communicate internally or externally with their suppliers, buyers and customers, but also to exchange information and work using cloud computing or to collect, analyse and interpret Big Data sets received in the course of their activities, transfer business operations into Industry 4.0 networking. Apparently, the processes should be carried out in parallel, since, without internal integration of individual departments within a company and external integration with other business partners (suppliers and buyers) based on cloud computing, it is hard to imagine how consumer expectations and needs, often individual and revealed through collected and examined Big Data, could be met successfully.

1. Development advancement and dynamics of selected sectors and Member States in the context of Industry 4.0

In order to more precisely identify digital integration and development advancement of companies, groups of economic sectors have been singled out which are viewed as components of Industry 4.0 revolution. Following an arbitrary approach, manufacturing as well as service sectors have been selected for further analysis (Table 1). In 2017, the broadly understood manufacturing sector covering electric and machine engineering and computer industry, whose specificity linked with multi-component specialisation makes it uniquely placed to benefit from the Industry 4.0 revolution, reported a rather significant share and growth compared to 2010. At the same time, the share of industrial sectors dominated by traditional raw material suppliers started to decrease and grew at a much slower pace over those years. Besides manufacturing sectors, the

analysis included some services which support industry in the period of transformation through the servitisation of finished goods but also through mutual integration including also by communication and shared management.

Table 1
Ranking of sectors covered by the research by share and increase of value added in the European Union in 2010–2017

Sector	Name of the sector used in the paper	Share in value added in 2017	Change in value added in 2010–2017
L68 – Real estate activities	Real estate activities	15.3%	20.9%
G45–47 – Wholesale and retail trade; repair of motor vehicles and motorcycles	Wholesale and retail trade	15.3%	19.2%
C26–33 – Manufacture of computers, electric & optical products, electrical equipment, machinery & equipment n.e.c., motor vehicles, other transport equipment, furniture, other manufacturing, repair & installation of machinery & equipment	Manufacture of electromachinery	12.9%	35.1%
M69–74 – Professional, scientific and technical activities	Professional and science services	9.0%	25.7%
F41–43 – Construction	Construction	7.3%	10.9%
J58–63 – Information and communication	Information and communication	6.8%	23.2%
H49–53 – Transportation and storage	Transport	6.7%	19.5%
N77–82 – Administrative and support service activities	Administrative and support services	6.2%	36.1%
C19–23 – Manufacture of coke, refined petroleum, chemical & basic pharmaceutical products, rubber & plastics, other non-metallic mineral products	Manufacture of chemicals	5.0%	26.8%
C10–18 – Manufacture of products based on: food, beverages, tobacco, textile, leather, wood, pulp and paper; publishing and printing	Manufacture of agri-food products	4.9%	18.8%
I55–Accommodation	Accommodation	4.0%	30.2%
D35–E39 – Electricity, gas, steam, air conditioning and water supply	Utilities supply	3.8%	12.4%
C24–25 – Manufacture of basic metals & fabricated metal products excluding machines & equipment	Manufacture of metal products	2.8%	27.7%

Source: Eurostat.

In addition, based on the outcomes of the analysis of increase in the cumulative value added generated by sectors covered by the research over the period 2010–2017 and their importance in the total value added of individual economies, Member States have been divided into leaders, moderate and modest Member States in terms of the

importance of manufacturing and services directly linked to the Industry 4.0 concept (Table 2).

Table 2

Ranking of Member States by share and change of value added of sectors under research in 2010–2017

Category	Member State	Share in 2017	Change 2017/2010
I group (leaders)	CZ	81.9%	1.03
	SK	79.7%	1.00
	DE	78.3%	1.03
	RO	78.2%	1.02
	LT	77.2%	1.04
	SI	76.9%	1.05
	PL*	76.3%	1.03
	HU	76.3%	1.02
	AT	75.4%	1.01
II group (moderate)	EE	74.4%	1.03
	EU28	73.3%	1.03
	LV	72.5%	0.99
	ES	71.5%	1.01
	BG	71.2%	1.04
	PT	71.0%	1.06
	FI	70.9%	1.01
	HR*	70.4%	1.03
	UK*	70.3%	1.06
	SE	70.3%	1.01
	FR	70.3%	1.01
	IE*	70.0%	1.07
III group (modest)	BE*	69.3%	0.99
	EL	66.9%	1.01
	DK	66.8%	1.08
	NL	66.8%	1.06
	CY	64.2%	1.03
	MT	58.9%	1.06
	IT	57.3%	0.80
	LU	51.9%	1.01

*) Data for 2016.

Source: Eurostat.

2. Enterprise Resource Planning (ERP) and Customer Relationship Management (CRM)

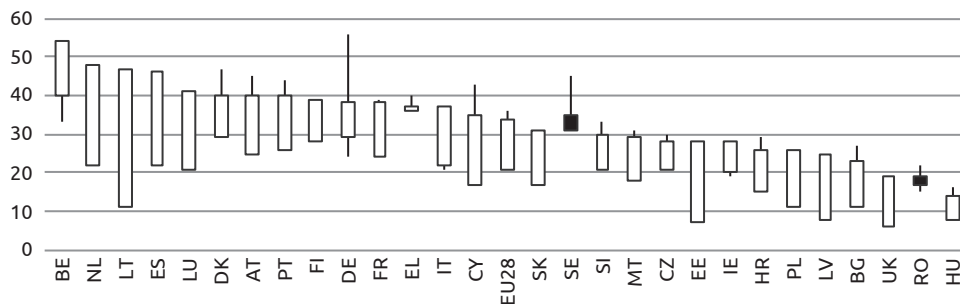
ERP systems are large-scale enterprise software packages that consist of several integrated subsystems, enabling planning and control of resources and processes of a company (Davenport, 1998). In consequence, ERP software provides a wide-ranging set of capabilities across all business operations, including many modules, for example: accounts receivable, accounts payable, sales and marketing, purchasing, human resources, inventory management, warehouse and transportation management, product management, planning, and production. Thus, it can cover many organisation activities: human resources, accounting, corporate governance, production, procurement, distribution, sales and sometimes customer services to collect necessary information on customer experiences. It should be noted that some ERP software can be more specialised and dedicated to selected sectors and activities of industries (Panorama Consulting Group, 2019). It means that a company using ERP can collect and store data, and from their interpretation get information on its activities, relations with partners and customers that is consistent, timely and reliable across organisational units and geographical locations (Barth and Koch, 2019).

It is worth noting that the ERP system often includes or is complemented by Customer Relations Management (CRM). CRM was originally associated with describing systems and tools used to automate sales processes (Payne and Frow, 2005). Being viewed as information-enabled relationship marketing (Ryals and Payne 2001), nowadays, CRM software is designed to focus capabilities to handle marketing and customer management, to organise and collect appropriate data on current and potential customers. It should ensure improving a relationship between a company and its customer based on some communication channels, including websites, telephone, e-mail, social media or dedicated applications – all media based on the Internet. This means it helps in contacts with management and sales management to improve productivity (Salesforce, 2019) by increasing individual approach to customers and maximising consumer satisfaction.

When it comes to digital integration of internal operations of European companies, the highest share of enterprises who use ERP software package to share information between different functional departments was declared in Belgium (54%), the Netherlands, Lithuania (the highest growth), Spain, Luxembourg, Denmark, Austria, and Portugal, with the lowest share reported in 2017 in Latvia (25%), Bulgaria, the United Kingdom, Romania, and Hungary (Figure 1). It is noteworthy that the biggest increases over the period covered by the research were observed for leaders of the 2017 ranking,

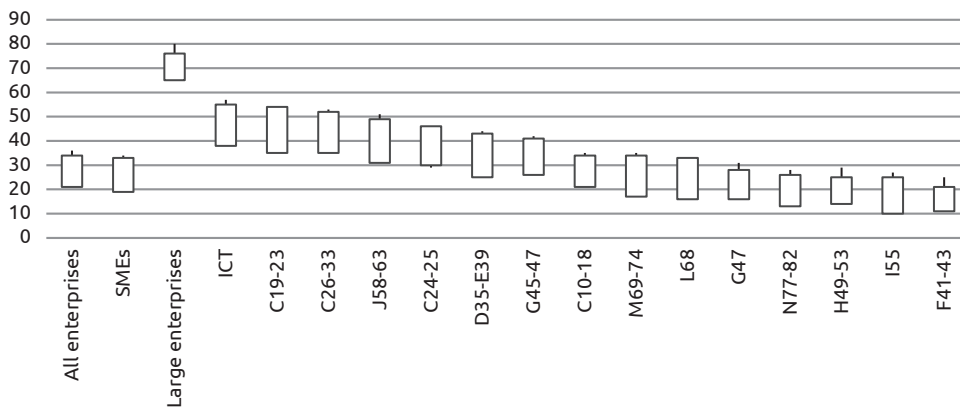
meaning recent years had a powerful impact upon their current position. Two Member States reported a decrease (Sweden and Romania, but also, e.g., Germany if we take account of mid-term data).

Figure 1
Changes in the share (min and max) of enterprises who use ERP software package to share information between different functional areas in 2010–2017



Source: Eurostat.

Figure 2
Changes in the share (min and max) of enterprises using ERP software package to share information between different functional areas broken down by size and sector in 2010–2017



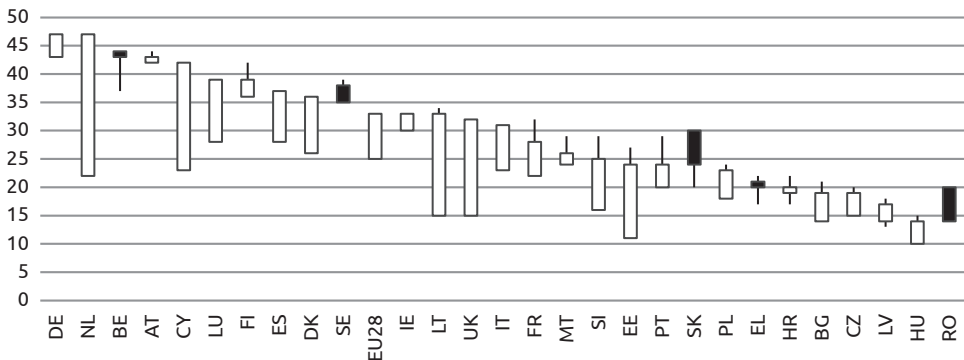
Source: Eurostat.

In 2017, more than three-fourths of large companies (compared to one-third of SMEs) declared using the ERP software systems (Figure 2). Sector-wise, the system was used

mainly by companies representing sectors such as manufacture of chemicals (C19-23), manufacture of electromachinery (C26-33), manufacture of metal products (C24-25), and information and communication services (J58-63). They also reported the highest growth between 2010 and 2017. On the other hand, the smallest growth dynamics and, as a result, the lowest share of enterprises using the ERP systems was found in transport (H49-53), accommodation (I55), and construction (F41-43) services.

The use of Customer Relationship Management (CMS) systems in the EU looks slightly different if we compare it to the integration of companies within the framework of ERM. The biggest share of companies using this type of software solutions was identified in Germany, the Netherlands, Belgium, Austria, and in Cyprus (more than 40%) while the lowest share in Bulgaria, the Czech Republic, Lithuania, Hungary, and Romania (below 20%) (Figure 3). Noteworthy, in this case the biggest growth (with the exception of the Netherlands and Cyprus) was reported in the Member States in which the share of such companies was close to the EU-28 (33%) average (Latvia and the UK).

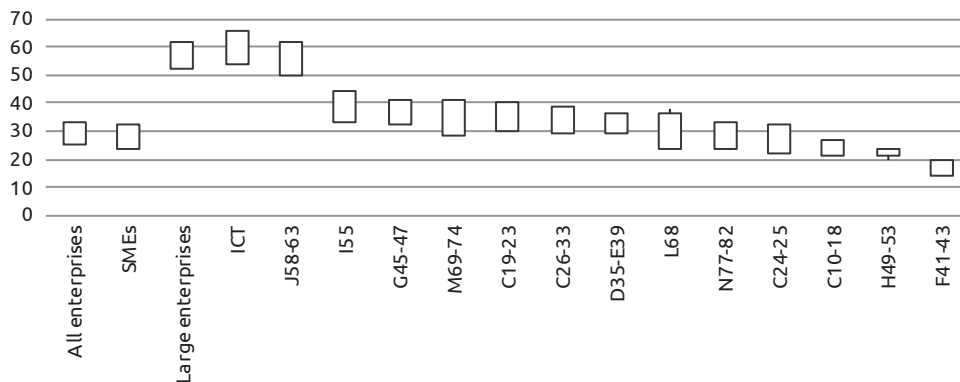
Figure 3
Changes in the share (min and max) of enterprises using software solutions like Customer Relationship Management in 2010–2017



Source: Eurostat.

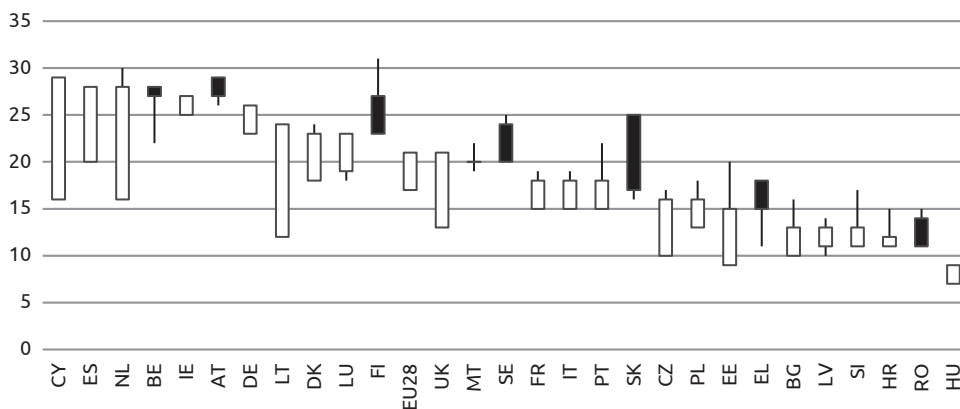
Also in the case of CRM systems, the share of large enterprises using the software clearly outnumbered the share of SMEs (62% and 32%, respectively) (Figure 4). In terms of economic sectors, obvious leaders are IT and communication companies followed by businesses from sectors such as accommodation, wholesale and retail trade, and professional and science services (over 40%). Relatively the least intensive relationships with customers were reported for companies which manufacture agri-food products or offer transport, and construction services (below 20%).

Figure 4
Changes in the share (min and max) of enterprises using software solutions like Customer Relationship Management broken down by size and sector in 2010–2017



Source: Eurostat.

Figure 5
Changes in the share (min and max) of enterprises using Customer Relationship Management to analyse information about clients for marketing purposes in 2010–2017

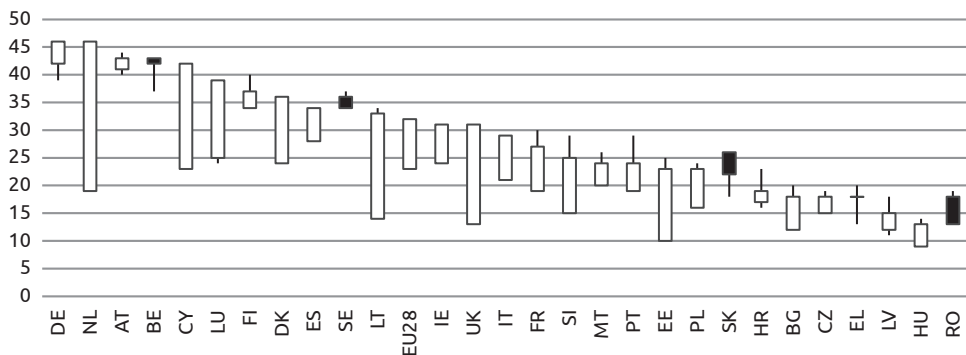


Source: Eurostat.

The above-mentioned system of customer relationship management is used, to a large extent, for marketing purposes. Leaders in this category are companies from Cyprus, Spain, the Netherlands, Belgium, Ireland, and Germany (above 26%), while the lowest share of companies using the CRM system exclusively for marketing purposes

was reported in Bulgaria, Latvia, Slovenia, Croatia, Romania, and Hungary (below 15%) (Figure 5). We need to bear in mind, however, that using data for this purpose is a relatively simple and well known way of managing consumer-related information. Much more complex approach to the subject, also better aligned with the Industry 4.0 concept, consists in collecting and using consumer data for other business goals connected with product individualisation and the servitisation of goods. The highest share of such companies were found in Germany, the Netherlands, Austria, Belgium, and in Cyprus (over 40%), with the lowest and decreasing share identified in the researched period in Croatia, Bulgaria, the Czech Republic, Greece, Latvia, Hungary, and Romania (below 20%) (Figure 6).

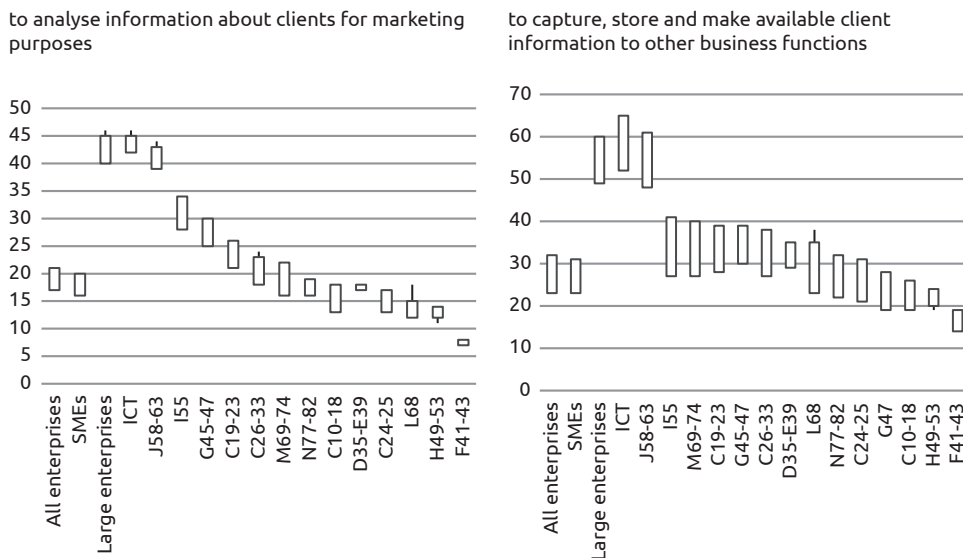
Figure 6
Changes in the share (min and max) of enterprises using Customer Relationship Management to capture, store and make available client information to other business functions in 2010–2017



Source: Eurostat.

Large entrepreneurs clearly dominate in using consumer data only for marketing purposes, as well as for other business purposes (45% and 60% respectively). In both cases, the highest share of such companies was found in IT & communication and accommodation services. Further ranking positions of sectors depended on the purpose for which data were used. In the case of strictly marketing activities, CRM systems were used also in wholesale and retail trade and in the chemical industry while entrepreneurs using the CRM system for other business goals represented a rather wide range of sectors whose performance in this area was very similar: professional and research services, utilities supply, as well as chemical and electromachinery industries (Figure 7).

Figure 7
Changes in the share (min and max) of enterprises using Customer Relationship Management broken down by size and sector in 2010–2017



Source: Eurostat.

The above analysis leads to the conclusion that trends in using both ERP and CRM for various marketing-related purposes and other business functions are convergent in different Member States, as well as sectors of industry and services under research. Member States which reported the highest and quickly growing shares of internally integrated enterprises belong, in most cases, to group III of countries representing relatively low but in recent years the most quickly growing value added in sectors included in the study (DK, NL, CY, LU but also LT and ES). On the other hand, the poorest performing countries were those in which the share of sectors covered by the study was relatively the highest although, admittedly, they did not report any radical increases over recent years (RO, HU from group I and LV, BG from group II). In group I of the states leading in terms of industrial and service structure, it is worth mentioning Slovenia and Poland whose performance was slightly better in digitalisation of internal processes in enterprises.

From the point of view of economic operations, the highest and growing shares of entrepreneurs who use ERP and CRM systems at the EU-28 level were identified in the chemical and electromachinery industries, as well as in accommodation, IT & communication, and professional and science services. Notably, these are sectors (with the

exception of the electromachinery industry) whose shares in total value added of all investigated areas of business operations are relatively low but have been rather significantly increasing in recent years. At the same time, the lowest indicator of internal digitalisation of business processes was found in construction, transport, and administrative and support services.

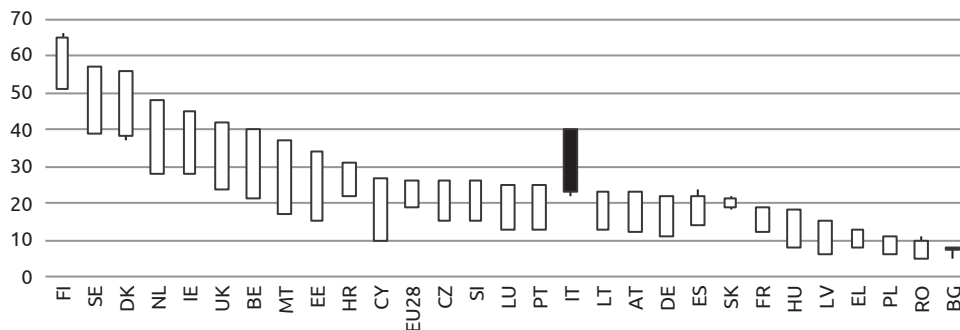
3. Cloud Computing

Using cloud computing services is the third indicator of the preparedness to the fourth industrial revolution. Cloud computing is the latest in a long line/set of technologies that seek to streamline the operation of enterprises. Some might argue that it is not a set of technologies but, rather, a set of services offered using a particular business model and existing technologies (Ingalsbe et al., 2011). Nonetheless, cloud computing represents the shift to an asset free IT provisioning model where highly scalable hardware, software and data resources are available over a network (Hoberg, 2012). The use of cloud computing has the following four characteristics: a) cloud computing has a secure and dependable centre of data storage, b) it can share data between various equipment, c) it can enable users to use the Internet infinitely, d) it does not require high quality equipment from the user (Abdel-Basset et al., 2018).

In the case of cloud computing services, the biggest portion of companies using them started doing so in the years 2014–2018 in countries such as Finland, Sweden, Denmark, the Netherlands, Ireland, the United Kingdom, and Belgium (from 40% up to 65%). These Member States occupy positions between moderate and modest from the viewpoint of the share of sectors covered by the study in 2017 with simultaneous stable growth in the recent period. Over the same period, the lowest indicator and the lowest growth dynamics were reported in Greece, Poland, Romania, and Bulgaria (below 15%), i.e., in Member States with a high share of value added in these sectors and relatively small changes in it throughout the study (Figure 8).

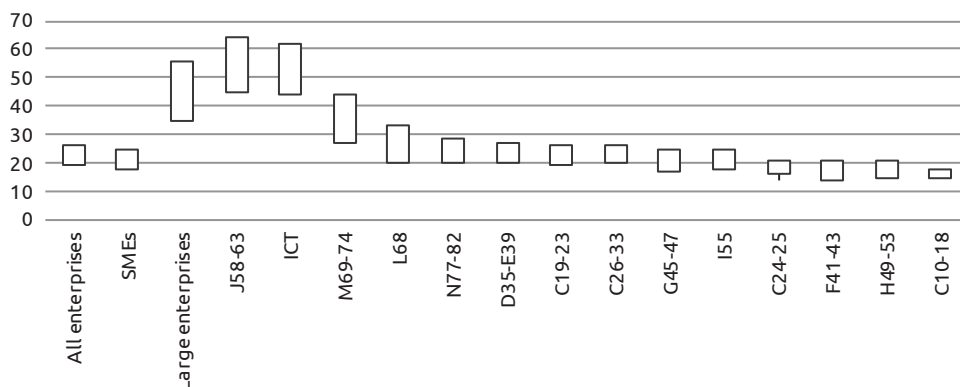
Taking account of economic sectors, the highest share of enterprises using cloud computing services was identified in IT & communication, real estate administration, administrative and support, as well as utilities supply services. There are sectors whose share in the value added slowly increases, although over the investigated period it was clearly lower compared to the leaders (with the exception of real estate administration services). On the other hand, the smallest share of companies using cloud computing was found in construction and transport services as well as in agri-food and metal industries (Figure 9). These sectors report a decreasing share in the value added of economic activities covered by the study.

Figure 8
Changes in the share of enterprises who buy cloud computing services used over the Internet broken down by Member State in 2010–2018



Source: Eurostat.

Figure 9
Changes in the share of enterprises who buy cloud computing services used over the internet broken down by size and sector of activity in 2010–2018



Source: Eurostat.

4. Big Data

Another indicator of the inclusion of companies in the Industry 4.0 concept is Big Data management. Big Data is defined as an extremely large volume of data that are analysed with technology to show the patterns of human development or anything related to society since Big Data leads to more precise analysis and thus helps in more

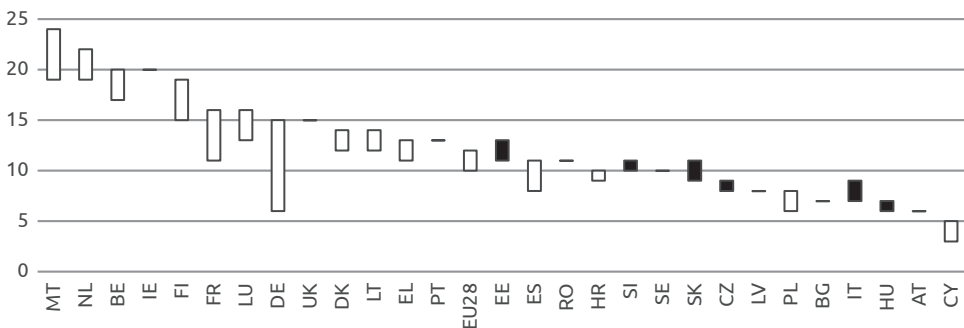
accurate decision making and more efficient work (Anshari and Lim, 2016). Big Data technologies are providing unprecedented opportunities for statistical inference on massive analysis, but they also bring in new challenges to be addressed (Talón-Ballastero et al., 2018). In response to the growth in digital data, Big Data is a term introduced to describe information management and information processing involving data of increasing volume, increasing complexity, increasing variety, and increasing velocity (Fox and Do, 2013). Finally, Big Data is the next frontier for innovation, competition and productivity (Manyika et al., 2011).

The biggest share of companies that analyse Big Data themselves can be found in Malta, the Netherlands, Belgium, and Ireland (above 15%) (Figure 10). In this case, however, growth dynamics is much more important, as it provides information on Member States in which companies have engaged in business networking and use Big Data analyses. In this ranking, Germany is the undisputable leader reporting growth of such companies by 9 percentage points (from a mere 6% in 2016), followed by France and Malta (5 percentage points each). Member States with the biggest share of companies using Big Data, with the exception of Germany, are countries in which the share of the examined sectors in total value added was relatively low in 2017, exhibiting, however, a clearly growing trend in the investigated period.

The smallest proportion of companies carrying out Big Data analyses was identified in Latvia, Poland, Bulgaria, Hungary, Austria, Italy, and in Cyprus (below 9%). With the exception of the last two, in these Member States the share of sectors covered by the study was relatively high and did not change in recent years.

Figure 10

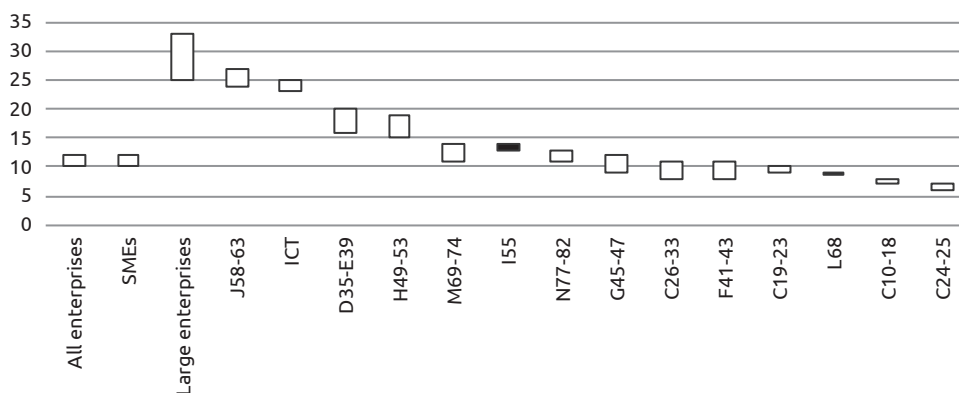
Changes in the share of enterprises analysing Big Data from any data source broken down by Member State in 2016–2018



Source: Eurostat.

When it comes to sectors of economic activity represented by companies which analyse Big Data, their list includes utilities supply, transport, professional and science, accommodation, and administrative and support services. Entrepreneurs from industrial sectors conduct such analyses much more rarely (Figure 11).

Figure 11
Changes in the share of enterprises analysing Big Data from any data source broken down by size and sector of activity in 2016–2018



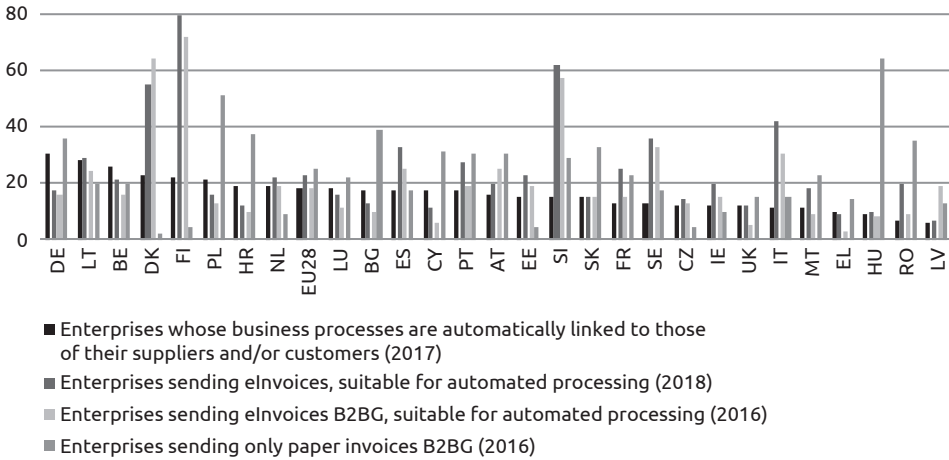
Source: Eurostat.

5. Digital integration of companies with their external partners

The final index that helps in assessing the readiness to embrace the Industry 4.0 concept is the degree of digital integration of companies with their external partners. The index consists of indicators which, on the one hand, address advanced collaboration formats consisting in having a business automatically linked to its suppliers or consumers and, on the other hand, electronic invoicing. The leaders with the highest share of companies exercising business processes automatically linked with external partners are Germany, Lithuania, Belgium, Denmark, Finland, and Poland (above 20%) (Figure 12), with the lowest share of companies automatically linked with their business partners reported by Greece, Hungary, Romania, and Latvia (below 10%). Thus, we may conclude that, for this particular indicator, the division into Member States with a high or low share in the value added in the investigated sectors is not meaningful. In both groups, we may identify Member States with a relatively low as well as very high share and change dynamics in the structure of value added.

Figure 12

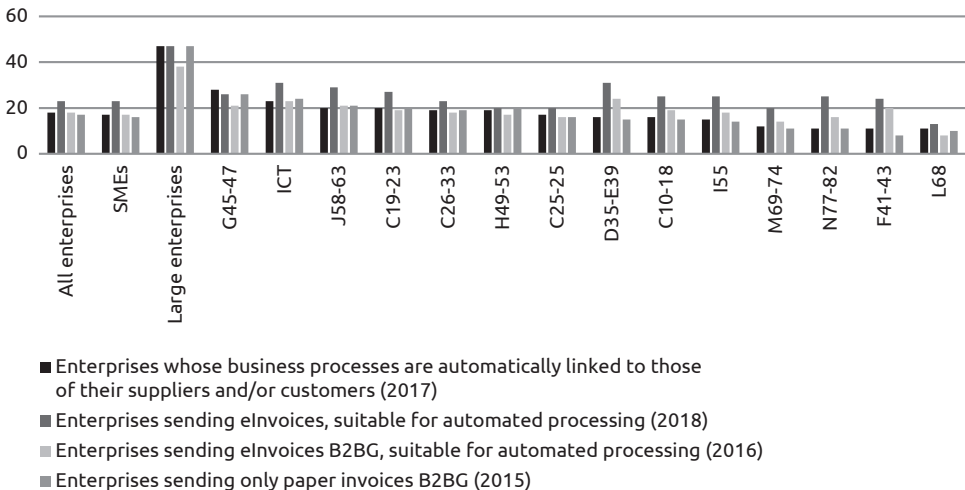
Digital integration of enterprises with external partners by Member States



Source: Eurostat.

Figure 13

Digital integration of enterprises with external partners broken down by size and sector of activity



Source: Eurostat.

Speaking of sectoral classification, the biggest share of companies whose business processes are integrated with their suppliers or consumers was found in the processing

industry, while the lowest in services (administrative and support services, construction and real estate activities), i.e., in sectors where EU-28 value added is relatively the least relevant (Figure 13).

Conclusions

The research conducted has helped in grasping some trends in the readiness of European companies to face the Industry 4.0 revolution. First, which seems obvious, the degree of differentiation in this area in the European Union is very high across the Member States and sectors: from extremely well prepared and clearly willing to get engaged in the process to extreme reduction or even refraining from any activities in the field of digitalisation.

Second, large enterprises are much better prepared to digital integration both internally and in connection with suppliers and customers, including consumers. The SME sector significantly lags behind in this classification, which suggests it should be supported by targeted actions undertaken by the Member States and the EU. The goal is to limit negative effects of the fourth generation industrial revolution which could quite easily lead to the exclusion of SMEs. As a result, we might expect the creation of two big conglomerates based on rather a restrictive EU antitrust policy.

Third, the group of Member States relatively well fitting the idea of Industry 4.0 includes countries in which manufacturing does not play a major role in generating value added. It means that entrepreneurs from these Member States focus on the provision of services to typical manufacturing enterprises. It does not mean, however, that the sector has completely lost in its relevance, as in many cases we can observe that its importance is significantly growing. The Industry 4.0 concept should be thus seen in a wider perspective, taking account of all economic actors: manufacturers, service providers, suppliers of components and raw materials, as well as consumers. Thus, it is not an idea that would promote a widely understood re-industrialisation of the EU; it is a concept focused on using new digital technologies in the economy intended to stimulate sectors in Member State economies whose relevance was less prominent.

Fourth, the group of Member States which reported a relatively high share of economic sectors included in the study, above all manufacturing, performs less impressively in terms of digital integration at internal and external levels, including digital integration with consumers. Apparently, they have given up innovation because of their relatively stronger standing when it comes to value added creation. Yet, the structure slowly evolves to the disadvantage of traditional sectors, which means that in situations

of limited engagement in digitalisation and servitisation of the product offer they might be squeezed out from the market.

Fifth, in some cases, a low share of companies engaged in digitalisation may result from the profile of a given industry, in particular in service sectors or from the size of companies; nevertheless, in the face of the Industry 4.0 revolution, it seems wrong to remain outside of the new trend. In order to more precisely grasp the preparedness of the European industry to the fourth industrial revolution, we need to conduct further studies at the level of individual Member States and sectors.

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