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Regulatory Aspects of Servitisation

Study Materials for Global Law Course

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Course abstract

The course deals with EU regulatory challenges arising from the servitisation of manufacturing and the related sustainability and digitalisation process in the EU economy. Servitisation is a complex interdisciplinary concept that essentially stands for bringing together products and services. Servitisation as an economic megatrend reflects consumers' oriented business models, offering not just products to the buyers, but solutions to their problems. This solution offering is enhanced by digitalization of the economy that makes the relationship between product-service providers and their customers easier to maintain due to various mechanisms of distant communication and monitoring. Moreover, servitisation is at the centre of the endeavours to establish a more sustainable circular economy. Adding services to products can prolong their consumption time, decrease the amount of materials needed for certain effect and improve waste management. Increasingly, however, servitisation is not just related to environmental sustainability, but social as well. These services often require people to be performed and digital applications tend to decrease their rights as workers to the benefit of the owners of these applications.

Albeit traditional non-digital services, such as aftersales repair, remain important, digitalisation of products and services increases effectiveness of the business. Entrepreneurs and consumers alike are looking for digital solutions. If they offer greater sustainability, we are dealing with a winning combination that helps preserve natural resources. Nevertheless, digitally supported servitisation is still primarily

economically motivated and its sustainability does not come automatically. Services providers and consumers alike will act sustainably only if regulation supports such orientation of servitisation business models. Internet enables advanced services. Yet, regulation is needed for this advancement to be both environmentally and socially sustainable.

The course discusses the correlation between economic motives for servitisation, its digital impetus and the (non-)correlation with sustainability goals. Then it focuses on EU regulatory perspective, discussing the issue of institutional alternatives related to servitisation followed by selected regulatory fields where EU action is needed to assure legal safety for entrepreneurs, consumers, workers, as well as not to jeopardize EU strategic goals related to the digital single market and sustainability. Considering its multifaceted character, servitisation inherently touches upon a full spectrum of legal fields. The course focuses on legal challenges of servitisation of manufacturing from competition and consumer law perspective, corresponding to two main motives of servitisation strategies, i.e., locking-out competitors and locking-in consumers. Moreover, it considers servitisation in cross-border trade more generally, thereby highlighting the tight connection between servitisation and globalisation. Finally, the course focuses on sustainability aspects of servitisation and the corresponding EU regulatory process.

The course provides the students with the context for contemporary issues underpinning the EU digitising industry and sharing economy law. The purpose of the course is to introduce methods of teaching, which enable greater participation of students in the academic process. Workshops in small groups are organised to enable the students to work in closer interaction with the course holder and other students, taking the advantage of diverse backgrounds of students and interaction between various opinions. This enables the course holder to constantly follow the students' progress of work and achievement of the expected outcomes. The final aim of the course is to give students understanding of the multifaceted regulatory issues involved in the development of the EU digitising industry and sharing economy.

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Short CV of the course teacher

Janja Hojnik is Doctor of Juridical Science with diplomas in law and economics, Full Law Professor of the University of Maribor, Faculty of Law (Slovenia) and Jean Monnet Chair Professor of EU Law. Advisory Board member of the Common Market Law Review (Leiden University). Vice-Rector of University of Maribor for Quality, HR and Legal Affairs (2018-2022). Vice-Dean for Research (2015-2018 and 2023-2027) and Head of the Doctoral Programme (2016-2018) at the Faculty of Law UM. Teaching and researching in the field of EU Law (internal market, price regulation, international trade, digital economy, research assessment and research ethics). Up to date holder of three Jean Monnet projects of the European Commission. Visiting lecturer at Universities of Ljubljana, Vienna, University of Oxford, Sciences Po (Paris), University of Trieste, Charles University (Prague), University of Sarajevo, Kingston University (London), Luxembourg University, Karel Franzens University (Graz), Central European University (Budapest), Edinburgh Napier University etc. Member of a group of authors preparing a commentary on the Treaty on Functioning of the EU for Springer Publishing (eds. Blanke/Mangiameli), responsible for provisions on free movement of goods.

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1 Introduction – industrial renaissance in Europe

Right at the outbreak of the COVID epidemics in Europe, on 10 March 2020, the European Commission adopted the EU Industrial Strategy[1] to lead the twin transitions towards climate neutrality and digital leadership. In 2021 it was updated to include some COVID lessons.[2] The Strategy outlines three drivers for industrial transformation: global competition, climate neutrality, and a digital future. The EU Industrial Strategy reflects on a new paradigm for the European Union, i.e. the European industrial sovereignty, namely in its strategic autonomy in key technologies and access to raw materials.

Manufacturing in developed economies is under massive pressure.[3] The story of deindustrialization of developed economies started in the 1950's and value added by manufacturing as a percentage of GDP is now less than 15 percent in most OECD

[1] Commission Communication, Identifying and addressing barriers to the Single Market, COM (2020) 93 final.
[2] 2021 update of the EU Industrial Strategy, COM (2021) 350 final.
[3] Andy Neely, 'The Servitisation of Manufacturing: An Analysis of Global Trends' (14th European Operations Management Association Conference 2007). Lena Johansson, 'Servicification of Swedish Manufacturing' (The National Board of Trade, Stockholm 2010).

countries.[4] Levitt's statement of 1972 that *'everybody is in service'*[5] is thus becoming progressively true. Nevertheless, the financial crisis of 2008 and the recession that followed have led many people and companies to seek alternative sources of employment and income and have headed the developed economies in general to recognize the danger of over-reliance on financial services. Moreover, economic recovery proves more difficult in countries with a weak industrial sector. Europe thus needs to *'rebalance'* the economy, with a particular focus on manufacturing.[6] It is believed that *'an industrial renaissance'* or *'reindustrialisation'* can bring jobs and growth back to Europe.[7] Nevertheless, to survive in developed economies providing product alone is insufficient and it is being suggested that manufacturing companies have to move up the value chain, innovating and creating ever more sophisticated products and services, so they do not have to compete on the basis of cost alone.[8] Despite the conventional separation between manufacturing and services, it is increasingly realistic for manufacturers to offer services; in fact, they increasingly base entire competitive strategies on service innovation.[9] Additionally, as the complexity and variety of business activities grow and digitalisation is spreading, the boundary between services and manufacturing becomes increasingly elusive.[10] To describe these processes, a term *'servitisation'* has burgeoned recently, reflecting the fact that we are in the midst of a redefinition of what is manufacturing.

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[4] Matthieu Crozet, 'The Servitisation of French Manufacturing Firms' 2014 CEPII Working Paper. Gintare Kemekliene and others, 'Services Employment in Europe, Now and in the Future' 2007 ETUI-REHS, Background paper for UNI-Europa Conference; Ronald Schettkat and Lara Yocarini, 'The Shift to Services Employment: A Review of the Literature' (2006) 17 Structural Change and Economic Dynamics 127.

[5] Theodore Levitt, 'Production-Line Approach to Service' 50 Harvard Business Review 20. See also Victor R Fuchs, *The Growing Importance of the Service Industries* (National Bureau of Economic Research, New York 1965).

[6] Bruce Tether and Elif Bascavusoglu-Moreau, 'Servitisation: The Extent and Motivations for Service Provision amongst UK Manufacturers' (2012); Finbarr Livesey, 'The Need for a New Understanding of Manufacturing and Industrial Policy in Leading Economies' (2012) 7 Innovations (15582477) 193. Howard Lightfoot, Tim Baines and Palie Smart, 'The Servitisation of Manufacturing: A Systematic Literature Review of Interdependent Trends' (2013) 33 International Journal of Operations & Production Management 1408; Louis Brennan and others, 'Manufacturing in the World: Where Next?' (2015) 35 International Journal of Operations & Production Management 1253. See also European Commission, Towards Knowledge Driven Reindustrialisation, European Competitiveness Report 2013, SWD(2013)347 final, p. 3.

[7] Karl Aiginger, 'The High Road: Europe Must Seize the Potential of Advanced Manufacturing' (*EurActiv*, 26 January 2016); Elżbieta Bieńkowska, 'Reindustrialisation of Europe: Industry 4.0 - Innovation, Growth and Jobs, Speech', *European Commission* (2015).

[8] Michael E Porter and Christian HM Ketels, 'UK Competitiveness: Moving to the Next Stage' (2003) DTI Economics Paper, May 2003; Andy Neely, 'Exploring the Financial Consequences of the Servitisation of Manufacturing' (2009) 1 Operations Management Research 103.

[9] Tim Baines, 'Exploring Service Innovation and the Servitisation of the Manufacturing Firm' (2015) 58 Research Technology Management 9.

[10] Crozet (n 4); Michel Leseure and others, 'Blurring the Boundary: Convergence of Factory and Service Processes' (2010) 21 Journal of Manufacturing Technology Management 341.

A study by Oxford Economics, which conducted an international survey of almost 400 senior executives from industrial sectors, showed that the proportion of companies competing through services contracts or products-as-a-service is expected to increase by more than 150 percent in the next three years.[11] This is not surprising, considering that servitisation is one of the economic megatrends of the modern society, along with globalisation, and encompasses a broad range of business models that are currently happening on the market. Additionally, it is a complex interdisciplinary concept that is increasingly popular among distinct scholar communities with complementary perspectives – ranging from manufacturing, management, marketing, environmental and computer sciences.[12] This fact – along with rapid development of information and communications technologies that have important implications for servitisation – makes dealing with this theme particularly challenging for law researchers and policy makers.[13] Nevertheless, considering the economic and broader societal importance of servitisation, legal scholars and practitioners have to respond to this emerging process by examining legal challenges, particularly those that are linked to information technology as enabler of servitisation. Europe-wide legal procedures against Uber that have led to four cases for preliminary ruling being referred to the EU Court of Justice[14] are just one proof of this point. Moreover, several other EU institutions are amid a multi-dimensional response to this business development, dealing with a variety of aspects, from infrastructural, leadership, skilling as well as regulatory.

This article attempts to outline some of the concrete EU law challenges arising from the servitisation process. Although some aspects of servitisation have already been examined from a legal point of view, legal scholars have not yet discussed these distinct business models as variations of a more general business process, known in non-legal research fields under the term *'servitisation'*. The objective of the course is

[11] Parametric Technology Corporation (PTC), 'Manufacturing Transformation, Achieving Competitive Advantage in a Changing Global Marketplace' (Oxford Economics 2013) J2171-Oxford_Economics_ebook-EN-0513.

[12] *"Service science"* has been developed by computer and information technology scholars, who are focusing not merely on one aspect of service, but rather on service as a system of interacting parts that include people, technology, and business. See Howard Lightfoot, Tim Baines and Palie Smart (n 6); Henry Chesbrough and Jim Spohrer, 'A Research Manifesto for Services Science' (2006) 49 Communications of the ACM 35.

[13] Natalia Kryvinska and others, 'Servitisation - Its Raise through Information and Communication Technologies' in Mehdi Snene and Michel Leonard (eds), *Exploring Services Science* (Springer International Publishing 2014).

[14] Case C-526/15, Uber Belgium BVBA v Taxi Radio Bruxellois NV, ECLI:EU:C:2016:830; Case C-434/15, Asociación Profesional Elite Taxi v Uber Systems Spain, SL, ECLI:EU:C:2017:981; Case C-320/16, Uber France SAS v Nabil Bensalem, ECLI:EU:C:2018:221; Case C-62/19, Star Taxi App SRL v Unitatea Administrativ Teritorială Municipiul Bucureşti, ECLI:EU:C:2020:980.

in this respect to show the many dimensions of servitisation and its impact upon the future development of law.

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2 Servitisation – 'a new paradigm of business operations'[15]

2.1 Definition: a process of creating value by adding services to products

One may admittedly wonder whether 'servitisation' is a proper word at all. The term was coined in 1988 by Vandermerwe and Rada, two management scholars, who wrote about *'the increasing offering of fuller market packages or 'bundles' of customer focused combination of goods, services, support, self-service and knowledge in order to add value to core corporate offerings'*.[16] Later definitions of servitisation explained it as *'the emergence of product-based services which blur the traditional distinction between manufacturing and traditional service sector enterprises'*,[17] as *'a trend in which manufacturing firms adopt more and more service components in their offerings'*,[18] as well as *'a change process wherein manufacturing companies embrace service orientation and/or develop more and better services with the aim to satisfy customer's*

[15] Michael W Toffel, 'Contracting for Servicizing' 2008 Harvard Business School Technology & Operations Mgt. Unit Research Paper, p. 6.

[16] Sandra Vandermerwe and Juan Rada, 'Servitisation of Business: Adding Value by Adding Services' (1988) 6 European Management Journal 314. In the last years this term is rapidly spreading from English to other languages, so one may find "la servitisation" in Italian and French, "Servitisation" in German, "serwicyzacja" in Polish, "servitizacija" in Slovenian, "uslužnost" in Serbian etc.

[17] Allen L. White, Mark Stoughton and Linda Feng, 'Servicizing: The Quiet Transition to Extended Product Responsibility' (Tellus Institute 1999).

[18] Bart van Looy, Paul Gemmel and Roland Dierdonck, *Services Management: An Integrated Approach* (Pearson Education 2003), p. 40.

needs, achieve competitive advantages and enhance firm performance'.[19] Servitisation is thus now widely recognized as the process of creating value by adding services to products.[20]

Vandermerwe and Rada describe that companies initially considered themselves to be in goods *or* services and then moved to offering goods *combined* with closely related services, and finally to a position where companies offer 'bundles' consisting of customer focused combinations of goods *and* services. Other business literature explains that traditionally the tendency has been for managers to view services as unavoidable in the context of marketing strategies – here, the main part of total value creation was considered to stem from physical goods, and services were assumed purely as an add-on to products.[21] From this beginning, it is now believed that a dramatic change has occurred in the way services are produced and marketed by manufacturing companies. The provision of services has now turned into *'a conscious and explicit strategy'* with services becoming a main differentiating factor in a totally integrated products and service offering.[22] In this situation, the services are considered as fundamental value-added activities and the product to be just a part of the offering.[23] This continuum from traditional manufacturer where companies merely offer services as add-on to their products, through to service providers where companies have services as the main part of their value creation is called *'product-service continuum'*[24] and is often used as a starting point for the categorization of different types of servitisation in management research.[25]

[19] G Ren and MJ Gregory, 'Servitisation in Manufacturing Companies: A Conceptualization, Critical Review, and Research Agenda', *Frontiers in Service Conference, San Francisco 2007*.

[20] Tim S Baines and others, 'The Servitisation of Manufacturing: A Review of Literature and Reflection on Future Challenges' (2009) 20 Journal of Manufacturing Technology Management 547; Rogelio Oliva and Robert Kallenberg, 'Managing the Transition from Products to Services' (2003) 14 International Journal of Service Industry Management 160.

[21] Heiko Gebauer and Thomas Friedli, 'Behavioral Implications of the Transition Process from Products to Services' (2005) 20 Journal of Business & Industrial Marketing 70.

[22] Baines and others (n 20) 556.

[23] Rogelio Oliva and Robert Kallenberg (n 20).

[24] ibid; Heiko Gebauer and Thomas Friedli (n 21); Heiko Gebauer, 'Identifying Service Strategies in Product Manufacturing Companies by Exploring Environment–strategy Configurations' (2008) 37 Industrial Marketing Management 278.

[25] Accordingly, Tukker has developed a model of three main forms of business models: product-oriented services, use-oriented services and result-oriented services - Arnold Tukker, 'Eight Types of Product–service System: Eight Ways to Sustainability? Experiences from SusProNet' (2004) 13 Business Strategy and the Environment 246. See also Laura Smith, Roger Maull and Irene C.L. Ng, 'Servitisation and Operations Management: A Service Dominant-Logic Approach' (2014) 34 International Journal of Operations & Production Management 242.

Servitisation is nowadays considered as omnipresent in manufacturing companies in developed economies.[26] Whereas some (traditional) services support the supplier's product (e.g., maintenance), other (more advanced) services support the client's action in relation to the supplier's product (e.g., IT consulting). While the former ensure the proper functioning of the product, the latter enable the supplier to explore how services support particular client's initiatives and advance the operation of customer's company.[27] Accordingly, the most commonly provided service in practice is still delivery of products, followed by the provision of spare parts and consumables, a customer helpline or support desk, and product or systems training.[28] Moreover, servitisation transactions may include renting cars instead of buying them; contracting services of irrigation instead of acquiring irrigation systems; or securing server capacity instead of procuring computers.[29] One of the most archetypal examples of a successful strategy of mixing the supply of goods and services is Rolls-Royce. The Economist reported in 2009 that *'instead of selling airlines first engines and then parts and service, Rolls-Royce has convinced its customers to pay a fee for every hour that an engine runs. Rolls-Royce in turn promises to maintain it and replace it if it breaks down. They aren't selling engines; they are selling hot air out the back of an engine. (…) It is sometimes necessary to be good at making things to sell the services connected with them. At Rolls-Royce it is difficult to see where one begins and the other ends'*.[30] In addition to this model of renting airplanes (called *Power-by-the-Hour*), Rolls Royce has also adopted sensors that are able to monitor 24/7 the airplane engine status (*TotalCare* programme) that is considerably simplifying the maintenance process.[31] Rolls Royce has thus succeeded in transition from being a pure manufacturer to being an integrated solutions provider.[32] Moreover, Volvo is essentially manufacturing cars, but they are today in the entire scale of activities associated with the automobile transportation from

[26] David Opresnik and Marco Taisch, 'The Value of Big Data in Servitisation' (2015) 165 International Journal of Production Economics 174, 174.
[27] Valérie Mathieu, 'Product Services: From a Service Supporting the Product to a Service Supporting the Client' (2001) 16 Journal of Business & Industrial Marketing 39, 40.
[28] Tether and Bascavusoglu-Moreau (n 6) 17.
[29] 'Project Proposes Policy Packages for Servitisation - Eco-Innovation Action Plan - European Commission' (*Eco-innovation Action Plan*).
[30] Editor's Note, 'Britain's Lonely High-Flier' *The Economist* (8 January 2009).
[31] See Marco Ardolino, Nicola Saccani and Marco Perona, 'The Impact of Digital Technologies and Ecosystems on the Servitisation of Companies: A Preliminary Analysis' (Aston, Spring Servitisation Conference 2015), pp. 51-58.
[32] Charlotta Windahl and Nicolette Lakemond, 'Integrated Solutions from a Service-Centered Perspective: Applicability and Limitations in the Capital Goods Industry' (2010) 39 Industrial Marketing Management 1278; Tim Brady, Andrew Davies and David M Gann, 'Creating Value by Delivering Integrated Solutions' (2005) 23 International Journal of Project Management 360. Similarly, Hoyer is offering trucks provided by MAN on a pay-as-you-go basis, Xerox developed advanced document management solutions and Alstom so-called Train-Life services - Baines (n 8) 9.

insurance to gas stations and roadside assistance networks.[33] Although servitisation often involves large multinationals supporting high-value capital equipment, there is a rising number of cases where servitisation is not limited to expensive capital goods. For example, AB Electrolux installs a washing machine in a customer's home, maintains and repairs it when necessary and charges customers by the laundry load.[34] It is now also common for car dealers to offer loans or leasing services to their customers, so they are not just selling products but also services – much the same as Amazon is now offering easier and more comfortable services around the book and IBM has become, with the growth of its software and consultancy, from a manufacturer of computer hardware to a service company.[35] While Uber is offering cheaper and more environmentally sustainable ways of transporting people, by connecting car owners and those in need of a drive over an online platform (i.e. ridesharing), there are many companies and cooperatives (such as Zipcar or Modo Co-op) offering a membership based system of car sharing, where people pay annual membership fees and price per kilometre.

2.2 Other models promoting selling of integrated solutions

Although the word may be new, *'servitisation'* and related concepts that are promoting the idea that it is not necessary to buy products to access the benefits they provide are nothing new. Wilson gives an example of pineapples that were first introduced into Europe in the 17th century and were so expensive that poorer middle-class families would even take to hiring pineapples for occasions when they wished to entertain, in order to appear impressive, praying that no one would in fact try to cut a slice.[36] Nowadays, apart from *'servitisation',* several other related terms describing the same idea may be observed in scholarly papers. Most notable are the following:

[33] Vandermerwe and Rada (n 16) 318. More in Björn Remneland Wikhamn, Jan Ljungberg and Alexander Styhre, 'Enacting Hard and Soft Product Offerings in Mature Industries: Moving Towards Servitisation in Volvo' (2013) 17 International Journal of Innovation Management 1.
[34] Toffel (n 15) 8.
[35] Louis V Gerstner Jr, *Who Says Elephants Can't Dance?: Leading an Enterprise through Dramatic Change* (Harper Business 2002). For a number of other examples across various industry sectors see Gunter Lay, *Servitisation in Industry* (Springer 2014).
[36] Bee Wilson, 'Canned Truth' [2005] Times literary supplement, TLS 36.

servicising,[37] servicisation[38], service infusion,[39] service design,[40] going downstream,[41] new manufacturing,[42] integrated solutions,[43] product of service,[44] tertiarization,[45] functionalization[46] and service-oriented manufacturing (SOM).[47] These expressions may be considered as (less commonly used) synonyms for servitisation. Additionally, there are some other concepts that are sometimes considered as alternative expressions for servitisation – nevertheless, a more profound examination reveals some noticeable differences among these terms. The Swedish National Board of Trade *(Kommerskollegium)* has coined the term *'servicification'* of the economy that describes the situation, where the industry is both increasingly using services in production as well as increasingly offering services to its customers.[48] This concept is thus broader than pure servitisation as defined earlier, considering that servicification may take place throughout the value chain of production – be it at the pre-production activities and inputs (e.g. taking a loan to buy material), during manufacturing and assembly (e.g. cleaning services in the factory), at sales and after-sales activities (e.g. installation and maintenance) or in relation to the product or 'solution' (e.g. technical consulting and training of personnel in the customer's factory).[49] Moreover, in French, the term *'la*

[37] Toffel (n 15).
[38] James Brian Quinn, Thomas L Doorley and Penny C Paquette, 'Beyond Products: Services-Based Strategy.' (1989) 68 Harvard Business Review 58.
[39] Saara Brax, 'A Manufacturer Becoming Service Provider – Challenges and a Paradox' (2005) 15 Managing Service Quality: An International Journal 142.
[40] JC Aurich, C Fuchs and MF DeVries, 'An Approach to Life Cycle Oriented Technical Service Design' (2004) 53 CIRP Annals - Manufacturing Technology 151.
[41] Richard Wise and Peter Baumgartner, 'Go Downstream: The New Profit Imperative in Manufacturing' (1999) 77 Harvard Business Review 133.
[42] Jane Marceau and others, 'Selling Solutions: Emerging Patterns of Product-Service Linkage in the Australian Economy' Australian Expert Group in Industry Studies University of Western Sydney 2002.
[43] Adrian Wilkinson, Andy Dainty and Andy Neely, 'Changing Times and Changing Timescales: The Servitisation of Manufacturing' (2009) 29 International Journal of Operations & Production Management; Andrew Davies, 'Moving Base into High-Value Integrated Solutions: A Value Stream Approach' (2004) 13 Industrial and Corporate Change 727.
[44] William McDonough and Michael Braungart, *Cradle to Cradle: Remaking the Way We Make Things* (Macmillan 2010) 111.
[45] Leo, P.-Y. and J Phillippe, 'Offer of Services by Goods Exporters: Strategic and Marketing Dimensions' (2001) 21 The Service Industries Journal 91.
[46] Walter R. Stahel, 'The Utilization-Focused Service Economy: Resource Efficiency and Product-Life Extension', *BR Allenby, DJ Richards (Eds.), The Greening of Industrial Ecosystems* (National Academy Press 1994). See also OK Mont, 'Clarifying the Concept of Product–service System' (2002) 10 Journal of Cleaner Production 237. The term functionalization refers to *"selling the function of a product or the service it provides, rather than the physical product"* – see Bette K Fishbein, Lorraine S McGarry and Patricia S Dillon, *Leasing: A Step toward Producer Responsibility* (INFORM 2000).
[47] Lu Zhen, 'An Analytical Study on Service-Oriented Manufacturing Strategies' (2012) 139 International Journal of Production Economics 220.
[48] Johansson (n 3).
[49] Kommerskollegium, 'Servicification on the Internal Market – a Regulatory Perspective: The Case of Customisation by 3D Printing' (National Board of Trade, Stockholm 2015), Emilie Aner and Magnus Rentzhog,

désintermédiation' stands for an economic and commercial phenomenon that describes reduction or removal of intermediaries in the distribution circle.[50]

The most important concept among the servitisation alternatives is, however, *'product-service system (PSS)',* a concept originated in the north of Europe at the end of the 1990s that describes companies offering solutions aimed at increasing market share and consumer satisfaction, but also with a parallel objective of reducing the consumption of products through alternative scenarios of product use instead of acquiring it.[51] The leading scholarly authority on PSS is Goedkoop, who defined it in 1999 as *'a combination of products and services in a system that provides functionality for consumers and reduces environmental impact'*.[52] Correspondingly, Mont highlights that PSS offers a system of integrated products and services that are intended to reduce the environmental impact through alternative scenarios of product use.[53] The PSS embodies a transition from *'well-being based on the product'* to *'well-being based on the access to the product'*.[54] In this respect, PSS is sometimes interchangeably used with the so-called *'dematerialization'* that stands for services being used to reduce the amount of materials that go into the product.[55] The difference between servitisation and PSS thus arises in the motivation of the process, considering that the PSS is closely coupled to the debates on sustainability and emphasizes the use of the function of a product without necessarily owning it with the aim of reducing the environmental impact.[56] Nevertheless, although servitisation and PSS have emerged from differing perspectives on the world, they are converging towards a common conclusion that

'Everybody Is in Services - The Impact of Servicification in Manufacturing on Trade and Trade Policy' (The National Board of Trade, Stockholm 2012).

[50] The development of Internet has, for example considerably enhanced *"la désintermédiation"* in the field of tourism. See Frédéric Jallat, 'Désintermédiation et Stratégie Sur Internet: Recomposition Des Filières, Nouveaux Acteurs et Réintermédiatisation' 2000 Revue française du marketing 69.

[51] Fernanda Hänsch Beuren, Marcelo Gitirana Gomes Ferreira and Paulo A Cauchick Miguel, 'Product-Service Systems: A Literature Review on Integrated Products and Services' (2013) 47 Journal of Cleaner Production 222.

[52] Mark J Goedkoop, *Product Service Systems, Ecological and Economic Basics* (Ministry of Housing, Spatial Planning and the Environment, Communications Directorate 1999).

[53] Mont (n 46).

[54] Ezio Manzini, Carlo Vezzoli and Garrette Clark, 'Product-Service Systems. Using an Existing Concept as a New Approach to Sustainability' (2001) 1 Journal of Design Research 0.

[55] MingSheng Li and others, 'Economy-Wide Material Input/output and Dematerialization Analysis of Jilin Province (China)' (2009) 165 Environmental Monitoring and Assessment 263; Joost G Vogtländer, Han C Brezet and Charles F Hendriks, 'Allocation in Recycling Systems' (2001) 6 The International Journal of Life Cycle Assessment 344.

[56] Beuren, Gomes Ferreira and Cauchick Miguel (n 51) 224; Tukker (n 25); Arnold Tukker and Ursula Tischner (eds), *New Business for Old Europe: Product-Service Development, Competitiveness and Sustainability* (Greenleaf 2006); Baines and others (n 19).

manufacturing companies should be focusing on selling integrated solutions and servitisation is nowadays seen as encompassing the PSS theme.[57]

Moreover, the concept of an *'extended product'* has been designed to describe situations where the supplier bundles additional accessories and services around the core product to make the sale more attractive to the customer, who is the end user.[58] Extended product includes a combination of a physical product and associated services, like maintenance, engineering, software etc.[59] and was coined predominantly for the purposes of the principle of extended producer responsibility (EPR) that is pursuing objectives of lower life-cycle environmental impacts for product systems. The concept is thus sometimes used as a synonym for both PSSs and servitisation, since all require manufacturers or service providers to extend their involvement with, and responsibility for, the product to phases in the life-cycle outside the traditional seller-buyer relationship.[60]

Finally, a similar process to servitisation is '*productization'*, describing the evolution of the services component to include a product, e.g. when hairdressers not only use products while carrying out the haircare, but also sell them to increase the profit from customer's visit.[61] In both cases the result of the process is a product-service 'bundle'. Conversely, a concept of *'reversed servitisation'* has been thought up as a path that is contrary to *'forward-unidirectional servitisation'*.[62] It refers to a situation, where companies take steps backward in servitising – the service strategy has been withdrawn based on management decisions in favour of increasing product dominance and more or less traditional manufacturing. While one would expect that

[57] Baines and others (n 20) 554; Tukker and Tischner (n 56).
[58] Thomas Lindhqvist, *Extended Producer Responsibility in Cleaner Production: Policy Principle to Promote Environmental Improvements of Product Systems* (Lund University 2000); Klaus-Dieter Thoben, Jens Eschenbächer and Harinder Jagdev, 'Extended Products: Evolving Traditional Product Concepts' [2001] 7th international Conference on Concurrent Enterprising. Bremen.
[59] Thoben, Eschenbächer and Jagdev (n 58) 437.
[60] Allen L. White, Mark Stoughton and Linda Feng (n 17) 21.
[61] Martin Spring and Luis Araujo, 'Service, Services and Products: Rethinking Operations Strategy' (2009) 29 International Journal of Operations & Production Management 444; Beuren, Gomes Ferreira and Cauchick Miguel (n 50) 225; N Morelli, 'Product-Service Systems, a Perspective Shift for Designers: A Case Study: The Design of a Telecentre' (2003) 24 Design Studies 73; Janne Harkonen, Harri Haapasalo and Kai Hanninen, 'Review: Productisation: A Review and Research Agenda' (2015) 164 International Journal of Production Economics 65.
[62] Max Finne, Saara Brax and Jan Holmström, 'Reversed Servitisation Paths: A Case Analysis of Two Manufacturers' (2013) 7 Service Business 513.

the reasons for reversed servitisation lay in the fact that servitisation proved unsuccessful, this is not necessarily so.[63]

2.3 Servitisation in the digital age: digitising industry

The move towards servitisation has coined with a rising trend towards digitalisation.[64] The emergence of fast and powerful ICT, like the Internet with its vast reach capabilities, constitutes a leading role in terms of improving existing business models.[65] It is claimed that *'the service revolution and the information revolution are two sides of the same coin'*[66] and *'informatization'* is becoming a necessary component of servitisation.[67] In the field of IT a concept *'XaaS'* was developed, standing for *'everything as a service'*, describing the extensive variety of services emerging for users to access on demand over the Internet. Under this concept even manufacturing may be considered *'as a service'*.[68] In this respect, ICT may be perceived as an important *enabler* of (innovative) servitisation, supporting both deeper relationships with customers and more extensive service offerings.[69]

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[63] As an illustration, Finne, Brax and Holmström (ibid.) point out that a regulation change forced Xerox, a photocopier manufacturer, to move from a service-based toward a product-based business model, whereas CapgoodCo (pseudonym), a leading global capital goods manufacturer, quadrupled its production volumes in ten years, while the conditions to provide associated product services became unfavourable and the company has thus decided to withdraw successful servitisation strategy.

[64] Christian Lerch and Matthias Gotsch, 'Digitalized Product-Service Systems in Manufacturing Firms' (2015) 58 Research Technology Management 45.

[65] Ravi Kalakota and Marcia Robinson, *E-Business 2.0: Roadmap for Success* (Addison-Wesley Professional 2001); HW Lightfoot, TS Baines and P Smart, 'Emerging Technology and the Service Delivery Supply Chain' in Hing Kai Chan, Fiona Lettice and Olatunde Amoo Durowoju (eds), *Decision-Making for Supply Chain Integration* (Springer London 2012) 211–226.

[66] Roland T Rust, 'If Everything Is Service, Why Is This Happening Now, and What Difference Does It Make' (2004) 68 Journal of Marketing 23, 24.

[67] David Opresnik and others, 'Information – The Hidden Value of Servitisation' in Vittal Prabhu, Marco Taisch and Dimitris Kiritsis (eds), *Advances in Production Management Systems. Sustainable Production and Service Supply Chains* (Springer Berlin Heidelberg 2013).

[68] So, instead of the "X" one can put platform, data or information or any other concept that may be seen as a service. See Yucong Duan, 'Value Modeling and Calculation for Everything as a Service (XaaS) Based on Reuse', *2012 13th ACIS International Conference on Software Engineering, Artificial Intelligence, Networking and Parallel Distributed Computing (SNPD)* (2012); Mohsen Moghaddam, José Reinaldo Silva and Shimon Y Nof, 'Manufacturing-as-a-Service—From E-Work and Service-Oriented Architecture to the Cloud Manufacturing Paradigm' (2015) 48 IFAC PapersOnLine 828; Arthur LK Yip and others, 'A Product Configurator for Cloud Manufacturing', 41st North American Manufacturing Research Conference, 2013.

[69] Kryvinska and others (n 10); Christian Kowalkowski, Daniel Kindström and Heiko Gebauer, 'ICT as a Catalyst for Service Business Orientation' (2013) 28 Journal of Business & Industrial Marketing 506, 3; Esko Penttinen and Jonathan Palmer, 'Improving Firm Positioning through Enhanced Offerings and Buyer–seller Relationships' (2007) 36 Industrial Marketing Management 552; Marco Ardolino, Nicola Saccani and Marco Perona, 'The Impact of Digital Technologies and Ecosystems on the Servitisation of Companies: A Preliminary Analysis' 2015 Spring Servitisation Conference, Aston. In this respect, Lerch and Gotsch developed a model of four generic stages, how manufacturers include ICT solutions in their provision of services - Lerch and Gotsch (n 64) 47.

Consequently, the so-called *Internet of Things* is already seen as one of the most important enablers of servitisation in the future[70] that will considerably burst the latter's dimensions and lead to the so-called *'cyber-physical systems'* (CPS),[71] not only for large manufacturers, but also for small and medium-sized enterprises, considering that digital infrastructures and devices are nowadays more affordable. The term *'Internet of Things' (IoT)* was coined in 1999 by a British visionary Kevin Ashton to describe a general network of things linked together and communicating with each other as computers do today on the Internet.[72] The connection of objects to the Internet makes it possible to access remote sensor data and to control the physical world from a distance.[73] Data communication tools are changing *'tagged things'* into *'smart objects'* with sensor data supporting a wireless communication link to the Internet.[74] ICT is an important enabler of servitisation for manufacturers of larger goods, such as elevators or jet engines that frequently sell maintenance contracts along with equipment; however, these contracts require regular inspection and maintenance visits. With IoT, on the other hand, manufacturers can remotely monitor the condition of equipment and look for indicators of imminent failure outside normal limits (e.g. vibration, temperature and pressure). This means that the manufacturer can make fewer visits, reducing costs and producing less disruption and higher satisfaction for the customer.[75] Remote diagnostics, where complex manufactured products are monitored via sensors may not, however, only be important for repairing industrial machines but also for human health, such as remote control of pacemakers.[76] Another illustration of the IoT potentials is British Gas *'Hive Active Heating'* service that enables their customers to control their home

[70] Sue Conger, 'From the Special Issue Editor: Servitizing IT' (2010) 27 Information Systems Management 100.
[71] Malte Brettel and others, 'How Virtualization, Decentralization and Network Building Change the Manufacturing Landscape: An Industry 4.0 Perspective' (2014) 44 International Journal of Science, Engineering and Technology 8 (1), 37.
[72] Luis Araujo and Martin Spring, 'Product Biographies in Servitisation and the Circular Economy' (Aston Business School 2015).
[73] Hermann Kopetz, *Real-Time Systems* (Springer US 2011) 307.
[74] Primarily RFID (Radio Frequency Identification) tagged items (electronic ID-tag) – see more in Rolf H Weber, 'Internet of Things – Need for a New Legal Environment?' (2009) 25 Computer Law & Security Review 522; EWT Ngai and others, 'RFID Research: An Academic Literature Review (1995–2005) and Future Research Directions' (2008) 112 International Journal of Production Economics 510; Jayavardhana Gubbi and others, 'Internet of Things (IoT): A Vision, Architectural Elements, and Future Directions' (2013) 29 Future Generation Computer Systems 1645; Harvé Chabanne, Pascal Urien and Jean-Ferdinand Susini, *RFID and the Internet of Things* (John Wiley & Sons 2013).
[75] 'State of the Internet of Things Market Report 2015' (*Verizon Enterprise Solutions*) 13. See also Saara A. Brax and Katrin Jonsson, 'Developing Integrated Solution Offerings for Remote Diagnostics: A Comparative Case Study of Two Manufacturers' (2009) 29 International Journal of Operations & Production Management 539.
[76] Vladimir Stantchev and others, 'Smart Items, Fog and Cloud Computing as Enablers of Servitisation in Healthcare' (2015) 185 Sensors & Transducers.

heating and boiler from their mobile or laptop. The advent of WiFi and 4G thus enables the communication with smart objects without the need of a physical connection. Mobile smart objects can move around and GPS makes it possible to identify their location.[77] This technology facilitates the development of so-called *'connected cars'* that enable the driver automatic notification of crashes and speeding, as well as voice commands, parking applications, engine controls and car diagnosis.[78] Moreover, each Philips or Samsung TV comes nowadays with an application called *'Smart TV'*, which consolidates video on demand function, the Internet access and even social media applications.[79] Technology literature reveals many other examples of smart things, such as smart aircrafts, smart watches, ovens and even smart diapers.[80]

ICT is also the basis of increasing use of cloud computing in manufacturing. The National Institute of Standards and Technology defined cloud computing as *'a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources'*.[81] Cloud therefore means outsourcing data to third parties (cloud providers) and accessing them remotely via the Internet. Cloud computing therefore stands for servitisation in the IT domain.[82] More and more manufacturers are taking advantage of cloud computing, not just in simple forms of putting business emails in cloud, but progressively also for production purposes. In this respect a whole concept of cloud manufacturing (CMfg) as a new service-oriented manufacturing mode has recently started to evolve.[83] CMfg combines current manufacturing

[77] Kopetz (n 73) 308.

[78] The basis for connected cars are so-called Cooperative Intelligent Transport Systems (C-ITS) that allow road vehicles to communicate with other vehicles and with roadside infrastructure. The European Commission published its final report on C-ITS Platforms in January 2016.

[79] Kryvinska and others (n 13).

[80] Michael Miller, *The Internet of Things: How Smart TVs, Smart Cars, Smart Homes, and Smart Cities Are Changing the World* (Que 2015).

[81] Peter Mell and Tim Grance, 'Perspectives on Cloud Computing and Standards' [2009] USA, NIST. See also Bo-Hu Li and others, 'Cloud Manufacturing: A New Service-Oriented Networked Manufacturing Model' (2010) 16 Computer Integrated Manufacturing Systems 1; Yang Cao and others, 'Study on Machining Service Modes and Resource Selection Strategies in Cloud Manufacturing' (2015) 81 The International Journal of Advanced Manufacturing Technology 597; Lin Zhang and others, 'Cloud Manufacturing: A New Manufacturing Paradigm' (2014) 8 Enterprise Information Systems 167; Xun Xu, 'From Cloud Computing to Cloud Manufacturing' (2012) 28 Robotics and Computer-Integrated Manufacturing 75; Xianhe Wen and Xiaojun Zhou, 'Servitisation of Manufacturing Industries Based on Cloud-Based Business Model and the down-to-Earth Implementary Path' [2014] The International Journal of Advanced Manufacturing Technology 1.

[82] Nabil Sultan, 'Servitisation of the IT Industry: The Cloud Phenomenon' (2014) 23 Strategic Change 375.

[83] See e.g. Amit Deshpande, Kevin Bevan and Mark Doyle, 'Cloud Computing Architecture for Manufacturing Data Management'; Bo-Hu Li and others, 'Cloud Manufacturing: A New Service-Oriented Networked Manufacturing Model' (2010) 16 Computer Integrated Manufacturing Systems 1; Xun Xu, 'From Cloud Computing to Cloud Manufacturing' (2012) 28 Robotics and Computer-Integrated Manufacturing 75; Dazhong Wu and others, 'Cloud-Based Design and Manufacturing: A New Paradigm in Digital Manufacturing and Design Innovation' (2015) 59

platforms with cloud computing techniques and provides virtual functions for dispersed manufacturing resources.[84] It is thus perceived as an important enabler for manufacturers to achieve product customisation that represents a cornerstone of digitising industry in Europe.[85] If a customer wants to purchase a tablet computer with specific dimensions or customised sports shoes, a complex supply chain will be needed involving different specialist manufactures whose outputs are coordinated to deliver the sub-components that are required to construct a given product. Such a flexible production network demands a sophisticated IT infrastructure which can translate customer-specific product configurations to a flexible manufacturing network.[86] Cloud computing seems to offer the necessary support for this although there are various security and privacy dilemma in this respect.

Moreover, ICT is the key enabler of the so-called sharing or collaborative economy that is in the raise, where smart phone applications enable access to platforms that connect buyers with sellers.[87] ICT has also considerably changed the music industry, which is faced with the transition from a tangible product (e.g. a plate or a CD) to an intangible service, which is offered over digital portals, where customers either pay for each downloaded track or pay access to a music service portal.[88] Since the advent of the Internet, the traditional physical music distribution thus remains useless. Similar process is developing in the publication of academic journals and magazines.[89] A specific manufacturing revolution is happening with more mainstream application of 3D printing (also called additive manufacturing or rapid prototyping) – a technology that builds physical objects directly from 3D computer-aided design data and adds different materials, layer-by-layer, with the help of a 3D

Computer-Aided Design 1; Weidong Li and Jörn Mehnen (eds), *Cloud Manufacturing* (Springer London 2013); Dazhong Wu and others, 'Cloud-Based Manufacturing: Old Wine in New Bottles?' (2014) 17 Procedia CIRP 94.

[84] W Li and others, 'Subtask Scheduling for Distributed Robots in Cloud Manufacturing' (2015) PP IEEE Systems Journal 1, 1.

[85] Yip and others (n 68).

[86] Ursula Rauschecker and others, 'Cloud-Based Manufacturing-as-a-Service Environment for Customized Products' in Paul Cunningham and Miriam Cunningham (eds), *eChallenges e-2011 Conference Proceedings* (IIMC International Information Management Corporation 2011) 1–2.

[87] E.g. the before mentioned Uber or Airbnb, which is connecting flat owners with tourists in need of a room (so-called home sharing) – Anna Felländer, Claire Ingram and Robin Teigland, 'Sharing Economy–Embracing Change with Caution', *Näringspolitiskt Forum rapport* (2015).

[88] Glenn Parry, Oscar F Bustinza and Ferran Vendrell-Herrero, 'Servitisation and Value Co-Production in the UK Music Industry: An Empirical Study of Consumer Attitudes' (2012) 135 International Journal of Production Economics 320; Gary Graham and others, 'The Transformation of the Music Industry Supply Chain: A Major Label Perspective' (2004) 24 International Journal of Operations & Production Management 1087.

[89] Anna Viljakainen and Marja Toivonen, 'The Futures of Magazine Publishing: Servitisation and Co-Creation of Customer Value' (2014) 64 Futures 19; Sara González Gaspar and Oscar F Bustinza, 'Proceso de Servitización En La Industria Editorial: El Papel de Los Nuevos Modelos de Negocio' (2014) 10, 219.

printer. This new technology has inconceivable potential to revolutionize countless industries, such as medicine, pharmaceuticals, and architecture, whereas NASA has sent a 3D printer even to the International Space Station.[90] This technology enables almost every individual to become a manufacturer, from hobbyist inventors to traditional service providers and is poised to radically disrupt the established trade patterns – just considering reports about a New York fashion designer, Mary Huang, who has begun selling 3D printed shoes and envisions a future in which she will send digital shoes to shops in London, avoiding shipping costs and import duties.[91] The rapid development of ICT is thus posing a particular challenge for manufacturers in their attempt for gaining competitive advantage through services.

In Germany, the development of manufacturers equipping their products and machines with intelligent digital systems that can communicate with other machines in production has started to be referred to as *'Industrie 4.0'*.[92] The French term for the same is *'Industrie du Futur'*, in the Netherlands strategists talk about *'Smart Industry'*, in Spain about *'Industria Conectada 4.0',* in Italy it is '*Fabbrica Intelligente',* whereas the European Commission has recently adopted the term *'digitising industry'*.[93] All these concepts are focused on creating smart products in smart factories (also called shop floor automations) and it is believed that smart product-service systems will dominate most industrial sectors in the near future and lead to the fourth industrial revolution.[94]

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[90] Heidi Nielson, 'Manufacturing Consumer Protection for 3-D Printed Products' (2015) 57 Arizona Law Review 609, 611; Committee on Space-Based Additive Manufacturing and others, *3D Printing in Space* (National Academies Press 2014); Paul Laidler, 'Just Press Print' <http://eprints.uwe.ac.uk/16833/> accessed 23 October 2023; Charles W Hull, 'The Birth of 3D Printing' (2015) 58 Research Technology Management 25; Joan Horvath, 'A Brief History of 3D Printing', *Mastering 3D Printing* (Springer 2014).

[91] Ed Gerwin, 'The Digital Opportunity: Democratizing Trade for the 99 Percent' May 2015 Progressive Policy Institute Policy Brief 3.

[92] Christian Lerch and Matthias Gotsch, 'How Digitalisation Can Accelerate the Transformation Process from the Manufacturer to Service Provider' (Aston Business School 2015); T Bauernhansl, 'Industry 4.0: Challenges and Limitations in the Production. Keynote' [2013] ATKearney, Factory of the year; A Dujin, C Geissler and D Horstkötter, 'INDUSTRy 4.0: The New Industrial Revolution' [2014] Roland Berger Strategy Consultants, Munich 0; Wolfgang Wahlster, 'From Industry 1.0 to Industry 4.0: Towards the 4th Industrial Revolution', *Forum Business meets Research* (2012); Tim Baines and Howard Lightfoot, 'Servitisation in the Aircraft Industry: Understanding Advanced Services and the Implications of Their Delivery' in Gunter Lay (ed), *Servitisation in Industry* (Springer International Publishing 2014); M Blanchet and others, 'Industry 4.0: The New Industrial Revolution-How Europe Will Succeed' [2014] Hg. v. Roland Berger Strategy Consultants GmbH. München; Stefan Ferber, 'Industry 4.0–Germany Takes First Steps toward the next Industrial Revolution'.

[93] See European Commission, DG Connect, An Action Plan for Digitising European Industry, Draft, 23 December 2015. See also UK Government, 'Future of Manufacturing: A New Era of Opportunity and Challenge for the UK' (30 October 2013), which identifies servitisation as a core element in its vision for the future of manufacturing.

[94] Michael Abramovici, Jens Christian Göbel and Matthias Neges, 'Smart Engineering as Enabler for the 4th Industrial Revolution' in Madjid Fathi (ed), *Integrated Systems: Innovations and Applications* (Springer International Publishing 2015). See also Henning Kagermann and others, *Recommendations for Implementing the Strategic Initiative*

2.4 Motives for servitisation and challenges in its adoption

Motives that lead manufacturing companies to adopt servitisation strategy are central for legal studies of this phenomenon. Business literature identifies three key motives, which encourage manufacturing companies to engage in service activities: economic, strategic, and marketing.[95] The main *economic drive* for servitisation lays in the fact that services may make up an additional source of revenue, and may generate higher profit margins, considering that profit margins on services are normally less sensitive to price-based competition.[96] It is being noted that the increased life-cycle of many modern complex products, such as aircrafts, is pushing the most significant revenues downstream towards in-service support.[97] Further important economic motivation for servitisation is to stabilize company's revenues over time: while the sale of a product can be a one-time operation for a company, the sales of related services can be spread over time. The sale of product-service bundles may also help balancing the effects of unfavourable economic cycles as services are counter-cyclical or at least more resistant to the economic cycles that affect investment and goods purchase.[98] Linked to this is so-called *'installed base'* argument,[99] which emphasises that the number of products already on the market usually far exceeds the number of new products. Offering maintenance services for the former products thus presents a large economic opportunity. Secondly, in respect of strategic motives for servitisation, it is claimed that manufacturing companies that extend their operations into providing services may considerably *improve their strategic positioning.* This is because servitisation helps manufacturers gaining competitive advantage and imposing barriers to competitors.[100] Servitisation is predominantly intended for differentiating the company's offer – considering that product-service bundles are normally harder to imitate than pure products.[101] After sales services may also lead

INDUSTRIE 4.0: Securing the Future of German Manufacturing Industry; Final Report of the Industrie 4.0 Working Group (Forschungsunion 2013). Kopetz (n 93) gives an example of smart refrigerators that keep track of the availability and expiry date of food items and autonomously places an order to the next grocery shop if the supply of a food item is below a given limit.

[95] Heiko Gebauer, Elgar Fleisch and Thomas Friedli, 'Overcoming the Service Paradox in Manufacturing Companies' (2005) 23 European Management Journal 14.

[96] Wise and Baumgartner (n 41); Heiko Gebauer and Thomas Friedli (n 21).

[97] Yvonne Ward and Andrew Graves, 'Through-Life Management: The Provision of Total Customer Solutions in the Aerospace Industry' (2007) 8 International Journal of Services Technology and Management 455.

[98] Rogelio Oliva and Robert Kallenberg (n 20); Saara Brax (n 39).

[99] Neely (n 8); Rogelio Oliva and Robert Kallenberg (n 20).

[100] Valérie Mathieu (n 27); Oscar F Bustinza and others, 'Servitisation and Competitive Advantage: The Importance of Organizational Structure and Value Chain Position' (2015) 58 Research-Technology Management 53; ibid.

[101] Rogelio Oliva and Robert Kallenberg (n 20); Heiko Gebauer and Thomas Friedli (n 21).

the manufacturer to sell their goods at cost and make profit out of these services. Servitisation thus enables *'locking out' competitors*, i.e. to prevent or delay competitors from increasing their market share based on new product development, since the customers are linked to their suppliers due to service contracts. Thirdly, when producing goods and services manufacturing companies can expect *marketing advantages* as servitisation enables *'locking in' customers*. By including a range of after sales services to customers the latter will be more loyal than if they simply bought the goods, while from the manufacturer's perspective the provision of services may provide insight into their customers' needs.[102] Servitisation thus helps building longer-term client relationships that result in longer great profits, which may be enhanced to the point where customers become dependent on the supplier.[103]

There are not, however, only microeconomic, but also macroeconomic benefits of the new business orientation. Digital production that enables manufacturers to offer an individual item at the price of a mass product, might be able, with the words of the president of the German Engineering Association (WDMA), Reinhold Festge, *'to wrestle back production that Europe lost to Asia many years ago'*.[104] Since the smart machines will produce the products in an automatized process, it is claimed that Europeans will be employed to create, maintain and modify the machines. As these are not physically demanding jobs, the new manufacturing should offer work opportunities also for older employees, which is important for the increasingly aging European population, providing, of course, that people acquire the necessary IT and engineering skills.[105] On the other hand, however, sharing economy as one of the front models of servitisation is criticised for advocating less consumption, thereby potentially causing harm to economy that is fuelled by consumer spending.[106] Servitisation may thus not be seen as a panacea for all economic problems of developed economies. Although there are many success stories, such as Rolls Royce and Xerox that now generate around half of revenue from services, some case studies suggest that servitized manufacturers often experience implementation

[102] Vandermerwe and Rada (n 16); JC Aurich, C Mannweiler and E Schweitzer, 'How to Design and Offer Services Successfully' (2010) 2 CIRP Journal of Manufacturing Science and Technology 136; Baines and others (n 20) 558.
[103] Manzini, Vezzoli and Clark (n 52); Baines and others (n 20).
[104] '"Industry 4.0": How European Companies Can Really Benefit' (*EurActiv*, 7 April 2015). See also Henning Kagermann, 'Change Through Digitization—Value Creation in the Age of Industry 4.0' in Horst Albach and others (eds), *Management of Permanent Change* (Springer Fachmedien Wiesbaden 2015).
[105] Jorge Valero, 'Why Industry 4.0 Is Not Just about Industry' (*EurActiv*, 18 January 2016).
[106] Felländer, Ingram and Teigland (n 87) 12.

issues, which might even result in decreased performance.[107] Neely asserts that servitized companies often achieve lower profit margins than do pure product manufacturers, especially in the case of large companies. Moreover, he claims that servitized companies are more likely to declare bankruptcy than are pure manufacturing companies.[108] The reasons for these difficulties may be found in cultural as well as in corporate challenges manufacturing companies are facing. Servitisation strategy is particularly challenging as the companies considering servitisation need to take into account competition outside their usual domain and unexpected rivals including their own suppliers, distributors, and customers.[109] They have to adapt the necessary organizational structures and processes, considering that service management principles are often at odds with traditional manufacturing practices and that the service culture is specific and different from the traditional manufacturing culture.[110] Finally, broader cultural dimension needs to be taken into account: what leads to a successful business in one country might not work in another due to cultural differences and priorities of the citizens[111] – to just think of the car sharing system.

[107] Ivanka Visnjic, Andy Neely and Frank Wiengarten, 'Another Performance Paradox?: A Refined View on the Performance Impact of Servitisation' 2012 SSRN Scholarly Paper ID 2117043. The situation, where companies made the transition into services in order to increase their profit margins, however, they did not get the expected high returns is called *"service paradox"* – see Gebauer, Fleisch and Friedli (n 95); Saara Brax (n 39).
[108] Neely (n 8).
[109] Vandermerwe and Rada (n 16); Rogelio Oliva and Robert Kallenberg (n 20); Finne, Brax and Holmström (n 62).
[110] Valérie Mathieu (n 27).
[111] See e.g. Sen Bao and Marja Toivonen, 'Cultural Differences in Servitisation: Nordic Manufacturers in China' (2015) 6 Journal of Science & Technology Policy Management 223.

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3 Distinction between goods and services

3.1 Distinguishing goods and services in marketing

Although the distinction between goods and services may at first sight seem straightforward, explicit definitions of the terms have troubled scholars from different domains since the Eighteenth century. Smith stated that goods have an exchangeable value and one of the main characteristics of a good is that its ownership rights can be established and exchanged.[112] Senior described goods as material things, meaning that goods are tangible and have physical dimensions.[113] Furthermore, Parry et al. define goods as having the following attributes:[114] they are physical objects for which a demand exists, their physical attributes are preserved over time, ownership rights can be established, they exist independently of their owner, they are exchangeable and they can be traded on markets.

[112] Adam Smith, *The Wealth of Nations [1776]*. See also Harold Demsetz in Oliver E Williamson and Sidney G Winter, *The Nature of the Firm: Origins, Evolution, and Development* (Oxford University Press, USA 1993) 159.
[113] Nassau William Senior, *An Outline of the Science of Political Economy* (Verlag Wirtschaft und Finanzen 1836).
[114] Glenn Parry and others, 'Goods, Products and Services' in M Macintyre and others (eds), *Service Design and Delivery* (Springer 2011) 20.

While these characteristics of goods are relatively commonly accepted, there has been less agreement about the definition of services.[115] As explained by Moeller, four characteristics have been regularly applied to denote what constitutes a service: intangibility, heterogeneity, inseparability, and perishability (so-called IHIP characteristics). Nonetheless, the characteristics attributed to this definition have attracted substantial criticism. For example, intangibility means that services are not physical objects and only exist in connection to other things. In this sense, Harker humorously described services as *"something that you cannot drop on your foot"*.[116] Although the intangible nature of services is a useful characteristic to employ, it has failings as a differentiator between services and goods. As Hill notes, music, books and films are all intangible goods that are marketed in such a manner that they can be physically stored. A story generated by its author, music created by composers or software games have no physical dimensions, but, since they are stored on media such as paper, film or disk, they have material characteristics of goods and, thus, have little in common with services.[117] Additionally, tradability is one of the most decisive, but still not generally applicable distinguishing criteria between goods and services. As Rathmell points out, goods can be owned and the ownership can be transferred. Services, on the other hand, refer to an act, which is paid for by the buyer but without establishing an ownership right. Services, therefore, cannot be traded.[118] Nevertheless, due to the rapid development of technology, services can now be provided in a way similar to goods, including being produced in one state and exported to another, which may have hardly seemed possible to Adam Smith.[119] This is also reflected under property law, where personal property describes all things, which are subject to individual rights, whether they are tangible or intangible.[120] Under property law it thus seems more important to distinguish between real and personal property than between tangible and intangible property.

[115] Sabine Moeller, 'Characteristics of Services-a New Approach Uncovers Their Value' (2010) 24 Journal of Services Marketing 359.
[116] Patrick T. Harker, *The Service Productivity and Quality Challenge* (Springer Science & Business Media 2012).
[117] Peter Hill, 'Tangibles, Intangibles and Services: A New Taxonomy for the Classification of Output' (1999) 32 The Canadian journal of economics/Revue canadienne d'Economique 426.
[118] John M. Rathmell, 'What Is Meant by Services?' (1966) 30 Journal of Marketing 32.
[119] The very title of the fundamental WTO Treaty – The General Agreement on Trade in Services (GATS) – evidently proves this development.
[120] John Cribbet and Corwin Johnson, *Cribbet and Johnson's Principles of the Law of Property* (3rd edition, The Foundation Press, Inc 1989) 9.

Goods and services thus have many distinguishing features, but also many similarities. It is hence more appropriate to talk about a full spectrum of forms of digital goods – from pure goods on one side to pure services on the other.[121] More recently, marketing researchers shifted their thinking from a pure service or pure product focus to a combination or product-service system (PSS),[122] where offering a combination of products and services generates greater income. Moreover, in this respect, the term *"servitisation"* was coined to describe the process whereby companies increase revenue by offering service options in addition to their products.[123] Vandermerwe and Rada who have coined the term "servitisation" claim that it is no longer valid *'to draw simplistic distinctions between goods and services'* and that it is necessary to move from *'the old and outdated focus on goods or services to integrated 'bundles' or systems (…) with services in the lead role'*.[124] It is believed that *'an industrial renaissance'* or *'reindustrialisation'* enabled by servitisation can bring jobs and growth back to Europe.[125] EU Commissioner Elżbieta Bieńkowska has hence claimed that *'manufacturing and services are two sides of the same coin'* and that *'in the modern economy, you cannot choose the one or the other (…). You must do both'*.[126] Notwithstanding all this, however, various forms of business models that come under the servitisation "umbrella" open challenges of their legal categorisation and treatment of transactions where goods and services' dimensions are increasingly blurred – particularly due to the digital dimension of an increasing number of physical goods (in respect of the Internet of Things).[127]

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[121] Lynn G. Shostack, 'Breaking Free from Product Marketing' (1977) 41 Journal of Marketing 73.

[122] Mark J Goedkoop, *Product Service Systems, Ecological and Economic Basics* (Ministry of Housing, Spatial Planning and the Environment, Communications Directorate 1999); Fernanda Hänsch Beuren, Marcelo Gitirana Gomes Ferreira and Paulo A Cauchick Miguel, 'Product-Service Systems: A Literature Review on Integrated Products and Services' (2013) 47 Journal of Cleaner Production 222.

[123] Sandra Vandermerwe and Juan Rada, 'Servitisation of Business: Adding Value by Adding Services' (1988) 6 European Management Journal 314; Rogelio Oliva and Robert Kallenberg, 'Managing the Transition from Products to Services' (2003) 14 International Journal of Service Industry Management 160; Tim S Baines and others, 'The Servitisation of Manufacturing: A Review of Literature and Reflection on Future Challenges' (2009) 20 Journal of Manufacturing Technology Management 547; Neil J Barnett and others, 'Servitisation: Is a Paradigm Shift in the Business Model and Service Enterprise Required?' (2013) 22 Strategic Change 145.

[124] Vandermerwe and Rada (n 16) 314.

[125] Matthieu Crozet and Emmanuel Milet, 'Should Everybody Be in Services? The Effect of Servitisation on Manufacturing Firm Performance' (2015) CEPII Working Paper 2015/19; Karl Aiginger, 'The High Road: Europe Must Seize the Potential of Advanced Manufacturing' (*EurActiv*, 26 January 2016); Elżbieta Bieńkowska, 'Reindustrialisation of Europe: Industry 4.0 - Innovation, Growth and Jobs, Speech', *European Commission* (2015); Andy Neely, 'Exploring the Financial Consequences of the Servitisation of Manufacturing' (2009) 1 Operations Management Research 103.

[126] Elżbieta Bieńkowska, 'Reindustrialisation of Europe: Industry 4.0 - Innovation, Growth and Jobs, Speech', *European Commission* (2015).

[127] Debasis Bandyopadhyay and Jaydip Sen, 'Internet of Things: Applications and Challenges in Technology and Standardization' (2011) 58 Wireless Personal Communications 49; Fawzi Behmann and Kwok Wu, *Collaborative*

3.2 Goods/services distinction under EU law

Despite the calls for a uniformed approach towards the sale of goods and services from scholars working in the domains of marketing and manufacturing, legislators and courts are usually more conventional, protecting the traditional distinction between goods and services. This holds true for both national and EU law. Consequently, the UK Sale of Goods Act (SGA)[128] contains a (partial) definition of goods (i.e. personal chattels), while there is no corresponding general definition of services.[129] Moreover, under the Supply of Goods and Services Act 1982 (SGSA) the consumer enjoyed a significantly lower level of protection in relation to services provided under contract than he or she did in relation to goods.[130] Finally, the Consumer Protection Act[131] that partially replaced the SGA and the SGSA as of 2015 for all consumer contracts includes a definition of goods[132] – but it does not provide one for services.

At EU level, the calls for legal unification of the concepts of goods and services began in 1980 with Hunnings' comment on the *Debauve*[133] and *Coditel*[134] cases, in which he compared sending the Financial Times newspaper from London to Frankfurt by post and by fax. He claimed that the means of transportation should not have made a considerable difference in the legal consequences and was critical about old-fashioned thinking of lawyers when dealing with new technologies:

"We are faced in reality with two different forms of transportation (...) The end result is exactly the same: the physical object in London has been transported into the hands of the recipient in Frankfurt. The conceptual blockage which prevents this equivalence being acted upon is the lawyer's

Internet of Things (C-IoT): For Future Smart Connected Life and Business (John Wiley & Sons 2015); Michael Miller, *The Internet of Things: How Smart TVs, Smart Cars, Smart Homes, and Smart Cities Are Changing the World* (Que 2015).

[128] Sale of Goods Act 1979, c. 54. The Act was replaced for consumer contracts from 1 October 2015 by the Consumer Rights Act 2015

[129] Robert Bradgate, 'Consumer Rights in Digital Products' (A research report prepared for the UK Department for Business, Innovation and Skills 2010) 46.

[130] ibid 27.

[131] Consumer Rights Act 2015 c. 15.

[132] Goods are defined as *"any tangible moveable items, but that includes water, gas and electricity if and only if they are put up for supply in a limited volume or set quantity"* – ibidem, s. 2(8).

[133] Case 52/79, Procureur du Roi v Marc J.V.C. Debauve and others, ECLI:EU:C:1980:83 concerned n*ational rules prohibiting the transmission by cable television of advertisements. These rules were considered consistent (non-distinctly applicable as well as proportional) with Article 56 TFEU (at that time Article 59 EC) by the Court.*

[134] Case 262/81, Coditel SA, Compagnie générale pour la diffusion de la télévision, and others v Ciné-Vog Films SA and others, ECLI:EU:C:1982:334. The case concerned *a contract whereby the owner of the copyright in a film had granted an exclusive right to exhibit that film for a specific period in the territory of a Member State. The Court ruled that such a contract is not subject to the prohibitions contained in Article 101 TFEU (at that time Article 85 EC).*

reluctance to move from Newtonian physics to quantum physics, an inability to attribute physical characteristics to anything that cannot be held in the hand and thus an unwillingness to accept that one can "import" electronic signals. This reluctance is likely to have more serious consequences than that of cable television. "[135]

Nevertheless, Hunnings' call for unification was not responded to for many years following his comments. The EU Court, which was tasked to define the distinction between goods and services within EU internal market law, approached this assignment by considering established distinguishing factors from other domains as well as from specific EU law objectives.[136] As highlighted by Snell, the differentiating characteristic for the EU Court has been that goods are material objects, whereas services are not.[137] Goods were, consequently, defined as *"products which can be valued in money and which are capable, as such, of forming the subject of commercial transactions"*[138] and as *"objects which are shipped across a frontier"*.[139] Services, on the other hand, are of non-material character. Thus, the transmission of television signals falls within the Treaty rules relating to services while things such as films are considered goods.[140]

Notwithstanding this, however, tangibility has not consistently been the essential feature that distinguishes goods from services under EU law. The EU Court had no reservations with the determination that electricity falls under the ambit of goods,[141] despite hearing several arguments of the Italian government that the EU Court did not sufficiently take into account the technical characteristics, especially its intangibility and the fact that it cannot be stored. In *Jägerskiöld,*[142] Advocate General Fennelly pointed out, that it is rather extraordinary that the EU Court considered electricity a good. He added that, in his opinion, it should be regarded as a specific example of power, taking into account its function as an energy source

[135] Neville March Hunnings, 'Casenote on Debauve and Coditel' (1980) 17 Common Market Law Review 560, 568.
[136] It has e.g. ruled that marijuana does not constitute goods under EU law – *Case* C-137/09, Marc Michel *Josemans* v Burgemeester van Maastricht, ECLI:EU:C:2010:774. The most thorough analysis of the goods/services distinction under EU law was made by Jukka Snell, *Goods and Services in EC Law: A Study of the Relationship Between the Freedoms* (Oxford University Press 2002).
[137] ibid 4.
[138] Case 7/68, Commission v Italy (Art), ECLI:EU:C:1968:46.
[139] Case C-2/90, Commission v Belgium (Wallonian waste), ECLI:EU:C:1992:310.
[140] Case 155/73, Giuseppe Sacchi, ECLI:EU:C:1974:40, para. 6-7. See also Case 52/79, Debauve, ECLI:EU:C:1980:83.
[141] Case 6/64, Flaminio Costa v E.N.E.L., ECLI:EU:C:1964:66; Case C-393/92, Commune d'Almelo and others v NV Energiebedrijf Ijsselmij, ECLI:EU:C:1994:171; Case C-158/94, Commission v Italy, ECLI:EU:C:1997:500, para. 14-20. Electricity is normally considered goods also under the national sale of goods and consumer protection legislation as well as under national criminal codes, which is decisive for definition of a theft.
[142] Case C-97/98, Jägerskiöld, ECLI:EU:C:1999:515, opinion of Advocate General Fennelly, para. 20.

making it a competing product with gas and oil.[143] Snell, however, explains the approach of the EU Court with its desire to put electricity, oil and gas under the same provisions.[144] This clarifies why the EU Court nevertheless excluded certain other types of intangible assets from the concept of goods. In Jägerskiöld, it was asked, whether fishing rights and licences constitute goods. Advocate General Fennelly felt that the classic definition of this concept from the case *Commission v Italy* (Art) does not cover *»everything that has a value, and thus can be traded«,* and that the goods, in the general sense of the word, have tangible physical properties. On this basis, he concluded that fishing rights and licences do not constitute goods, but services instead – similar to *the hiring out of sporting facilities, hotel accommodations, or of other rights related to the temporary enjoyment of immovable property.*[145] The EU Court supported his opinion. The question that follows then is, whether digital goods are closer to the sales of goods or to the hiring out of sporting facilities.

3.3 Categorising digital goods between goods and services

The European Commission has defined the completion of the Digital Single Market as one of its ten political priorities.[146] A Digital Single Market is, according to the 2015 Commission's Communication, *"one in which the free movement of persons, services and capital is ensured and where the individuals and businesses can seamlessly access and exercise online activities under conditions of fair competition, and a high level of consumer and personal data protection, irrespective of their nationality or place of residence."*[147] This should ensure that Europe maintains its position as *»a world leader in the digital economy, helping European companies to grow globally.«* A well-functioning Digital Single Market should make online access to goods and services easier and, therefore boost the traditional free movement of goods and services. It will also increase the digital skills and learning of European citizens so they can use digital transactions to their personal benefit – as consumers, patients and public administration clients.

[143] Also, Directive 1999/44/EC on the sale of consumer goods and associated guarantees (OJ L 171, 7.7.1999, p. 12-16) specifically excludes electricity from the definition of goods.
[144] Snell (n 136) 4.
[145] Case C-97/98, Jägerskiöld, ECLI:EU:C:1999:515, opinion of Advocate General Fennelly, para. 21-23.
[146] European Commission, 10 priorities, http://ec.europa.eu/priorities/index_en.htm (accessible 22 October 2023).
[147] Communication from the Commission, A Digital Single Market Strategy for Europe, COM (2015) 192 final, p. 3.

At the centre of the Digital Single Market are digital goods, a broad and rapidly expanding term in view of the variety of "goods" covered, referring to all goods that are stored, delivered and used in its electronic format, such as smartphone applications, digital music and books, computer design files for 3D printed products, for instance houses, medical devices and food. As such digital goods may be distinguished from physical (or analogue) goods that refer to material things with physical dimensions,[148] but also from services that were traditionally considered as something that cannot be stored nor owned. Therefore, digital goods bring a broad range of legal challenges in respect of whether they should legally be treated as physical goods or as services – or, alternatively, as a *sui generis* concept and what consequences this would bring – *inter alia* in the field of copyright, taxation, and consumer protection law.

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A common, non-legal definition describes the term digital goods as a *"general term that is used to describe any goods that are stored, delivered and used in its electronic format. Digital goods are shipped electronically to the consumer through e-mail or download from the Internet."*[149] The 2011 EU Consumer Rights Directive[150] uses the term "digital content", which is defined as *"data which are produced and supplied in digital form"*[151] Its preamble provides the following examples: *"Digital content means data which are produced and supplied in digital form, such as computer programs, applications, games, music, videos or texts, irrespective of whether they are accessed through downloading or streaming, from a tangible medium or through any other means"*.[152]

In line with this, commentators normally draw a distinction between digital products supplied in physical form and those supplied entirely digitally, e.g., by Internet download. Situations may largely vary: the online purchase of a book is a digital transaction, which does not involve the supply of a digital product; on the other hand, the download of the book to be read as an e-book involves digitally contracting

[148] Cf German Civil Code, BGB (in the version promulgated on 2 January 2002, *Bundesgesetzblatt,* I page 42, 2909), s. 90, under which only corporeal objects are things as defined by law.
[149] Webopedia, Digital goods, http://www.webopedia.com/TERM/D/digital_goods.html (accessible 22 October 2023).
[150] Directive 2011/83/EU of the European Parliament and of the Council of 25 October 2011 on consumer rights, OJ L 304, 22.11.2011, p. 64-88.
[151] Article 2(11) of the Directive 2011/83/EU. Cf UK Consumer Protection Act 2015 that defines "digital content" as data which are produced and supplied in digital form – s. 2(9) as well as German Civil Code (BGB) 200, under which digital content is defined as not being contained in a tangible medium and that is produced and made available in digital form – s. 90.
[152] Recital 19 of the preamble to the Directive 2011/83/EU.

for the digital delivery of a digital product. Again, the online purchase of a CD, involves digitally contracting for the physical delivery of a product, which may be regarded as digital or physical, whereas one may also purchase software in a local computer store.[153] Finally, we are currently witnessing the development of "cloud computing" which, rather than supplying the consumer with a copy of the program, involves the software supplier allowing the consumer to access the program supplier's server via the Internet to obtain the product.[154] Thus, this new process more closely resembles the supply of a service than a contract for the supply of goods.[155] This broad spectrum of forms in which digital goods exist is also reflected in the EU Court's case law. In general, if digital goods are not related to a tangible entity, rules on services will apply; if they do, rules concerning goods will apply. In *Sacchi*, the EU Court held that, *"the transmission of television signals, including those in the nature of advertisements, comes, as such, within the rules of the Treaty relating to services"*.[156] The next paragraph of the judgment deals with trade in materials (tapes, film etc.) used for television programmes, which are covered by the rules relating to the movement of goods. This ruling is still good law as evidenced by the EU Court's decision in *Dynamic Medien*[157] where Germany prohibited sale of DVDs or video cassettes with cartoons without an age-limit label corresponding to a classification from a higher regional authority. The EU Court considered the case under the free movement of

[153] Robert Bradgate, 'Consumer Rights in Digital Products' (A research report prepared for the UK Department for Business, Innovation and Skills 2010) 12. The examples above also clearly show the difference between e-commerce and digital goods.

[154] Such as Spotify that enables users to "stream" Spotify's online libraries of music. Access to the media is via an online account, negating the need to buy and download music onto your own hard drive - Gary Graham and others, 'The Transformation of the Music Industry Supply Chain: A Major Label Perspective' (2004) 24 International Journal of Operations & Production Management 1087; Glenn Parry, Oscar F Bustinza and Ferran Vendrell-Herrero, 'Servitisation and Value Co-Production in the UK Music Industry: An Empirical Study of Consumer Attitudes' (2012) 135 International Journal of Production Economics 320; Natalia Kryvinska and others, 'Servitisation - Its Raise through Information and Communication Technologies' in Mehdi Snene and Michel Leonard (eds), *Exploring Services Science* (Springer International Publishing 2014) <http://link.springer.com/chapter/10.1007/978-3-319-04810-9_6> accessed 23 October 2023; Emma Gallacher and Sean Jauss, 'Exhaustion of Copyright – the Impact of UsedSoft on the Exhaustion of Copyright in Software and Other Digital Subject Matter' 2014 Lawyer Monthly Global Expert 14.

[155] Bradgate (n 153) 14.

[156] Case 155/73, Giuseppe Sacchi, ECLI:EU:C:1974:40.

[157] Case C-244/06, Dynamic Medien Vertriebs GmbH v Avides Media AG, ECLI:EU:C:2008:85.

goods rules,[158] finding the national rules to be measures having equivalent effect to quantitative restrictions that are prohibited by Article 34 TFEU.[159]

In contrast to this, however, in *Football Association Premier League ('the FAPL')*[160] the EU Court treated prohibition of the importation of foreign decoding devices under free movement of services rules – considering that the decoding devices merely provide access to the signal, which enables the broadcasting services. The EU Court held that national legislation, which prohibited the import, sale or use of foreign decoder cards, was contrary to the freedom to provide services.[161] It explained that *»the national legislation is not directed at decoding devices, but deals with them only as an instrument enabling subscribers to obtain the encrypted broadcasting services.«*[162] Rules on the free movement of goods were, thus, not applied.[163]

On the other hand, however, the *UsedSoft*[164] case was decided using principle of exhaustion that has until then been applied only to physical goods although it referred solely to the downloading and storing of software on customers' computers. In Usedsoft the EU Court recognised ownership rights (traditionally only attributable to physical goods) in relation to software and accordingly extended the principle of exhaustion developed under free movement of goods rules to software.

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[158] For commentary see: Peter J Oliver, *Oliver on Free Movement of Goods in the European Union: Fifth Edition* (Bloomsbury Publishing 2010); Panos Koutrakos, Niamh Nic Shuibhne and Phil Syrpis, *Exceptions from Eu Free Movement Law: Derogation, Justification and Proportionality* (Hart Publishing 2016); DG Enterprise European Commission, 'Free Movement of Goods, Guide to the Application of Treaty Provisions Governing the Free Movement of Goods' [2010] Publications Office of the European Union.

[159] Already the case in Henn and Darby (Case 34/79, ECLI:EU:C:1979:295), in which the United Kingdom Government banned the importation of pornographic materials, was decided on the basis of free movement of goods rules. See also English case of International Computers Ltd v St Albans District Council [1996] 4 All ER 481, where it was decided that software supplied on some physical medium will be regarded as a sale of goods. In contrast, the situation where software is supplied by downloading it from the Internet, or uploading it from a CD, which is retained by the supplier and not supplied to the customer, is not considered a sale of goods by English courts, because nothing tangible is supplied. Nevertheless, a sale of goods is involved when one purchases a new personal computer that comes bundled with a number of software programs – as illustrated in Australian case Toby Constructions Products Pty Ltd v Computa Bar (Sales) Pty Ltd [1983] 2 NSWLR 48.

[160] Joined Cases C-403/08 and C-428/08, Football Association Premier League v QC Leisure and Others and Karen Murphy v Media Protection Services Ltd, ECLI:EU:C:2011:631.

[161] Ben Van Rompuy, 'Premier League Fans in Europe Worse off after Murphy Judgment' Kluwer Competition Law Blog (6 May 2014). The ruling was enforced by the Court of Appeal end of 2012: Football Association Premier League Ltd v QC Leisure & Ors [2012] EWCA Civ 1708 (20 December 2012).

[162] Joined Cases C-403/08 and C-428/08, para. 82.

[163] This is in line with the EU Court's ruling in case C-20/03, Marcel Burmanjer, ECLI:EU:C:2005:307, where the EU Court stated that an economic activity should be examined in the context of either the free movement of goods or the freedom to provide services if one of these elements *"is entirely secondary in relation to the other and may be considered together with it"* – see para. 34-35). Cf Case C-108/09 Ker-Optika bt, ECLI:EU:C:2010:725, para. 43 and case C-275/92, *Schindler,* ECLI:EU:C:1994:119.

[164] Case C-128/11, UsedSoft GmbH v Oracle International Corp., ECLI:EU:C:2012:407.

This conclusion was based on the EU Court's establishment of an EU wide definition of the term sale: *"an agreement by which a person, in return for payment, transfers to another person his rights of ownership on an item or tangible or intangible property belonging to him"*.[165] Furthermore, the EU Court made numerous arguments about the principles of equivalence between digital and physical goods.[166] In particular, it ruled that it made no difference whether the copy of the computer program was made available to the customer by means of a download or a physical CD or DVD[167] and that the online transmission method was the "*functional equivalent*" to the supply of a material medium.[168] This is in line with the practice of the World Intellectual Property Organisation (WIPO), that quite explicitly categorises software as goods, whether it is delivered offline or online.[169] Consequently, the ruling has been declared as *"a fundamental decision on the interaction between intellectual property rights and the European single market in the online world"*[170] and compared to the importance of *Consten and Grundig*[171] and *Deutsche Grammophon*[172] in relation to physical goods in the 1960s and 1970s.

Bradgate supports this categorisation by stating that *"provision of a service involves doing something. Therefore making downloads available at a website involves the provision of a service; but the download itself is not a service within this definition; it has much more in common with a 'thing', albeit an intangible one, and therefore (…) a download is not in itself an activity but is closer to the concept of goods."*[173] Furthermore, Dreier agreed that *"it is of secondary importance whether the offering is conducted offline or online"*.[174] These arguments are also in line with the UN Convention on the International Sale of Goods (CISG), which *inter*

[165] Case C-128/11, UsedSoft, para. 42.
[166] More on the principle of equivalence in Chris Reed, 'Online and Offline Equivalence: Aspiration and Achievement' [2010] International Journal of Law and Information Technology eaq006; Maurice HM Schellekens, 'What Holds Off-Line, Also Holds On-Line?' [2006] SSRN Scholarly Papers.
[167] Case C-128/11, UsedSoft, para. 47.
[168] Case C-128/11, UsedSoft, para. 61.
[169] World Intellectual Property Organization (WIPO), I*nternational Classification of Goods and Services for the Purposes of the Registration of Marks,* 10th ed., 2011 defines goods *inter alia* to include *"all computer programs and software regardless of recording media or means of dissemination, that is, software recorded on magnetic media or downloaded from a remote computer network."* - see Class 9, Explanatory Note. WIPO's practice is applied by the EU Office for the Harmonisation in the Internal Market (OHIM), which administers the European trademark system.
[170] Christopher Stothers, 'When Is Copyright Exhausted by a Software License? UsedSoft v. Oracle' (2012) 34 European Intellectual Property Review 787, 790; see also Emma Linklater, 'UsedSoft and the Big Bang Theory: Is the E-Exhaustion Meteor about to Strike?' 2014 SSRN Scholarly Papers.
[171] Joined cases 56 and 58/64, Établissements Consten S.à.R.L. and Grundig-Verkaufs-GmbH v Commission, ECLI:EU:C:1966:41.
[172] Case 78/70, Deutsche Grammophon Gesellschaft mbH v Metro-SB-Großmärkte GmbH & Co. KG, ECLI:EU:C:1971:59.
[173] Bradgate (n 153) para. 159.
[174] Thomas Dreier, 'Online and Its Effect on the "Goods" versus "Services" Distinction' (2013) 44 IIC-International Review of Intellectual Property and Competition Law 137, 138.

alia applies to situations in which software is permanently transferred to the other party in all respects except for the copyright – as opposed to mere agreements on temporary use against payment of royalties.[175] In this respect Diedrich clarifies that *"any item that can be commercially sold and in which property can be passed on and which is not explicitly excluded from the CISG's sphere of application by virtue of Art. 2 CISG can be the subject matter of a contract of sale, i.e. goods, pursuant to Art. 1(1) CISG."*[176] Accordingly, the sale of computer software is covered by the CISG as the latter does not limit its sphere of application to tangible things. The mode, in which software is delivered, i.e. via disc or electronically, is therefore irrelevant under CISG.[177] As Diedrich puts it, this would be the same as excluding beer from the sphere of application of CISG if it is being sold in a bottle and from the tap.

In contrast to this, in *Commission v Luxembourg and France*,[178] the EU Court denied affording digital books the same VAT status as afforded to the *"supply of books on all physical means of support"* for which Member States may apply a reduced rate of VAT, even though digital books also need a physical apparatus (such as a computer) to be read. The Court pointed out that a reduced rate of VAT can apply only to supplies of goods and services covered by Annex III to the VAT Directive, which refers in particular to the 'supply of books ... on all physical means of support'. The Court established that the reduced rate of VAT is applicable to a transaction consisting of the supply of a book found on a physical medium. While the Court admitted that to be able to read an electronic book, physical support is required, such support is, according to the Court, not included in the supply of electronic books, meaning that Annex III does not include the supply of such books within its scope. Moreover, the Court found that the VAT Directive excluded any possibility of a reduced VAT rate being applied to 'electronically supplied services' and held that the supply of electronic books is such a service.[179]

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[175] Peter Schlechtriem and Ingeborg H Schwenzer, *Commentary on the UN Convention on the International Sale of Goods (CISG)* (Oxford University Press 2005) 35.

[176] Frank Diedrich, 'The CISG and Computer Software Revisited' (2002) 6 Vindobona Journal of International Commercial Law and Arbitration 55.

[177] Schlechtriem and Schwenzer (n 176) 35. This view is also supported by the case law - See e.g. *Silicon Biomedical Instruments B.V. v. Erich Jaeger GmbH,* RB Arnhem, 28 June 2006, CISG-Online 1265, *(English version available at* http://cisgw3.law.pace.edu/cases/060628n1.html). The case concerned a dispute between a Dutch buyer and a German seller of software used in hospitals. CIGS was held to be applicable.

[178] Cases C-479/13, Commission v France, ECLI:EU:C:2015:141 and C-502/13, Commission v Luxembourg, ECLI:EU:C:2015:143.

[179] Ibidem, paras. 25-29.

What can be established from the foregoing is that the EU Court is not taking a uniform approach towards digital goods, but rather treats them alternately as goods and services. It is understandable that when determining the legal categorisation of digital goods, the EU Court (as well as the Commission) do not only examine objective characteristics of digital goods, but also consider the broader result they want to achieve through their case law and proposals of EU legislation. In line with the Court's elementary *modus operandi* one can conclude that when the Court was called upon to interpret the principles of EU law (e.g., the principle of exhaustion that is supporting free movement of goods on the internal market and limiting copyright) it was open to broaden the definition of the term "goods" so as to cover digital goods. In contrast, however, when the Court was called upon to interpret derogations to the principles of EU law it followed its established maxim of interpreting the derogations narrowly, thereby not allowing the broadening of the national autonomy in certain fields, which could lead to the partitioning of the internal market (such as a reduced rate of VAT), from physical goods to the digital ones. This varied approach of the EU Court towards classification of digital goods undeniably has several relevant legal consequences.

As far as the scope of the **Digital Content Directive**[180] and the **Sale of Goods Directive**[181] are concerned, the following definitions are used:

- **digital content**, meaning data which are produced and supplied in digital form;
- **digital service**, meaning a service that allows the consumer to create, process, store or access data in digital form or a service that allows the sharing of or any other interaction with data in digital form uploaded or created by the consumer or other users of the same service;
- **goods with digital elements**, meaning any tangible movable items that incorporate or are inter-connected with digital content or a digital service in such a way that the absence of that digital content or digital service would prevent the goods from performing their functions.

[180] Directive (EU) 2019/770 on certain aspects concerning contracts for the supply of digital content and digital services (the "Digital Content Directive" or "DCD", *OJ L 136, 22.5.2019, p. 1–27.*
[181] Directive (EU) 2019/771 concerning contracts for the sale of goods, amending Regulation (EU) 2017/2394 and Directive 2009/22/EC, and repealing Directive 1999/44/EC (the "Sale of Goods Directive" or "SGD", *OJ L 136, 22.5.2019, p. 28–50.*

The purpose of the Digital Content Directive is to contribute to the proper functioning of the internal market while providing for a high level of consumer protection, by laying down common rules on certain requirements concerning contracts between vendors and consumers for the supply of digital content or digital services. The DCD applies to any contract where the vendor supplies or undertakes to supply digital content or a digital service to the consumer and the consumer pays or undertakes to pay a price. For example, the DCD covers computer programs, applications, video files, audio files, music files, digital games, e-books or other e-publications, and also digital services which allow the creation, processing, accessing or storage of data in digital form, including software-as-a-service, such as video and audio sharing and other file hosting, word processing or games offered in the cloud computing environment and social media.

On the other hand, the Sale of Goods Directive vaguely mentions that it is applicable "to sales contracts between a consumer and a seller". Additionally, it should apply to digital content or digital services which are incorporated in or interconnected with goods, and are provided with the goods under the sales contract, irrespective of whether such digital content or digital service is supplied by the seller or by a third party. In case of doubt as to whether the supply of incorporated or interconnected digital content or an incorporated or interconnected digital service forms part of the sales contract, the digital content or digital service will be presumed to be covered by the sales contract.

For example, the SGD applies to the sale of any kind of "smart" equipment, such as a smartphone, smart TV (advertised as having access to certain applications) or smart watch. Digital content can be pre-installed upon the conclusion of the sales contract or, where that contract so provides, can be installed subsequently. Once such installation is provided for in the contract, it will be covered by the SGD.

If a consumer expressly agrees to buy a smartphone without a specific operating system and purchases the system separately from a third party, the supply of the separately bought operating system does not form part of the main sales contract and, as such, does not fall within the scope of the SGD. Similarly, if the consumer buys a car with no GPS and subsequently purchases one from a third (or even the same) party, those will also form two

separate contracts, one within the scope of the SGD and the other within the scope of the DCD.[182]

The Digital Services Act (DSA)[183] and Digital Markets Act (DMA),[184] adopted by the EU legislators in 2022, further add to the concept of digital services. Under this package digital services include a large category of online services, from simple websites to internet infrastructure services and online platforms. The rules specified in the DSA primarily concern online intermediaries and platforms. For example, online marketplaces, social networks, content-sharing platforms, app stores, and online travel and accommodation platforms. The Digital Markets Act includes rules that govern gatekeeper online platforms. Gatekeeper platforms are digital platforms with a systemic role in the internal market that function as bottlenecks between businesses and consumers for important digital services. Some of these services are also covered in the Digital Services Act, but for different reasons and with different types of provisions.

In the field of taxation, digital goods are generally considered services, not goods. Consequently, before 1 January 2015, the supply of services between businesses (B2B services) was, in principle, taxed at the customer's place of establishment, while services supplied to private individuals (B2C services) were taxed at the supplier's place of establishment. This allowed companies like Amazon, Microsoft, Apple, and Google to set up small offices in countries with favourable VAT rates and register all their European sales there. Luxembourg's "super-reduced" VAT rate on e-books (just 3 percent) thus meant that it became home to Amazon's European headquarters. The Directive 2008/8/EC[185] that became effective as of 1 January 2015 intended to shut down this tax loophole being used by big firms to charge less VAT on digital goods in that it provides that telecommunications, broadcasting and electronic services provided to a non-taxable person are, in all cases, taxable at the place where the customer is

[182] Daria Rutecka, The Digital Content Directive and the Sale of Goods Directive: when to apply which?, https://www.schoenherr.eu/content/the-digital-content-directive-and-the-sale-of-goods-directive-when-to-apply-which/ (22 October 2023).
[183] Regulation (EU) 2022/2065 of the European Parliament and of the Council of 19 October 2022 on a Single Market For Digital Services (Digital Services Act), *OJ L 277, 27.10.2022, p. 1–102.*
[184] Regulation (EU) 2022/1925 of the European Parliament and of the Council of 14 September 2022 on contestable and fair markets in the digital sector (Digital Markets Act), OJ L 265, 12.10.2022, p. 1–66.
[185] Council Directive 2008/8/EC of 12 February 2008 amending Directive 2006/112/EC as regards the place of supply of services, OJ L 44, 20.2.2008, p. 11-22.

located.[186] Accordingly, although considered services, digital goods now experience the same VAT treatment as the sales of goods, where in principle the location of the buyer determines the VAT rate. Consequently, when a Slovenian company is selling CDs over the Internet to private customers in Denmark, the Danish VAT must be charged when the Danish threshold is exceeded. The same is also now true for music sold in electronic form only.

Nevertheless, VAT treatment of digital and physical goods is not completely levelled as the EU Court refused to afford digital goods the same VAT status as is given to paper books. In the aforementioned cases *Commission v Luxembourg and France*[187] the EU Court held that the reduced VAT rate is applicable only to transactions consisting of the supplying of books found on a physical medium and rejected the argument that the supply of electronic books constituted a supply of goods (and not a supply of services). Only the physical support enabling an electronic book to be read could qualify as 'tangible property' but such support is not part of the supply of electronic books.[188] The principle of equivalence between online and offline property declared in *UsedSoft* therefore does not apply to VAT.

Consequently, Members of the European Parliament have asked the Commission to take urgent action to align VAT rates for electronic books and press with those applied to paper publications[189] and culture ministers of France, Germany, Poland and Italy wrote to the Commission demanding a review of the VAT regulations so they can align the tax levels for all books published in all forms. The statement of the latter says: *"Whether it is digital or printed, it is the content that makes the book, not the way the reader has access to it. A book is a book no matter what its form is. For these reasons, we share the belief that it is necessary to apply the same reduced rates of VAT to both digital and printed books. Technology-neutral regulations must be clearly asserted at the European level so that innovation and the development of e-books are not jeopardized."*[190] In this Declaration, the ministers asked the Commission to propose European legislation that would allow

[186] Article 58 of the VAT Directive. For more detail, see European Commission, Explanatory notes on the EU VAT changes to the place of supply of telecommunications, broadcasting and electronic services that enter into force in 2015, 3 April 2014.
[187] Cases C-479/13, Commission v France, ECLI:EU:C:2015:141 and C-502/13, Commission v Luxembourg, ECLI:EU:C:2015:143.
[188] Ibidem, para. 35.
[189] Cécile Barbière, 'MEPs Demand Urgent VAT Reduction for E-Books' *EurActiv.com* (20 May 2015).
[190] Joint Declaration on TVA for E-books, http://www.euractiv.com/files/20151903_mcc-declaration-en.pdf (accessible 22 October 2023).

reduced tax rates of VAT for all books whether they are printed or digital. In response, the Commission recognised in its digital strategy that the *"complications of having to deal with many different national systems represent a real obstacle for companies trying to trade cross-border both on and offline"* and said it will explore *"how to address the tax treatment of certain e-services, such as digital books and online publications, in the context of the general VAT reform."*[191] Under this reform, however, the Commission had to think through not only aspects of cultural diversity in respect of various media on which culture can be offered to the people,[192] but also environmental aspects, considering the environmental impact of paper books and newspapers in comparison to e-books and e-news. In any case, keeping the advantageous VAT position of paper books does not seem plausible in the long-term.

Finally, on 2 October 2018, the Council agreed a proposal allowing Member States to apply reduced, super-reduced or zero VAT rates to electronic publications, thereby allowing alignment of VAT rules for electronic and physical publications. However, super-reduced and zero rates will only be allowed for Member States that currently apply them to 'physical' publications. These rules apply temporarily, pending the introduction of a new, 'definitive' VAT system. The Commission has issued proposals for the new system, which would allow Member States more flexibility than at present in setting VAT rates.

[191] Communication from the Commission, A Digital Single Market Strategy for Europe, COM(2015) 192 final, p. 8.
[192] Cf Joint Cases 60/84 and 61/84, Cinéthèque v Fédération Nationale de Cinemas Francaises, ECLI:EU:C:1985:329, where the EU Court accepted protection of cinemas as a justified restriction on free movement of goods for reasons of legitimate protection of cultural diversity. See also Case C-353/89, Commission v Netherlands, ECLI:EU:C:1991:325, concerning national radio and television programmes.

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4 Legal challenges of servitisation – EU perspective

Modern economic and technological development needs to be followed by appropriate regulatory framework that will control the associated hazards. Considering that the industry and consumers are becoming ever smarter, smart regulatory solutions need to follow,[193] thereby establishing the right balance between safety, liability and competition on one side and innovation and flexibility on the other. Regulation can in this respect be both a driver and a serious barrier for the uptake of innovative technologies: on the one hand, it is helping to pave the way for more innovative solutions and is driving growth, while a lack of clear regulation is reducing competitiveness of the EU industry and functions as a barrier to growth.[194] Conversely, servitisation also has a rebound effect upon regulation – if just considering the impact of wide spreading practice of access based consumption, where consumers tend not to own anything, on the efficiency of civil and criminal law enforcement procedures that are premised upon ownership.

[193] Oettinger, 'Europe's Future Is Digital, Speech at Hannover Messe' Speech 15-4772 (15 April 2015).

[194] E.g., eCall system, an integrated telecommunication solution helping in case of serious accidents, was made mandatory for new cars from April 2018. In case a serious accident with a vehicle occurs, the system will automatically transmit an alert to the nearest emergency centre – Regulation (EU) 2015/758 of the European Parliament and of the Council of 29 April 2015 concerning type-approval requirements for the deployment of the eCall in-vehicle system based on the 112 service and amending Directive 2007/46/EU, OJ L 123, 19.5.2015, p. 77-89. Market research has suggested that the eCall regulations will significantly drive growth in this sector between 2015 and 2020 - Lengton and others, "Internet of Things, Connected Cars' (Business Innovation Observatory 2015) 11.

When framing the EU response to the servitisation trend, the EU institutions, however, need to respect the EU multi-level governance system, thereby respecting the competences of various levels of governance.[195] EU industrial policy is horizontal in nature and aims at securing framework conditions favourable to industrial competitiveness.[196] It falls among those policies, where the EU has competence to carry out actions to support the actions of the Member States (Article 6 TFEU). Consequently, it is the Member States that are the holders of their respective industrial policies, thereby adopting corresponding national strategies on digitalization of manufacturing.[197] The EU's response is in this respect focused on coordination between national and EU-level initiatives and in developing policy actions, such as investments in digital innovations and infrastructure, accelerating the development of ICT standards, exploring regulatory conditions and adaptation of the workforce, including up-skilling.

Moreover, EU industrial policy is well integrated into a number of other EU policies such as those relating to competition, consumers, trade, the internal market, research and innovation, employment, environmental protection and public health. This interweaving between industry and other policies logically affects the servitisation trend as well. Most of these fields are, however, not within exclusive competence of the EU institutions[198] and even though regulation at the EU level will in most instances be crucial so as to prevent a myriad of different national approaches that would create chaos and partition of the internal market, authorities at national and local level will, in line with the principles of subsidiarity and proportionality, need to get involved.

Moreover, other constitutional and institutional settings have to be respected in the regulatory process, including industry involvement and self-regulation in line with the 'New Approach' so that the market itself defines the technical solutions while

[195] Marks and others, 'European Integration from the 1980s: State-Centric v. Multi-Level Governance' (1996) 34 JCMS: Journal of Common Market Studies 341.
[196] Commission Communication, Industrial Policy in an Enlarged Europe, COM (2002) 714 final.
[197] In Germany the development of manufacturers equipping their products and machines with intelligent digital systems is referred to as *'Industrie 4.0',*[197] the French term for the same is *'Industrie du Futur'*, in the Netherlands and in Slovakia strategists talk about *'Smart Industry'*, in the UK about *'Catapult'* (High Value Manufacturing), in Spain about *'Industria Conectada 4.0',* and in Italy it is referred to as '*Fabbrica Intelligente'*. More in Bauernhansl, 'Industry 4.0: Challenges and Limitations in the Production. Keynote' [2013] ATKearney, Factory of the year; Dujin and others, 'INDUSTRy 4.0: The New Industrial Revolution' [2014] Roland Berger Strategy Consultants, Munich.
[198] See Articles 3-6 TFEU.

public authorities only set the general regulatory requirements.[199] In this respect, regulatory requirements will on the one hand restrict servitisation, e.g. when certain entities are not permitted to provide particular services,[200] while boosting it on the other, e.g. when servitisation is a response to environmental or consumer regulation.

Finally, regulation must leave enough flexibility so that law does not restrict technological development. Even though regulation at EU level will in most instances be crucial so as to prevent a myriad of different national approaches that would create a mess and partition the internal market, authorities at national and local level will need to get involved, where this is more appropriate than supranational response. At the same time, it is also important that this regulatory process does not by-pass democratic governance principles and that industry is included in the regulatory process, as well as that self-regulation replaces legislation where possible, so that only general regulatory requirements are set by the public authorities and the market defines the technical solutions.[201] The relationship between servitisation and law is not, however, one-sided, but rather an interactive one. Considering its multifaceted character, servitisation inherently touches upon a full spectrum of legal fields.

The following chapters make an overview of legal challenges related to servitisation from six aspects, according to the 'value' protected by various disciplines of EU law: a) free competition; b) consumers; c) intellectual property; d) data protection; e) environment and f) cross-border trade. The first five legal aspects correspond to the five drivers of servitisation, i.e., locking-out competitors, locking-in customers, innovation, data intensity and sustainability, while the last aspect corresponds to the tight connection between servitisation and globalisation. Additionally, important aspects of servitisation concern labour law,[202] criminal law[203] and forensic

[199] See Commission Communication, A vision for the internal market for industrial product, COM (2014) 25 final, p. 5. See also Klindt in Bräutigam and Klindt (n 197) 100–106; Weber and Weber, *Internet of Things: Legal Perspectives* (Springer Science & Business Media 2010) 23.

[200] E.g., broader EU definition of shadow banking leads to decline of the provision of some services by non-deposit taking entities, such as leasing activities of car sellers – see Commission **Communication, Shadow Banking – Addressing New Sources of Risk in the Financial Sector,** COM (2013) 614 final and a response by Leaseurope, Comments on the Green Paper on Shadow Banking, Brussels, date of the document not stated.

[201] Thomas Klindt in Peter Bräutigam and Thomas Klindt (n 197) 100–106; Weber and Weber (n 195) 23.

[202] It is estimated that 47 percent of all jobs in today's US labour market have a 70 percent or greater likelihood of being displaced by computers over the next decade or two, taking into account the advancement in robotics and artificial intelligence - Felländer, Ingram and Teigland (n 87) 11. See also Brishen Rogers, 'Social Costs of Uber' (2015) 82 University of Chicago Law Review Dialogue 85.

[203] Martin Schorn in Peter Bräutigam and Thomas Klindt (n 197) 187–195.

procedures,[204] as well as telecommunications law,[205] medical law[206] and many other fields of law and will also demand comprehensive examination in the future.

4.1 Single market for product-service systems

The internal market, covering both free movement of goods and free movement of services, is considered to be *'an excellent basis for the digitalisation of industry and an advantage in international competition'* and *'the only way to achieve the necessary economies of scale that justify investment and secure the competitiveness of European companies'*.[207] Nevertheless, as the complexity of servitisation solutions increases, companies can get into situations, where they are free to sell one part of the product-service system across the border, but not the whole system. Considering still existing differences in regulation of free movement of goods and services, the question arises whether product-service combinations move across the border under the provisions on free movement of goods or services and whether it is possible to adapt these rules to the newly developed integrated solutions, where the boundary between goods and services is blurred. Secondly, with fast development of new, ICT based servitisation models new national restrictions on the cross-border movement of such products may be anticipated with new justifications put forward by the Member States in that respect.

4.1.1 From 'product or service' to 'product and service' approach

Servitisation creates a challenge for the EU Court that oversees delineating between economic transactions that fall under the TFEU provisions on free movement of goods and services respectively. The servitisation movement is arguing that this distinction is no longer relevant and that one must see a combination or a bundle of products *and* services (so called product-service systems), rather than products or services. Consequently, Vandermerwe and Rada claim that it is no longer valid *'to draw simplistic distinctions between goods and services'* and that it is necessary to move from *'the old and outdated focus on goods or services to integrated 'bundles' or systems (…) with services*

[204] RC Hegarty, DJ Lamb and A Attwood, 'Digital Evidence Challenges in the Internet of Things', *Proceedings of the Tenth International Network Conference (INC 2014)* (Lulu com 2014).
[205] Tobias Frevert et al in Peter Bräutigam and Thomas Klindt (n 197) 179–186.
[206] Susanne Wende in ibid 196–214.
[207] WDMA European Office, "'Industrie 4.0: Mastering the Transition", 10 Key Recommendations for a European Framework for the Successful Digital Transition in Industry' (2016) 11.

in the lead role'.[208] Although managers may quickly adopt this holistic approach to their businesses and their customers' problems, legislators and courts are usually more conventional.

As found by Snell, the differentiating characteristic for the EU Court has been that goods are material objects, whereas services are not.[209] There are still some important legal consequences of the distinction between goods and services remains. Consequently, the EU Court has until now not guaranteed horizontal direct effect of the Treaty provisions on free movement of goods, while the provisions on free movement of services were.[210] This discrepancy has been accentuated when horizontal direct effect of the Services Directive (Art. 15) was considered by the Court. Advocate General Szpunar proposed horizontal direct effect should be recognised,[211] but this has not been supported by the Court. This way the Court stayed in line with its doctrine of not affording horizontal direct effect to provisions of directives. This is in line with a series of its previous rulings (and in line with the current wording of Article 288 TFEU),[212] nevertheless, it forms inconsistency between legal effects of free movement of services under the Treaty and the same principles as enshrined in the Directive. The latter relies on the Treaty provisions as interpreted by the Court, yet, due to the lack of horizontal direct effect of the Directive's provisions the latter have closer ambit than those (same) principles as provided in the Article 56 TFEU. This encourages claimants to advocate their case against a private defendant under the Treaty, rather than the Directive. Moreover, applicability of the Services Directive can hardly be limited to *"pure services"* and although the Directive itself refers to free movement of services and freedom of establishment, it is increasingly clear that to a large extend it also refers to free movement of goods. Contrary to the position of scholarship that selling goods

[208] Vandermerwe and Rada (n 16) 314.
[209] Jukka Snell, *Goods and Services in EC Law: A Study of the Relationship Between the Freedoms* (Oxford University Press 2002) 4.
[210] Cf cases C-159/00, Sapod Audic v Eco-Emballages SA, ECLI:EU:C:2002:343 and C-341/05, *Laval* un Partneri, ECLI:EU:C:2007:809 at one hand and cases C-267 and 268/91, *Keck and Mithouard,* ECLI:EU:C:1993:905 and C-384/93, *Alpine* Investments, ECLI:EU:C:1995:126 on the other. For comments see Christoph Krenn, 'A Missing Piece in the Horizontal Effect "Jigsaw": Horizontal Direct Effect and the Free Movement of Goods' (2012) 49 Common Market Law Review 177; Dorota Leczykiewicz and Stephen Weatherill, *The Involvement of EU Law in Private Law Relationships* (Bloomsbury Publishing 2013); Pal Wenneras and K Boe Moen, 'Selling Arrangements, Keeping Keck'(2010)' 35 European Law Review 387; Mads Tønnesson Andenæs and Wulf-Henning Roth, *Services and Free Movement in EU Law* (Oxford University Press 2002).
[211] Case C-261/20, Thelen Technopark Berlin, ECLI:EU:C:2021:620.
[212] For a comment see Justin Lindeboom, 'Op-Ed: "No Horizontal Direct Effect of the Services Directive, and a Good Thing Too: Thelen Technopark"', EU Law Live, 23 Feb 2022.

should in general be excluded from the Services Directive because *"the corollary of the fact that the Directive applies to services is that it does not apply to goods",*[213] the Commission advocated that the Directive also applies to the retail and wholesale of goods.[214] This is practically very important.[215] In this respect, a request for a preliminary ruling by the Dutch Raad van State was lodged in 2016,[216] questioning whether retail falls within the scope of the Services Directive. Advocate General Szpunar concluded to the confirmative,[217] pointing out that with the arrival of the Internet retail not only consists of merely selling a product, but also of advising, counselling and offering follow-up services and that as such, it is not an activity which is merely ancillary to a product.[218] According to him, Bristol BV, a firm wishing to establish a retail outlet for its shoe and clothing discount chain, is therefore a service provider which can rely on the provisions of the Services Directive. Although the Grand Chamber of the EU Court has not completely followed the Advocate General, it has confirmed that the Directive applies to the retail sector, blurring the sharp distinction between goods and services.

The established approach of the Court in situations of product-service combinations has been to determine, whether within a certain product-service bundle goods or services dominate *(the dominance approach)*. This is supported by the EU Court's ruling in *Burmanjer*,[219] where the EU Court stated that an economic activity should be examined in the context of either the free movement of goods or the freedom to provide services, if one of these elements *'is entirely secondary in relation to the other and may be considered together with it'*.[220] Consequently, production of goods was categorised under goods, not services. In *Commission v France*[221] the EU Court held that *'printing work cannot be described as a service, since it leads directly to the manufacture of a physical*

[213] Catherine Barnard, 'Unravelling the Services Directive' (2008) 45 CMLRev 323, 335.
[214] Commission's Handbook on the implementation of the Services Directive refers to 'distributive trades (including retail and wholesale of goods and services)' - Office for Official Publications of the EC, 2007, point 2.1.1.
[215] See e.g. Janja Hojnik, Tell me where you come from and I will tell you the price: Ambiguous expansion of prohibited geographical price discrimination in the EU, CMLRev 2019, 23.
[216] Joined Cases C-360/15 and C-31/16, College van Burgemeester en Wethouders van de gemeente Amersfoort v X BV and Visser Vastgoed Beleggingen BV v Raad van de gemeente Appingedam, ECLI:EU:C:2018:44.
[217] Ibidem, Opinion of Advocate General Szpunar delivered on 18 May 2017, para. 80 and 105, referring to the drafting history of the directive that reveals that the European Parliament initially attempted to remove the reference to 'distributive trades' during the first reading, while the Council reinstated such a reference in the draft, which stayed until the adoption of the directive – para 72.
[218] Ibidem, para. 102. More on this in Joasia A. Luzak, 'Time to Let Go of the Services/Goods Distinction? - CJEU in X (C-360/15 & C-31/16)' *Blog Recent developments in European Consumer Law* (1 February 2018).
[219] Case C-20/03, Marcel Burmanjer, ECLI:EU:C:2005:307.
[220] Ibid., para. 34-35. Cf case C-108/09 Ker-Optika bt, ECLI:EU:C:2010:725, para. 43.
[221] Case 18/84, Commission v France, ECLI:EU:C:1985:175.

article'.[222] In contrast to this, however, the EU Court held in *van Schaik*[223] that a contract on repair services for a car presented performance of services and not goods as the supply of spare parts was only ancillary to the service provision. Restrictions that apply for repair services from other Member States are thus considered under the free movement of services. Moreover, restrictions on leasing contracts between the Member States were also assessed in the light of the free movement of services,[224] which suggests that car sharing would be treated in the same way, as well as other servitisation models that are based on renting. Even a case concerning Hungarian legislation, which prohibited the operation of slot machines outside casinos, was decided on the basis of free movement of services provisions, not goods as one might expect.[225] Accordingly, servitisation transactions that include the transfer of product ownership will mostly fall under the free movement of goods. Where ownership is kept by the trader, however, rules on free movement of services will be applied. In the digital era, where the distinction between goods and services is increasingly blurred, however, the dominance approach to product-service systems becomes particularly problematic. Nevertheless, smart products enabled by the IoT will usually fall under the category of goods (e.g. selling a connected car or a thermostat with sensors enabling remote control either by the house owner or by the producer). The same holds for 3D printing, i.e. under the condition that the trader will send the customer already printed products; however, if only a digital design (CAD) is sold and the purchaser prints the product himself, rules on free movement of services will apply for the first transaction. The EU Court's approach to digital goods depends on the medium: if digital goods are not related to a tangible entity, rules on services will apply; if they do, rules concerning goods will apply.[226] Conversely, however, the *UsedSoft*[227] case was decided using free movement of goods principles although it referred solely to the downloading and storing of software on customers' computers. The EU Court made a number of arguments about the *principle of equivalence* between digital and physical goods, ruling that it made no difference whether the copy of the computer program was made available to the

[222] Ibidem, para. 12.
[223] Case C-55/93, Johannes Gerrit Cornelis van Schaik, ECLI:EU:C:1994:363.
[224] Case C-451/99, Cura Anlagen v Auto Service Leasing GmbH, ECLI:EU:C:2002:195.
[225] Case C-98/14 Berlington Hungary, ECLI:EU:C:2015:386. Conversely, however, the case *Läärä v Finland (Case* C-124/97, ECLI:EU:C:1999:435) that concerned rules on gambling machines, was determined in view of the free movement of goods provisions.
[226] Case C-244/06, Dynamic Medien Vertriebs, ECLI:EU:C:2008:85. Cf Joined Cases C-403/08 and C-428/08, Football Association Premier League, ECLI:EU:C:2011:631.
[227] Case C-128/11, UsedSoft GmbH v Oracle International Corp., ECLI:EU:C:2012:407.

customer by means of a download or a physical CD or DVD[228] and that the online transmission method was the '*functional equivalent*' to the supply of a material medium.[229] The *UsedSoft* ruling thus makes a step from the dominance to the *integration approach*, supported by the servitisation movement, although the Court will not be able to fully abandon the former approach and support the latter until there are two separate systems of rules behind this distinction, one for goods and one for services (and potentially the third for digital content).

4.1.2 True (digital) single market for product-service systems

Considering that the EU Treaties promote both free movement of goods and services, all barriers to cross-border movement of product-service systems should in principle be inconsistent with the Treaties and thus abandoned. This may lead to a conclusion that integrated solutions that are the result of servitisation may use benefits of the single market, regardless the precise form of the product-service bundle. In line with this, in a series of cases the EU Court asked the Member States to remove barriers on cross-border servitisation transactions. France was unsuccessful in defending its rules that prevented Boscher, a firm of auctioneers ('commissaires-priseurs') operating in Paris, that was instructed by the German company Nado, to sell by public auction a number of expensive second-hand vehicles. The rules required that the owner or person in possession of the vehicles was entered in the trade register at the place of the sale, i.e. in Paris. The Court was quick to conclude that this national legislation was incompatible with the Treaty provisions on free movement of goods.[230] However, there may be other aspects of law that are in the competence of the Member States and still legitimately hinder free trade on the internal market. Thus, in *Cura Anlagen*[231], ASL leased a German-registered passenger vehicle to Cura Anlagen for 36 months, for a fixed monthly sum, including the cost of compulsory insurance, plus an additional rate per 1 000 km covered by the vehicle over and above a certain distance. After bringing the vehicle into Austria in February 1999, Cura Anlagen was unable to use it there in accordance with the terms of the contract because of the provisions prohibiting the driving of a vehicle with foreign plates in Austria for more than three days. The EU

[228] Ibidem, para. 47.
[229] Ibidem, para. 61.
[230] Case C-239/90, SCP Boscher, Studer et Fromentin v SA British Motors Wright and Others, ECLI:EU:C:1991:180.
[231] Case C-451/99, Cura Anlagen, cit. op.

Court held that '*registration appears to be the natural corollary of the exercise of those powers of taxation',* however *'Member States cannot impose a time-limit that is so short as to make it impossible or excessively difficult to comply with the obligations imposed'.*[232] Consequently, Member States may still restrict cross-border leasing services, providing these restrictions are not excessively difficult for the parties involved. Conversely, there are occasions, where the national legislation obliges manufacturers to offer services in addition to the product thereby partitioning the internal market, e.g. by imposing obligatory guarantees. Although this obligation might help the manufacturers to attract consumers, it is considered as a measure having equivalent effect to quantitative restrictions (MEQR) under the free movement of goods. Consequently, in 2009 the Commission warned Slovenia of its breach of the Directive 1999/44/EC on the sale of consumer goods and associated guarantees,[233] because the national implementing legislation enacted a mandatory guarantee for manufacturers, not only a voluntary. Although this requirement was imposed on a non-discriminatory basis, the Commission considered it as an additional administrative burden and thus a MEQR, taking into account that a foreign manufacturer might have offered guarantee under different conditions as prescribed by the Slovenian legislation.[234] Imposing a servitizing duty for manufacturers by the Member States is thus permitted only if it is within the EU law boundaries.

EU free movement law is not, however, only concerned with traditional services that are added to the products, but increasingly also with digital services and products. The fact that EU digital single market (DGS) is still not completed poses significant difficulties for manufacturers, particularly those engaged in the digitalisation of industry. Considering that the new industry is based on data, free flow of the latter is essential for digitising industry. *Reinhold Festge (WDMA) is critical about the delay in the establishment of the digital single market, saying that 'legislators tend to treat machines from the digital age like machines from the industrial revolution, but connected to the Internet, somehow'* and warns that *'If the single market is not ready in time, the digitalisation of industry will be shaped by companies outside the EU, notably the US.'*[235] Nevertheless, the Digital Single

[232] See para. 41 and 46.
[233] *OJ L 171, 7.7.1999, p. 12-16. Now replaced by Directive (EU) 2019/771* on certain aspects concerning contracts for the sale of goods, *OJ L 136, 22.5.2019, p. 28–50.*
[234] Damjan Možina, Obvezna garancija za brezhibno delovanje in varstvo kupca v Evropskem pravu. Podjetje in delo, 2011, 38; Rajko Knez, 'Garancije za brezhibno delovanje stvari: ni vse zlato, kar se sveti' Kolumna Ius Info 8 October 2007.
[235] Reinhold Festge (n 104).

Market Strategy[236] provides a strategic framework for the digital economy including smart objects like the connected cars and other smart objects, and focusses *inter alia* on providing better access for consumers and businesses to online goods and services. It is therefore widely believed that the DSM is *'all about time'*.[237] As emphasised by the Commission, its aim is *'to achieve a single market for the Internet of Things, where any device can plug and play in a trusted way without hindrance from national borders.'*[238]

In contrast, in relation to the platform economy the EU Court declared in *Uber Spain*[239] that an intermediation service, the purpose of which is to connect, by means of a smartphone application and for remuneration, non-professional drivers using their own vehicle with persons who wish to make urban journeys, must be regarded as being inherently linked to a transport service and, accordingly, must be classified as 'a service in the field of transport' within the meaning of EU law. Consequently, such a service is excluded from the scope of the freedom to provide services in general as well as the directive on services in the internal market and the directive on electronic commerce. It follows that it is for the Member States to regulate the conditions under which such services are to be provided Moreover, in relation to *Airbnb*[240], the Grand Chamber of the Court held that Directive 2006/123 applies to legislation of a Member State relating to activities consisting in the repeated short-term letting, for remuneration, whether on a professional or non-professional basis, of furnished accommodation to a transient clientele which does not take up residence there. Nevertheless, combating the long-term rental housing shortage constitutes an overriding reason relating to the public interest justifying national legislation making short-term letting of accommodation to a transient clientele which does not take up residence there subject to authorisation. This means that when it comes to regulating platform economy, we see a combination of national and EU competences, as well as a mixture of binding and non-binding legal instruments. To illustrate, the Commission has proposed a set of measures, both binding and non-binding, to improve the working conditions in platform work and

[236] Communication from the Commission, A Digital Single Market Strategy for Europe, COM(2015) 192 final, p. 3.
[237] Jorge Valero, 'Kaja Kallas: Digital Single Market "Is All about Time"' (*EurActiv*, 19 January 2016).
[238] See European Commission, An Action Plan for Digitising European Industry, Draft, 23 December 2015, p. 67.
[239] Case C-434/15, Asociación Profesional Elite Taxi v Uber Systems Spain SL, ECLI:EU:C:2017:981.
[240] Joined Cases C-724/18, Cali Apartments v Procureur général près la cour d'appel de Paris et ville de Paris and C-727/18, HX v Procureur général près la cour d'appel de Paris et ville de Paris, ECLI:EU:C:2020:743.

to support the sustainable growth of digital labour platforms in the EU.[241] This should ensure that people working through digital labour platforms can enjoy the labour rights and social benefits they are entitled to.

4.1.3 Free trade with 3D printed goods

In some situations, it will, however, be legitimate for the Member States to restrict free trade. At least two situations may already be foreseen in relation to the new manufacturing trends that are not harmonised at the EU level and will likely lead to fragmentation of the single market by the Member States. Firstly, while the masses are amazed by the advancements and astonishing developments in the 3D printing sector, this new technology also enables home production of 3D printed guns, exactly like the one a law student (how unfortunately!) at the University of Texas developed and printed using 3D printer bought on eBay.[242] The design programme is called the Liberator and serves as a basis for printing plastic guns.[243] Although there were initial doubts as to the shortcomings of such guns, it is now evident that they are sound and fully operational.[244] Further concerns arise from the fact that in only two days after this Texas student released its blueprint on Pirate Bay, it was downloaded over 100.000 times.[245] US Bureau of Explosives issued a public warning that 3D printed firearms *'can defeat normal detection such as metal detectors'* and could thus *'present a problem to public safety'*.[246] Professor Hull's wife, who rushed that evening in 1983 to her husband's lab to see his first ever 3D printed object, probably did not expect that small cup would years later lead to 3D printed guns.[247] The EU Commission warned about the threats connected with 3D printed guns already in

[241] A proposal for a Directive on improving working conditions in platform work (COM(2021) 762 final) includes measures to correctly determine the employment status of people working through digital labour platforms and new rights for both workers and self-employed people regarding algorithmic management. While Draft Guidelines clarify the application of EU competition law to collective agreements of solo self-employed people seeking to improve their working conditions, including those working through digital labour platforms.

[242] This student's name is Cody Wilson, a founder and director of Defense Distributed, a non-profit organisation that develops and publishes open-source gun designs, suitable for 3D printing.

[243] Andy Greenberg, 'Meet the Liberator: Test-Firing the World's First Fully 3D-Printed Gun' (2013) 14 Retrieved on July 2013.

[244] Carrie Johnson Twitter, 'Plastic Guns Made With 3-D Printers Pose New Security Concerns' (*NPR.org*).

[245] A Greenberg, *3D-Printed Gun's Blueprints Downloaded 100,000 Times In Two Days (With Some Help From Kim Dotcom)* (FORBES, May 2013).

[246] Twitter (n 265); for a review of legal issues under US law see: Barton Lee, 'Where Gutenberg Meets Guns: The Liberator, 3D-Printed Weapons, and the First Amendment [notes]' [2013] North Carolina Law Review 1393; and Dubin (n 262).

[247] Hull (n 90).

its Communication from October 2013[248] and made a commitment to follow the development in its November 2015 proposal on amending the EU Firearms directive.[249] Considering the lack of express prohibition of 3D printed guns at EU level, UK made a decision to make *'the manufacture, sale or possession of 3D guns illegal'*.[250] Other Member States are likely to follow and they would probably be successful in raising public security concerns in cases of potential claims against the restrictions on free trade with such products.

4.1.4 Social robots

Similar fragmentation of the internal market might also arise in relation to so-called *'social robots'*. These are designed to personally interact with its human owner and are almost indistinguishable from their human counterparts. Despite their appearance, however, they are not afforded with legal protection like human creations, but are considered as simple chattels, like an umbrella.[251] This becomes problematic, when such social robots are manufactured for purposes of child sexual exploitation. The new technology thus enables transformation of lifeless sex dolls that may already be purchased over the Internet, into complex machines that look and act like real human beings.[252] This situation is comparable to the issues of virtual child pornography that is in most jurisdictions, as far as legal treatment is concerned, indistinguishable from real child pornography. Regulation in this respect is mostly limited to the property law provisions, affording their owner full control over such social robots, even though they look as children and are intended for sexual use, without any special protection that is for example nowadays afforded to animals, where several jurisdictions already prohibit any sexual activity with an animal.[253] It is subject to discussion whether this is appropriate; however, from the EU internal market one may quickly get associations to the *Conegate* case,[254] in which the UK unsuccessfully relied on public morality concern to restrict free movement of *'love-*

[248] Commission's Communication, Firearms and the internal security of the EU: protecting citizens and disrupting illegal trafficking, COM (2013) 716 final.
[249] See Article 17 of the Proposal for a Directive amending Directive 91/477/EEC on control of the acquisition and possession of weapons, 18 November 2015.
[250] UK Home Office, Guide on Firearms Licensing Law, December 2015.
[251] Even though nowadays, even an umbrella might be considered as a service - Danny Cohn, 'Is an Umbrella a Product or a Service?!' <http://designit-tlv.com/umbrella-product-service/> (accessed 23 October 2023).
[252] Tim Bowler, 'Will We Ever Want to Have Sex with Robots?' (*BBC News*, 27 August 2013).
[253] Kate Darling, 'Extending Legal Rights to Social Robots', *We Robot Conference, University of Miami, April* (2012), SSRN Scholarly Paper ID 2044797.
[254] Case 121/85, **Conegate Limited v HM Customs & Excise,** ECLI:EU:C:1986:114.

dolls', considering that the UK did not object domestic production of the same products. Had this protectionism not occurred, it would probably be granted approval of the restriction on free movement by the EU Court.[255] Without EU harmonising legislation concerning trade with 3D printed guns and social robots, Member States will thus be free to restrict their production and distribution, claiming public morality and security justifications.

4.2 Servitisation as a strategy for causing competitive harm

Competition law is perhaps the most restrictive field of law from the servitisation perspective preventing companies from adopting certain business models altogether. For example, rules that control vertical integration may restrict free servitisation policy of manufacturers,[256] which is particularly important, considering that companies that are adopting servitisation strategy have a strong focus on the *'aftermarket'* and derive significant value from the sales of spares and repairs.[257] More particularly, EU law expressly restricts motor vehicles repairs to be done by the brand-owners.[258] While competition law restrict certain servitisation models, the latter at the same time impose numerous new challenges upon competition law, such as distribution over the Internet and operation of Internet platforms.[259]

4.2.1 Anti-competitive practices of tying and bundling

Generally speaking, servitisation as a strategy that promotes bundling of products and services most obviously and directly collides with rules on competition that consider practices of selling two or more products and/or services jointly (i.e. tying

[255] As Henn and Darby case affirms: 34/79, ECLI:EU:C:1979:295.
[256] James C Cooper and others, 'Vertical Antitrust Policy as a Problem of Inference' (2005) 23 International Journal of Industrial Organization 639. Commission Regulation 330/2010 on the application of Article 101(3) of the TFEU to categories of vertical agreements and concerted practices, OJ L 102, 23.4.2010, p. 1-7.
[257] Andy Neely, 'Making the Shift to Services' (2014) 2014 Institute for Manufacturing Review 12, 13.
[258] Commission Regulation 461/2010 on the application of Article 101(3) of the Treaty on the Functioning of the European Union to categories of vertical agreements and concerted practices in the motor vehicle sector, OJ L 129, 28.5.2010, p. 52–57 and Commission notice - Supplementary guidelines on vertical restraints in agreements for the sale and repair of motor vehicles and for the distribution of spare parts for motor vehicles. For a background of this regulation see Damien Gerard, 'Regulated Competition in the Automobile Distribution Sector: A Comparative Analysis of the Car Distribution System in the US and the EU' [2003] European Competition Law Review 518. Nevertheless, the Commission was more open towards certain servitisation models under its merger review and has, for example, cleared several joint ventures in the field of car sharing: see Austrian REWE International AG – case number M.6402; D'Ieteren&Continental - case number M.7266, decision of 5 August 2014; OJ C260, 09.08.2014; DriveNow – case number M.6148.
[259] Alexander Birnstiel et al in Peter Bräutigam and Thomas Klindt (n 197) 153.

and bundling) as anti-competitive.[260] Among the many reasons to offer a bundled product is price discrimination, entry deterrence and cost savings creation.[261] The aforementioned *'reversed servitisation'* of Xerox happened precisely for the reason of the firm's breach of US antitrust rules by way of bundled leasing of the photocopying machines, high priced tonners (called 'black gold' at the time) and maintenance services.[262] This is far from saying, however, that competition law prohibits every product-service bundle, taking into account that tying is a normal feature of commercial life.[263] As found by Carlton and Waldman, *'a crucial aspect of tying from an antitrust perspective is that there is so much tying in real-world markets and most of that tying is driven by efficiency'*.[264] Advocates of bundling claim that companies and society at large often reap benefits from bundling. An obvious explanation for many bundles is that the company can integrate the products better than its customers can.[265] Moreover, tying may be used to maintain the efficiency of the tying product or lead to lower prices.[266] Thus, an overly stringent tying law might prevent efficient product

[260] Rousseva explains that the distinction between bundling and tying is technical; in the case of tying, one of the products (the tied product), can be purchased independently, in the case of bundling, however, no distinction is made between the purchases of the products involved - Ekaterina Rousseva, *Rethinking Exclusionary Abuses in EU Competition Law* (Hart Publishing 2010) 219. Moreover, legal theory distinguishes between 'pure bundling', which is the practice of offering two or more goods only in bundled form, and 'mixed bundling' that refers to the offering of two goods both separately and as a bundle. See F Enrique Gonzalez Diaz and Anton Leis Garcia, 'Tying and Bundling under EU Competition Law: Future Prospects [article]' [2007] Competition Law International 13; Keith N Hylton and Michael A Salinger, 'Tying Law and Policy: A Decision Theoretic Approach' SSRN Scholarly Paper ID 267170; Alison Jones and Brenda Sufrin, *EU Competition Law: Text, Cases, and Materials* (Oxford University Press 2014) 485.

[261] Michael A Salinger, 'A Graphical Analysis of Bundling' (1995) 68 The Journal of Business 85.

[262] Xerox had had nearly 1000 patents on copying machines in mid 1970s and a monopoly on plain-paper copying and 86 percent of total U.S. office copier sales and lease revenue in 1971. Xerox increased its profits through a sophisticated price discrimination strategy. One way of extracting more revenue from high-use customers was to tie the sales of toner to the use of Xerox copiers. Toner was priced at such levels that it was called 'black gold' by Xerox insiders. Additionally, Xerox set prohibitively high sale prices for its machines, inducing virtually all customers to lease rather than purchasing. It offered more economical lease terms to high-volume users than to low-volume customers. Service was bundled with the lease of a Xerox machine, making it difficult for independent service vendors to compete. In 1973 the Federal Trade Commission issued a complaint alleging that Xerox had monopolized the copying machine market and a plain-paper copier submarket, thereby violating Section 5 of the US Federal Trade Commission Act. Xerox chose to negotiate. In mid-1975, a consent agreement was reached and approved by the Federal Trade Commission. The most comprehensive analysis by Erwin A Blackstone, 'Copying-Machine Industry: Innovations, Patents, and Pricing, The' (1972) 6 Antitrust Law & Economics Review 105. See also David T Kearns, David Mauler and Sunny Kleinfield, *Xerox-Prophets in the Dark: How Xerox Reinvented Itself and Beat Back the Japanese* (Harper Business 1992) 64–65 and F. M. Scherer, 'Technological Innovation and Monopolization' (US Department of Justice Document 2006).

[263] Richard Whish and David Bailey, *Competition Law* (Oxford University Press 2015) 730.

[264] Dennis W Carlton and Michael Waldman, 'Tying' SSRN Scholarly Paper ID 1529843 1859.

[265] Barry Nalebuff, 'Bundling as an Entry Barrier' (2004) 119 Quarterly Journal of Economics 159.

[266] Whish and Bailey (n 260) 730–731; Adam D Rennhoff and Konstantinos Serfes, 'The Role of Upstream-Downstream Competition on Bundling Decisions: Should Regulators Force Firms to Unbundle?' (2009) 18 Journal of Economics & Management Strategy 547. Martin Peitz, 'Bundling May Blockade Entry' (2008) 26 International Journal of Industrial Organization 41, 41–42; David S Evans and Michael Salinger, 'Why Do Firms Bundle and Tie-Evidence from Competitive Markets and Implications for Tying Law' (2005) 22 Yale Journal on Regulation 37.

integration by imposing the requirement of the separate product test.[267] The Commission's and the EU Court's approach has been long criticised for being based on form and for ignoring the fact that tying may be undertaken with the view to attaining efficiency gains and delivering benefits to consumers.[268] Whish and Bailey highlight that *'manufacturing activity, by its very nature, involves the bringing together of different components'*, and conclude that *'it would be perverse to suggest that, when engaged in by a dominant firm, such behaviour should be stigmatised as presumptively unlawful'*.[269] In line with this argument, the Commission nowadays does not maintain a presumption that tying normally causes competitive harm. Tying is thus no longer *per se* illegal. Instead, the Article 102 Enforcement Priorities Guidance notes that *'(t)ying and bundling are common practices intended to provide customers with better products or offerings in more cost effective way'*.[270] This is considered as the biggest change in the Commission's 'new approach' towards tying and bundling.[271]

Nevertheless, tying and bundling practices can sometimes lead to serious competitive harm if employed by a dominant firm. Competition authorities have thus examined tying and bundling as a business practice that may affect market structure – they are accused to be an instrument to induce exit and deter or blockade entry.[272] A company that has market power in two goods, can, by bundling them together make it harder for a competitor with only one of these goods to enter the market. Tying and bundling allow an incumbent to credibly defend both products without having to price low in each.[273] A firm that has only some components of a bundle will find it hard to enter against an incumbent who sells a package solution at a discount. This will be especially true when the consumers have positively correlated values for the components of the package or when the components are complements.[274] Providing that certain conditions are met, bundling may thus be proclaimed as anti-competitive, and the companies are forced by the authorities to abandon their servitisation practice that is in breach of competition law. Within the EU, both Article 101(1) and 102(2) TFEU specifically list tying as an example of

[267] Jonathan Faull and Ali Nikpay, *Faull and Nikpay: The EU Law of Competition* (OUP Oxford 2014) 457.
[268] Rousseva (n 257) 219.
[269] Whish and Bailey (n 260) 730.
[270] Communication from the Commission: Guidance on its enforcement priorities in applying Article 82 of the EC Treaty to abusive exclusionary conduct by dominant undertakings, OJ C 45, 24.2.2009, p. 7-20, para. 49.
[271] Faull and Nikpay (n 264) 456.
[272] Nalebuff (n 262); Peitz (n 263).
[273] Nalebuff (n 262).
[274] ibid.

infringements,[275] unless they are objectively justified.[276] Consequently, *Digital Undertaking*, a computer supplier, needed to adjust its services in the aftermarket, after the Commission accused the firm of abusing its dominant position on the software support market as it made it uneconomic for customers to buy the hardware maintenance from a third party. Competitors in the hardware maintenance market were therefore excluded from servicing Digital systems.[277] In *Napier Brown – British Sugar* the Commission started an investigation, because the undertaking adopted a delivery pricing policy, which, by only providing the product and the delivery together, excluded competition on the separate although ancillary transport market.[278] Further examples of the tying rules' effect upon servitisation include a dominant supplier withdrawing the benefit of a guarantee unless a customer uses a supplier's components as opposed to those of third party.[279] *Microsoft* is another prominent case that was investigated at both sides of the Atlantic for technical bundling of two services – Windows operating system with its Windows Media Player[280] and similar investigations against *Google* in relation to its Android mobile operating system and applications were announced, both in the EU and in the USA.[281]

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[275] Thomas Eilmansberger, 'How to Distinguish Good from Bad Competition under Article 82 EC: In Search of Clearer and More Coherent Standards for Anti-Competitive Abuses' (2005) 42 Common Market Law Review 129, 153; Whish and Bailey (n 260) 731. Moreover, issues of tying and bundling have also arisen in cases under the EU Merger Regulation – e.g. Case M 2416, decision of 30 October 2001, Tetra Laval/Sidel, OJ 2004, L43, p. 13.

[276] In relation to objective justifications for the tie, the Commission's Guidance provides that it will consider claims that tying and bundling may lead to savings in production or distribution that would benefit consumers (Article 102 Guidance, para. 62). Rousseva is in this respect critical of the fact that the major concern of the EU Court has been that tying and bundling may oust competitors from the market. Keeping competitors' access to the market open has thus been crucial for the EU Court, no matter whether the competitors are efficient of not. Consequently, in respect of the consumer interest, the possibility to choose among various suppliers was the only aspect of consumer welfare that was considered by the EU Court, thereby ignoring benefits that might have accrued to consumers as a result of the tying practice - Rousseva (n 124) 225.

[277] Commission Press Release IP/97/868, cf Jones and Sufrin (n 257) 462.

[278] (1988) OJ L284, p. 41.

[279] Whish and Bailey (n 260) 729 referring to the case Novo Nordisk, XXVIth Report on Competition Policy, 1996, pp. 142-143.

[280] COMP/C-3/37.792, 24 March 2004, (2005) 4 CMLR 965. For a comment see: Damien Geradin, 'Limiting the Scope of Article 82 EC: What Can the EU Learn from the US Supreme Court's Judgment in *Trinko* in the Wake of *Microsoft*, *IMS,* and *Deutsche Telekom* (2004) 41 Common Market Law Review 1519; Kai-Uwe Kühn, Robert Stillman and Cristina Caffarra, 'Economic Theories of Bundling and Their Policy Implications in Abuse Cases: An Assessment in Light of the Microsoft Case' (2005) 1 European Competition Journal 85; Pierre Larouche, 'The European Microsoft Case at the Crossroads of Competition Policy and Innovation' SSRN Scholarly Paper ID 1140165.

[281] Samuel Gibbs, 'Reviewing Google's Practices a High Priority, Says EU Antitrust Chief' *The Guardian* (26 October 2015); see also Sam Thielman, 'Google's Android under Antitrust Investigation by FTC' *The Guardian* (25 September 2015) and European Commission, Fact Sheet, 'Antitrust: Commission Opens Formal Investigation against Google in Relation to Android Mobile Operating System' *MEMO/15/4782* (2015). This investigation is distinct and separate from the Commission investigation into Google's behaviour in internet search – see Florian Wagner-Von Papp, 'Should Google's Secret Sauce Be Organic?' (2015) 16 Melbourne Journal of International Law 1.

The EU General Court recently confirmed the Commission's decision that Google imposed unlawful restrictions on manufacturers of Android mobile devices and mobile network operators, thereby imposing a fine of €4.125 billion on Google.[282]

It should be noted in this respect that dynamic new technology markets are likely to receive greater competition law scrutiny; as new innovations in mobile technologies appear, new competitive harms may arise.[283] Cautiousness is needed as overextension of competition law to emerging, integrated products can stymie innovation and thereby decrease consumer welfare. On the other hand, however, refusing to extend competition law may lead to higher prices and thereby decreasing the consumer welfare.[284] The new technologies bring new challenges for competition authorities, considering rapid changes of products and their prices of technological products and services, as well as widespread bundling of not just one but numerous services into a product[285] thereby disabling price transparency of each part of the bundle. Despite the challenges of servitisation in the digital age, it may be concluded that current tying and bundling law is sufficiently flexible to address challenges of new technology products and services, but courts must also be aware of the dangers posed by non-equilibrium-based arguments and econometric analyses, while remaining open to new means of proving competitive harm.[286] 'Smart' response is thus needed to appropriately balance the various interests.

4.2.2 Sharing economy as a threat to fair competition

Moreover, a legal analysis of servitisation cannot avoid challenges imposed by the so-called sharing or collaborative economy,[287] which has been defined to include the renting, bartering, loaning and swapping of assets that are typically underutilized,

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[282] Case T-604/18, Google and Alphabet v Commission (Google Android), ECLI:EU:T:2022:541.

[283] Thomas H Au, 'Anticompetitive Tying and Bundling Arrangements in the Smartphone Industry' [2012] Stanford Technology Law Review 188. See also Antonio García Zaballos, 'Impact of Bundling of ICT Services on Regulation' (2013) 15 Info 69.

[284] Hon Orrin G Hatch, 'Antitrust in the Digital Age', *Competition, Innovation and the Microsoft Monopoly: Antitrust in the Digital Marketplace* (Springer 1999) 20; Jay Pil Choi, 'Tying and Innovation: A Dynamic Analysis of Tying Arrangements*' (2004) 114 The Economic Journal 83.

[285] Au states that there are over half a million applications on the iPhone - Au (n 146) 189. Bakos and Brynjolfsson in this respect talk about economies of aggregation - Yannis Bakos and Erik Brynjolfsson, 'Bundling and Competition on the Internet' [2000] *Marketing Science* 63.

[286] Au (n 280) 228.

[287] Sometimes even called "Uber-All Economy" (Walker Smith J., 'The Uber-All Economy of the Future' (2016) 20 Independent Review 383) or "on demand" economy (Rachel Botsman and Roo Rogers, *What's Mine Is Yours: How Collaborative Consumption Is Changing the Way We Live* (Collins London 2011)).

including a variety of tangible and intangible assets.[288] Services of the internet platforms for ridesharing or home sharing have caused a whole hurricane across sectors. This concept enables a conversion of goods into services and converting underleveraged service assets into more valuable ones, where consumers pay for usage rather than for ownership.[289] In economic terms, it is astonishing that some of the start-up companies providing these services have, with the assistance of ICT, received outstanding market valuation, previously reserved for a few large companies, thereby contributing to a true social revolution.[290] Digitalization enabling sharing platforms has thus created an increased democratisation of entrepreneurship and innovation by reducing entry barriers for applications' creators and digital platform providers.[291] But it is not just about start-up companies, giants like Ikea or Kingfisher are now supporting sharing and sustainable economy.[292] It is thus being envisioned that what's ahead is *'a shift in the dominant business model, one in which all consumer goods will be available as a service and all consumer services will be available on demand'*.[293] Consumers will just press a button on their smart phones and service providers will pick up their dirty laundry and bring it back clean or make a delivery of food, thereby saving consumers' time.[294]

Notwithstanding all this, however, archetypes of sharing economy such as Uber and Airbnb have come under scrutiny because of the effects their business models have had on their respective competitors with allegations of unfair competition. It is claimed that they are avoiding certain taxes, professional and safety regulations, as well as shifting the burden of risk from the trader onto the consumer.[295] Airbnb has thus come under fire from hotel groups and governments across the globe for avoiding the duty to pay tourist taxes, which are typically included in the cost of renting a room in a hotel, and local safety laws. Airbnb responds that safety

[288] Felländer, Ingram and Teigland (n 87) 13.
[289] Walker Smith J. (n 283) 385. See also Frank Tietze, Thorsten Pieper and Cornelius Herstatt, 'To Own or Not to Own: How Ownership Impacts User innovation–An Empirical Study' (2015) 38 Technovation 50.
[290] Uber for example has 41 billion USD valuation – see Felländer, Ingram and Teigland (n 87) 11.
[291] ibid 15.
[292] Sustainable Brands, 'Kingfisher, IKEA Talk Evolution Into Circular, Service, Sharing Business Models' (*sustainablebrands.com*, 29 October 2015).
[293] Walker Smith J. (n 284) 383.
[294] According to a study, the five main collaborative economy sectors (peer-to-peer finance, online staffing, peer-to-peer accommodation, car sharing and music video streaming) have the potential to increase global revenues from around EUR 13 billion now to EUR 300 billion by 2025 - LLP PricewaterhouseCoopers, 'The Sharing Economy' [2015] Report, Consumer Intelligence Series 14.
[295] Rogers (n 197).

inspection is replaced by a peer-to-peer review system.[296] In relation to Uber, it is noteworthy that it first offered its services to off-duty taxi drivers, who had licences to operate taxi-like services before expanding to include individuals who did not have taxi license but did have cars. This helped Uber to price discriminate. Ordinary taxi drivers are now the main opponents of Uber organising revolts across Europe as a sign of protest.[297] The taxi industry and many cities and states are demanding that Uber comply with the existing taxi regulations, including entry control and price-fixing.[298] Germany and Spain have tried to ban Uber's services, arguing it undercuts local competition, and in Paris rioting by taxi drivers and the arrest of two Uber executives led the company to suspend its lower cost Uberpop service. Conversely, Uber rely on the notion that the expanded *'ridesharing'* model is sufficiently different from a taxi service to render the laws regulating taxis inapplicable. The company's position is that it does not employ anyone; rather, Uber merely connects willing purchasers of rides with willing sellers. Uber thus sees itself as a technology firm rather than a transportation firm because it is based on a 'simple' interface and an advanced IT system that conducts big data analytics.[299] This explanation was supported by the High Court in London, which ruled that the driver's Smartphone with the Driver's App is not a device for calculating fares, thereby making taxi regulations inapplicable.[300] Moreover, two national courts have turned to the EU Court of Justice with questions for preliminary ruling that will be important in determining whether Uber is a transport company or a digital service provider.[301] Considering that in the past the Court has often showed its support for consumers to make their own choice of which service they would like to use, providing that their safety was ensured, the Court might support the solution not to force Uber to comply with outdated regulations. In this respect it might be useful for the EU Court to learn the results of a public consultation, performed by the Commission in which a majority of consumer respondents took the view that *'collaborative economy platforms provide sufficient information on service providers, consumer rights,*

[296] Dean Baker, 'Don't Buy the "Sharing Economy" Hype: Airbnb and Uber Are Facilitating Rip-Offs' *The Guardian* (27 May 2014).
[297] Stan Schroeder, 'Uber Arrives in Croatia despite Taxi Drivers' Vow to Revolt' (*Mashable*, 22 October 2015); Charles Arthur, 'Uber Backlash: Taxi Drivers' Protests in Paris Part of Global Revolt' *The Guardian* (26 June 2015); eub2, 'European Taxi Drivers Block Brussels over Uber' *eubusiness.com* (16 September 2015).
[298] Hannah A Posen, 'Ridesharing in the Sharing Economy: Should Regulators Impose Uber Regulations on Uber' (2015) 101 Iowa L. Rev. 405.
[299] Felländer, Ingram and Teigland (n 87) 23.
[300] Transport for London v Uber London Ltd, Case No: CO/1449/2015, judgment of 16 October 2015, [2015] EWHC 2918 (Admin), para. 17.
[301] Case C-434/15, Asociación Profesional Élite Taxi v Uber Systems Spain, S.L., and Case C-526/15, Uber Belgium BVBA v Taxi Radio Bruxellois NV, both pending.

characteristics and modalities of the offer and statutory rights'.[302] In line with these results, the Commission's announcements of *'giving a chance to new business models'* and avoiding Europe becoming *'the only continent which denied new business models'*[303] may be seen as signs of the EU Executive's greater support for sharing economy than shown by the national governments. Moreover, Commissioner for Industry Elżbieta Bieńkowska made the case for a light regulatory approach, arguing in favour of *'clear guidelines related to existing regulations'* thereby ruling out specific EU legislation to regulate sharing economy transactions.[304]

4.3 Customer-centric manufacturing and out-come based contracting

4.3.1 From quarter-inch drills to quarter-inch holes

Another field of law that is intensely influenced by the new servitisation models and which may at the same time restrict but potentially also enhance servitisation business strategies is consumer law. In this respect, it is important to note, that a key feature of servitisation strategies is a transition from a culture of product centricity to a strong *consumer centricity*. In the traditional manufacturing products were designed and produced, then sent to a showroom in anticipation of a sales transaction; customers were remote from the manufacturer and the manufacturer had little knowledge about how the product was being used, and how it was performing, once it was sold.[305] In servitisation, however, customers are not just provided with products through a single transaction but with holistic, more tailored *'solutions'*, even if this delivery requires the incorporation of products from other vendors (i.e. multi-vendor products).[306] The trend from products to solutions is putting the emphasis

[302] European Commission, 'First Brief Results of the Public Consultation on the Regulatory Environment for Platforms, Online Intermediaries, Data and Cloud Computing and the Collaborative Economy' (*Digital Agenda for Europe*, 29 January 2016).

[303] 'Brussels Wants to Share' (*brand-e*, 2 November 2015); 'Europe Should Embrace Sharing Economy, Says EU' (*The Irish Times*, 28 October 2015).

[304] Jorge Valero, 'Brussels to Issue Sharing Economy "guidelines" in March' *EurActiv* (28 January 2016). The Commission announced it will issue guidance on how EU law applies to collaborative economy business models and relevant provisions of national law. This guidance is to be based on the Services Directive, E-Commerce Directive, European consumer legislation, as well as on relevant Treaty provisions. On the other hand, a response from Airbnb was as follows: *"We must be careful that the commission does not assume that some kind of harmonized approach to all of these businesses, and all of the regulatory frameworks that govern them, will be appropriate –- or even feasible"* - Rebecca Christie, 'Uber, Airbnb May Gain From EU Push for Growth Without Deficits' *The Washington Post with Bloomberg* (14 January 2016).

[305] Baines (n 10) 9.

[306] Danny Miller and others, 'The Problem of Solutions: Balancing Clients and Capabilities' (2002) 45 Business Horizons 3.

on the *outcomes* the customer wants, rather than on the physical product.[307] Theodore Levitt in this respect famously said: *'People don't want quarter-inch drills, they want quarter-inch holes'*.[308] This is particularly important in the business-to-business (B2B) and business-to-government (B2G) field, where customers are looking to their partners to provide integrated, often technology-enabled, solutions that meet their needs.[309] A goods-dominant logic to value creation has thus been replaced by a service-dominant logic[310] and a producer has been replaced by a solution provider.[311]

Since customers want solutions that are ready to go, servitisation is inherently positive for consumers and considering that solutions' providers often need to make significant investment to deliver integrated solutions, solution-orientation requires long-term customer relationships.[312] If a manufacturer wants to keep a long-term relationship with a customer, it must be responsive to the latter's needs. Servitisation strategy thus *per se,* for business motives of the manufacturer rather than for regulatory coercion, looks after the interests of the consumer. The servitisation process forces manufacturers to develop concern about how long the products will work, since they took over the risk for good functioning of the product and regularly maintaining it. The traditional role of consumer law that needed to protect the vulnerable and susceptible consumer is in this respect therefore diminished, at least at a conceptual level. At the same time, ICT is changing the role of the consumer *'from isolated to connected, from unaware to informed, from passive to active'*.[313] This process is sometimes also called *'digitalization'* of the consumer,[314] considering that people are increasingly able to use digital services. The younger generations are grown up with digitalization and are eagerly in the forefront of adopting new technology. This could

[307] Andy Neely (n 3) 13.
[308] Elsie T Freeman, 'Buying Quarter Inch Holes: Public Support Through Results' [2000] *Archival Issues* 91.
[309] Andy Neely (n 3).
[310] Laura Smith, Roger Maull and Irene C.L. Ng (n 24); Stephen L Vargo and Robert F Lusch, 'Evolving to a New Dominant Logic for Marketing' (2004) 68 Journal of Marketing 1; Stephen L Vargo and Robert F Lusch, 'Service-Dominant Logic: Continuing the Evolution' (2007) 36 Journal of the Academy of Marketing Science 1.
[311] Christian Schnürmacher, Haygazun Hayka and Rainer Stark, 'Providing Product-Service-Systems - The Long Way from a Product OEM towards an Original Solution Provider (OSP)' (2015) 30 Procedia CIRP 233. According to Oliva and Kallenberg this customer orientation consists of two separate elements. Firstly, a shift of the service offering from product-oriented services to *"user's processes oriented services"*, where the focus is on the effectiveness of end-user's processes related to the product; and secondly, a shift of the nature of customer interaction from transaction-based to relationship-based, which means that a focus is not on selling products but on establishing and maintaining a *relationship* with the customer - Rogelio Oliva and Robert Kallenberg (n 19).
[312] Andy Neely (n 3) 12.
[313] C.K. Prahalad and Venkat Ramaswamy, 'Co-creating Unique Value with Customers' (2004) 32 Strategy & Leadership 4.
[314] Raimo Mäenpää and SOK Janne J Korhonen, 'Digitalization in Retail: The Impact on Competition' in Transition 89, 90.

mean that the traditional presumption in consumer law that a consumer is uninformed and thus requires special legal protection no longer holds true. Nevertheless, the change is so rapid that the pre-Internet generations hardly follow the suit (although so-called *'technology converts'* in their 70's and beyond are more and more common) and new manufacturing methods bring new dangers for consumers. Moreover, sharing economy services, such as the one from Uber or Airbnb, bring new consumer safety concerns, considering that the risk is shifted from the service provider to the consumer. Excessive strategies of long-term consumers' locking-in may also be legally problematic. Consequently, it is still important that the servitisation process is embedded in consumer law framework.

4.3.2 Adapting rules on product/services liability and safety

The multifaceted character of servitisation primarily brings challenges in the field of regulating liability for product-service systems. Recently, two important steps were made in form of proposals by the Commission to renew liability rules on products and AI,[315] which include modernisation of liability rules for circular economy business models and for digital products. These two proposals remedy a lack of political will to support a directive on the liability of suppliers of services as proposed by the Commission in 1990[316] If the Member States are indeed devoted to supporting the servitisation process in Europe, as proclaimed in various national economic strategies, they should approach this topic with less suspicion towards EU regulation than in the past and increase consumer trust that is a prerequisite for the whole servitisation process to flourish. Considering that the Product Liability Directive[317] does not apply to intangible goods, inadequate services, careless advice, erroneous diagnostics and flawed information are currently not in themselves included in this directive. It is nevertheless important that when damage is caused by a defective product, used in the provision of a service, it will be recoverable under the Product Liability Directive.[318] Many servitisation transactions will thus come

[315] Proposal for a directive on liability for defective products, COM(2022) 495 and Proposal for a Directive on adapting non-contractual civil liability rules to artificial intelligence (AI Liability Directive), COM(2022) 496.
[316] Proposal for a Council Directive on the liability of suppliers of services. COM (90) 482 final, 20 December 1990. More on this Stephen Weatherill, EU Consumer Law and Policy (Edward Elgar Publishing 2013) 186–187.
[317] Council Directive 85/374/EEC on the approximation of the laws, regulations and administrative provisions of the Member States concerning liability for defective products, OJ L 210, 7.8.1985, p. 29-33.
[318] Andrew Grubb and Geraint G Howells, *The Law of Product Liability* (Butterworths 2007) 292–297. See Case C-203/99, Veedfald v Arhus Amtskommune, ECLI:EU:C:2001:258 and Case C-495/10, Dutrueux, ECLI:EU:C:2011:869.

within the ambit of this Directive, including software that is stored on a tangible medium.[319] This means that in case the consumer, whose car causes an accident due to malfunctioning software, or a patient, who suffers the wrong dosage of radiation due to a glitch in the consumer software may bring a claim under the Product Liability Directive against the producer of software.[320] When software is supplied over the Internet (so-called non-embedded software), however, potential defects do not fall within the scope of the current directive and it needs to be broadened to digital products as foreseen in the proposal from September 2022.

A similar situation exists in the field of product safety regulation. Although Article 2(1) of Directive 2001/95[321] defines the reach of the product safety regime to include any product intended for consumer use or likely to be used by consumers *'including in the context of providing a service'*, there is no counterpart of this directive in the field of the safety of services.[322] It is hence for the Member States to adopt legislation setting safety standards for services, which is not the preferred solution in times of extensive servitisation. Analysis of the suitability of existing safety regulations is, for example, needed in relation to software-based product functions that can more and more be modified after delivery.[323] Various safety issues may also arise in relation to automated systems, despite the fact that manufacturers and designers of robots are focused on perfecting their systems for 100 percent reliability and thus making liability a non-issue.[324] It can happen that robotic technology fails, either unintentionally or by design, resulting in economic loss, property damage, injury, or loss of life.[325] For some robotic systems, traditional product liability law will apply, meaning that the manufacturer will bear responsibility for a malfunctioning part, however, more difficult cases will certainly come to the courts, such as a situation, where a self-driving car appears to be doing something unsafe and the driver overrides it – was it the manufacturer's fault, or is it the individual's fault for taking over.[326] Similar difficulties may arise in relation to remotely piloted aircrafts (civil

[319] Written Question No 706/88 by Gijs de Vries to the Commission: Product liability for computer programs, OJ C 114, 8.5.1989, 42.
[320] Daily Wuyts, 'The Product Liability Directive – More than Two Decades of Defective Products in Europe' (2014) 5 Journal of European Tort Law 1, 5.
[321] **Directive 2001/95/EC on general product safety**, OJ L 11, 15.1.2002, pp. 4-17.
[322] Weatherill (n 313) 282.
[323] WDMA European Office (n 203) 12.
[324] Keith Kirkpatrick, 'Legal Issues with Robots' (2013) 56 Communications of the ACM 17, 18.
[325] Kirkpatrick (n 141). Cf Eric Hilgendorf, *Robotik im Kontext von Recht und Moral* (Nomos Verlag 2014) 27.
[326] Maurice Schellekens, 'Self-Driving Cars and the Chilling Effect of Liability Law' (2015) 31 Computer Law & Security Review: The International Journal of Technology Law and Practice 506.

drones),[327] where the EU Commission called already in 2014 for *'tough standards'* to cover *inter alia* safety, insurance and liability.[328] The recently proposed Revised Product Liability Directive specifically proposes to regulate liability for "products in the digital age", thereby allowing compensation for damage when drones are made unsafe. Furthermore, the European Drone Strategy 2.0, adopted by the Commission in November 2022, sets out a vision for the further development of the European drone market.[329] Europe has about 2,500 small civil drone operators, more than the rest of the world combined. Over the last few years, businesses have cropped up around the EU that manufacture and use drones in agriculture, energy, monitoring infrastructure, photography and other industries.[330] The regulatory work in this field is entrusted to the European Aviation Safety Agency (EASA) that is developing the necessary security requirements as well as a clear framework for liability and insurance. The Transport Committee of the European Parliament adopted a report[331] calling for Europe to *'do its utmost to boost its strong competitive position'* in this field. Harmonized rules at the EU level would in this respect be welcome to safeguard a single market for the drone's industry. It is also essential to understand, however, that the more autonomous systems are, the less they can be considered simple tools in the hands of other actors[332] and that overly stringent regulation, expecting perfection instead of acceptable robot behaviour, may discourage manufacturers from investing money in innovations, such as self-driving cars, drones and automated machines.[333] Smart regulation is thus again needed, taking into account all the involved stakes.

Further challenges for liability and safety rules derive from the fact that servitisation may change the roles in the production cycle. Traditional product legislation assumes that goods are manufactured and assembled at a production site, placed on the

[327] More on technical aspects of drones in Miller (n 80) 179–201.
[328] European Commission, 'European Commission Calls for Tough Standards to Regulate Civil Drones' *Press Release IP-14-384* (8 April 2014).
[329] Commission's Communication, 'A Drone Strategy 2.0 for a Smart and Sustainable Unmanned Aircraft Eco-System in Europe', COM(2022) 652 final.
[330] Catherine Stupp, 'Europe's First Civil Drone Law Gets a Boost in Parliament' *EurActiv* (17 July 2015). See also Sarantis Michalopoulos, 'Commission Promotes Smart Farming to Mitigate Climate Change' (*EurActiv*, 29 January 2016).
[331] Motion for a European Parliament Resolution on safe use of remotely piloted aircraft systems (RPAS), commonly known as unmanned aerial vehicles (UAVs), in the field of civil aviation, (2014/2243(INI)).
[332] See European Commission, An Action Plan for Digitising European Industry, Draft, 23 December 2015, p. 59.
[333] More on this in Neil M Richards and William Smart, 'How Should the Law Think about Robots?' [2013] SSRN Scholarly Paper ID 2263363; Samir Chopra and Laurence F White, *A Legal Theory for Autonomous Artificial Agents* (University of Michigan Press 2011).

market and sold to distributors and consumers. Developments in manufacturing technology will have the potential to alter this picture in the near future. By pairing digital services such as web-based design services with advanced manufacturing such as 3D printing enables a huge shift from mass production to full customisation.[334] In 3D printing the borderline between manufacture and service provision is blurred and there is uncertainty as to who should be assumed to be the manufacturer of the product, particularly when a 3D printer has been used somewhere in the value chain.[335] Furthermore, as 3D printers are becoming more popular and affordable, private individuals have started to print their own goods at home. As long as the goods are intended for the individual's own use, the EU-rules do not apply, since the printed goods are not placed on the market.[336] More and more available 3D printers, however, make it much easier for individuals (particularly hobbyist inventors) to become manufacturers.[337] Considering that they are not familiar with product liability rules, the strict products liability framework may be forced to change to accommodate this new technology.[338] Without this regulatory change they may attempt to evade liability by arguing that they are merely 'services providers',[339] renting the 3D printer to the client during printing (although the printer remains in the manufacturer's office) and selling the raw material to the client in advance thereby disclaiming product responsibility.[340]

Additionally, 3D printing turns traditional service providers into manufacturers. Specific regulatory challenges in this respect arise in the medical field, where 3D printing brings the ability to print replacement body parts, organs, bones and even skin.[341] In this situation medical doctors and dentists provide a bundle of services – besides the ordinary patient treatment they make a digital design of the implant and printing the implant in their offices with a 3D printer.[342] Each device is designed and

[334] European Commission, Business Innovation Observatory – Design for Innovation, "Web-based design services as a new business model in the design world", 2014.
[335] Kommerskollegium (n 49).
[336] ibid 21.
[337] Regulation (EC) No 765/2008 setting out the requirements for accreditation and market surveillance relating to the marketing of products, OJ L 218, 13.8.2008, p. 30-47.
[338] Nora Freeman Engstrom, '3-D Printing and Product Liability: Identifying the Obstacles' (2013) 162 University of Pennsylvania Law Review Online; Nicole D Berkowitz, 'Strict Liability for Individuals - The Impact of 3-D Printing on Products Liability Law [notes]' [2014] Washington University Law Review 1019.
[339] Nielson (n 90) 616.
[340] For an example of legal terms of an online service provider disclaiming product responsibility see: Kommerskollegium (n 49) 22.
[341] Mark H Michalski and Joseph S Ross, 'The Shape of Things to Come: 3D Printing in Medicine' (2014) 312 JAMA 2213.
[342] Kommerskollegium (n 49) 20.

manufactured based on a patient's medical image data, which ensures a perfect fit with his unique anatomy. Low price and high functionality 3D printed medical devices may save lives and have important consequences on the social security systems, however, the regulation needs to contemplate the risks involved and maintain patient safety standards.[343] Under the previous EU Medical Devices Directive[344] 3D printed medical devices fell in the category of *'custom-made medical devices',*[345] similarly to orthopaedic shoes that are not strictly regulated. In relation to 3D printed medical implants (such as prosthetic limbs, hips or teeth), however, it was widely accepted that they require more stringent quality requirements to address the needs and potential risks.[346] Nevertheless, it seemed that EU regulators were supporting the *status quo*, considering that the Explanatory Memorandum to the future Medical Devices Regulation stated that: '*Manufacturers of medical devices for an individual patient, so called 'custom-made devices', must ensure that their devices are safe and perform as intended, but their regulatory burden remains low*.'[347]

Nevertheless, during the regulatory procedure EU legislators noted that rules under the old regime applied to invasive devices have not sufficiently take account of the level of invasiveness and potential toxicity of certain devices which are introduced into the human body. It was thus emphasised that to obtain a suitable risk-based classification of devices that are composed of substances or of combinations of substances that are absorbed by or locally dispersed in the human body, it is necessary to introduce specific classification rules for such devices. The classification rules should take into account the place where the device performs its action in or on the human body, where it is introduced or applied, and whether a systemic absorption of the substances of which the device is composed, or of the products of metabolism in the human body of those substances occurs.

[343] '3D Printing Regulation: Should Governments Intervene?' Inlinepolicy.com, 19 June 2014; 'Innovation Outpacing EU Regulation: The Case for Medical 3D Printing' (*Medtech Views*, 30 September 2014).
[344] Council Directive 93/42/EEC of 14 June 1993 concerning medical devices**,** OJ L 169, 12.7.1993, p.1.
[345] Defined as "any device specifically made in accordance with a written prescription of a doctor of medicine, of a dental practitioner or of any other person authorised by national law by virtue of this person's professional qualifications which gives, under his responsibility, specific design characteristics, and is intended for the sole use of a particular patient" – Art. 2 of the Proposal for a Regulation on medical devices, COM (2012) 542 final – known as the proposed MDR.
[346] Susanne Wende in Peter Bräutigam and Thomas Klindt (n 197) 211. See also '3D Printing of Custom Medical Devices under Future EU Law' Medical Devices Legal, 3 March 2014.
[347] The proposal to the MDR, para. 3.2.

What was needed to assure patients' safety is to subject the manufacturers of higher risk 3D custom printed devices to a conformity assessment[348] and to require CE marking of the input material (in the same way as materials that are currently used for creating a dental filling).[349]

The new Medical Devices Regulation[350] thus guarantees free movement of medical devices. Article 24 provides: *»Except where otherwise provided for in this Regulation, Member States shall not refuse, prohibit or restrict the making available on the market or putting into service within their territory of devices which comply with the requirements of this Regulation.«* Moreover, devices should, as a general rule, bear the CE marking to indicate their conformity with this Regulation so that they can move freely within the Union and be put into service in accordance with their intended purpose. Member States should not create obstacles to the placing on the market or putting into service of devices that comply with the requirements laid down in this Regulation. However, Member States should be allowed to decide whether to restrict the use of any specific type of device in relation to aspects that are not covered by this Regulation.[351]

Consequently, in respect of 3D-printed medical devices the MDR has made an exception for "*mass-produced devices which need to be adapted to meet the specific requirements of any professional user.*"[352] Which effectively means, medical products produced using additive manufacturing processes are not considered custom-made anymore.

4.3.3 Simple contract rules for complex contractual relationships

Another field of law that is inherently linked with servitisation is contract law. Servitisation transactions take the form of various contracts that are the keystone of success for both parties involved. Contracts play a crucial role in safeguarding the collaboration between partners, defining all the aspects that need to be considered to protect both partners. Development of new servitisation models imposes challenges for law practitioners, who are employed to draft increasingly complex contracts, as well as for regulatory authorities at different levels of government.

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[348] As specified in Section 7 of Part A of Annex X of the proposed MDR.
[349] '3D Printing of Custom Medical Devices under Future EU Law' (n 343).
[350] Regulation 2017/745 on medical devices, OJ EU L 117/1, 5.5.2017.
[351] Preamble, recit. 40. See also Article 13(2) of the Regulation: *"In order to place a device on the market, importers shall verify that: (a) the device has been CE marked and that the EU declaration of conformity of the device has been drawn up".*
[352] Article 2(3).

National civil codes, under increasing impact of EU law, explicitly regulate different contract types that serve as a legal basis for contractual relationships of the establishing servitisation economy. Moreover, there are many atypical contracts (also called mixed contracts) that respond to demands of flexibility coming from the economy.[353] Considering that numerous servitisation models assume long-term nature of the relationship it is imperative for the contracts to contain detailed provisions on duration and termination, which protect each party and allow changes and termination of the relationship if required, as well as provisions reflecting the possibility of disputes throughout the life of the contract.[354]

From a contract law point of view, servitisation models may essentially be classified into two groups. In the first group, there are servitisation transactions, where ownership of the product is transferred to the consumer (i.e., the product is sold), while some services are added to the product to enhance its value. These services may either be traditional (such as maintenance and repair services, financial loan for sale of a car etc.) or digital, embedded in smart products connected to the Internet (e.g., computers with software, smart machines, smart cars etc.). Conversely, in the second group of servitisation models, there are transactions, where ownership of the product remains at the trader and only a service is transferred to the consumer (e.g., a machine is rented, a car is shared among several users, leased etc.). Submitting this classification of servitisation transactions under the contractual forms provided by the EU Consumer Rights Directive[355] leads to the conclusion that the first group of transactions falls under the sales contracts. According to the definition in Article 2(5) of the Directive, the criterion for classifying a contract as a 'sales contract' is the transfer of the ownership of goods to the consumer against payment of the price thereof. The last part of the definition under Article 2(5), however, provides that a sales contract also includes *'any contract having as its object both goods and services'*. Consequently, if a contract's *main purpose* is the transfer of ownership of certain goods, it should be classified as a sales contract even if it also covers related services provided by the seller, such as installation, maintenance or any other processing, irrespective of the relative value of the goods and services.[356] It may be predicted

[353] Walz in Peter Bräutigam and Thomas Klindt (n 197) 134.
[354] Rachel Cuthbert, Duncan McFarlane and Andy Neely, 'The Impact of Contract Type on Service Provider Information Requirements' (2012) 3 International Journal of Service Science, Management, Engineering, and Technology (IJSSMET) 65.
[355] Directive 2011/83/EU on consumer rights, OJ L 304, 22.11.2011, pp. 64-88.
[356] DG Justice, Guidance document concerning Consumer Rights Directive, June 2014, p. 6.

that this type of contract will also cover the occurrence of products that are unique pieces according to customer's requirements; yet, they will be produced by smart machines as a standardized (mass) product, even though the situation is not pure sale of goods, but includes a service, similarly to tailor made clothes.[357] A sales contract further expressly applies to digital content supplied on a tangible medium (rec. 19). Nevertheless, if a separate contract is made only for the services part of the product-service bundle (e.g., a contract for the repair) it should be classified as a service contract because of their main purpose (rec. 26). Service contracts are defined as those under which the trader supplies or undertakes to supply a service to the consumer and the consumer pays the price thereof (Article 2(5)). It follows that service contracts cover the second group of servitisation transactions, where the ownership of products remains with the trader and only their use is transferred.

With the assistance of ICT, a specific group of services is increasing within the second group of servitisation transactions, i.e., digital content, which is not supplied on a tangible medium, e.g. e-book, music, apps or even a computer aided design (CAD) of shoes, jewellery or even a house intended for 3D printing. Considering their specifics in terms of ownership, these are normally considered as services. Sale of such services presupposes that the customer already owns the necessary product (equipment), like a computer, a smart phone, or a 3D printer to make use of the digital content sold. Although the EU Court of Justice established an EU wide definition of the term sale, i.e. *'an agreement by which a person, in return for payment, transfers to another person his rights of ownership on an item or tangible or intangible property belonging to him'*,[358] the Consumer Rights Directive has introduced specific rules for this type of contracts, which are thus distinguished from sales contracts and service contracts.[359] As recognised by the Commission in the Digital Strategy, however, the problem with these contracts is that *'when it comes to remedies for defective digital content purchased online (such as e-books) no specific EU rules exist at all, and only few national ones.'* The Commission therefore announced putting forward clear contractual rules for online sales of both

[357] Cf Steffen Burrer in Peter Bräutigam and Thomas Klindt (n 197) 148, who is wondering whether this situation would be covered by a sales contract, service contract or some new atypical form of contract.
[358] Case C-128/11, UsedSoft, para. 42.
[359] Recital 19 of the **Directive 2011/83/EU of the European Parliament and of the Council of 25 October 2011 on consumer rights,** OJ L 304, 22.11.2011, p. 64-88. Recital 19 also clarifies that the Directive considers digital content supplied on a tangible medium, such as a CD or a DVD, as goods. This is in line with the aforementioned EU Court's decision in Case C-244/06, Dynamic Medien Vertriebs GmbH v Avides Media AG, ECLI:EU:C:2008:85.

physical goods and digital content.[360] These are now valid as the Digital Content Directive (DCD, 2019/770) and the Sale of Goods Directive (SGD Directive, 2019/771). Although the subject-matter of both directives is essentially the same – conformity of goods, digital content or digital services with the contract, remedies in the event of a lack of such conformity, modalities for the exercise remedies – the directives are complementary and do not overlap. The rules apply to both online and offline (face-to-face) sales of goods, e.g., whether a consumer buys a household appliance, a toy or a computer via the Internet or over the counter in a local store. This legislation includes rules on remedies available to consumers, guarantee periods, the burden of proof and the trader's obligations:

- when a product is defective, the consumer can choose between having it repaired or replaced, free of charge,
- the consumer is entitled to an immediate price reduction or contract termination and to get his/her money back in certain cases, e.g., if a problem still appears despite the trader's attempt to fix it, or if the repair is not done within a "reasonable period of time", or if the defect is of a serious nature,
- the trader is liable if the defect appears within two years from the time the consumer received the product (member states may, however, introduce or maintain a longer legal guarantee period in their national laws, to keep the same level of consumer protection already granted in some countries),
- for up to one or two years following the delivery, the buyer does not need to prove that the good was faulty (the burden of proof is reversed in favour of the consumer).

Under the previously valid rules, if a consumer discovered that a product, he/she purchased more than six months ago was defective and asked the trader to repair or replace it, he/she may have been asked to prove that this defect existed at the time of delivery. Under the new rules, during a one or two-year period, the consumer can ask for a remedy, without having to prove that the defect existed at the time of delivery.

[360] COM(2015) 192 final.

An additional legal challenge in the digital realm is the spreading occurrence of free offerings. Observing full spectrum of servitisation models, services according to some studies in average bring 10 percent of manufacturer's total revenues.[361] While some are charged for through fixed price contracts, by performance based agreements or on a pay-by-use basis, it is reported that one third of the companies earned nothing from services. This shows that many services are provided for free, without explicit charge. In reality, however, this means that a great share of services offered are indirectly invoiced (i.e. included in the product's price), rather than directly.[362] This diminishes price transparency for the consumer, who might not be informed on the services' share in the price. When long-term warranties are presented by the seller as a free service for the consumer, the consumer might have problems enforcing this warranty if the company fails to observe it, considering that the EU consumer legislation in principle did not apply to services provided by the trader for free.

However, while the DCD applies only to contracts where the consumer agreed to pay a price (and that is why, e.g. software offered under a free and open-source licence is not covered by it), the price may not necessarily mean "money". The DCD also applies where the vendor supplies or undertakes to supply digital content or a digital service to the consumer, and the consumer provides or undertakes to provide personal data to the vendor, except where the personal data provided by the consumer are exclusively processed by the vendor for the purpose of supplying the digital content or digital service in accordance with the DCD or for allowing the vendor to comply with legal requirements to which the vendor is subject, and the vendor does not process those data for any other purpose. The issue of personal data as a currency will be subject to additional debates, especially with respect to its compliance with the GDPR-related restrictions.

Moreover, the situation should be covered by the Unfair Commercial Practices Directive[363] that prevents a trader from falsely describing a product as free where, in fact, it is not.[364] *Alternatively, a consumer might be unaware of the real currency in which she is*

[361] Bruce Tether and Elif Bascavusoglu-Moreau, 'Servitisation: The Extent and Motivations for Service Provision amongst UK Manufacturers' (2012) 11.
[362] ibid.
[363] Directive 2005/29/EC concerning unfair business-to-consumer commercial practices in the internal market, OJ L 149, 11.6.2005, p. 22–39.
[364] Commission Communication, On the application of the Unfair Commercial Practices Directive Achieving a high level of consumer protection Building trust in the Internal Market, COM (2013) 138 final, p. 3.

paying for the service.[365] *It is nowadays already a widespread occurrence that consumers are offered digital content in exchange for personal data, which are considered as 'the crude oil of the digital revolution'.*[366] In this respect, it is important that the Directive on Consumer Rights does not mention 'payment' as an essential term for online digital content contracts. Consequently, it also applies to a contract for a free download from an app store. This 'omission' is vital considering that consumers are often offered free content in exchange for personal data that are, consequently, monetised.[367]

Moreover, it should be noted that outside the B2C realm covered by the above mentioned EU regulatory framework, servitisation makes contract drafting increasingly demanding and complex for practising lawyers. This increasing complexity of contracts in servitisation transactions (so-called service ladder)[368] refers to the high number of components and their interrelation within the service provision, as well as to the high amount of resources that are needed to achieve the intended outcome.[369] Complexity can further arise from the dynamic nature of services due to the 'open' nature of services, i.e. the constant adaptation to context and conditions.[370] Well drafted contractual provisions applicable to such B2B transactions in this respect reduce uncertainty, risk of opportunism and provide a safeguard against *ex post* performance problems.[371] These contracts come under different labels, ranging from performance based contracts and contracts for availability to contracts for capability and outcome-based contracts.[372] These contracting mechanisms allow that the customer pays only when the company delivers outcomes, such as when the buyer uses the product. Since in these contractual relations the customer often no longer directly manages or even owns

[365] J Gregory Sidak, 'Do Free Mobile Apps Harm Consumers?' (2015) 52 San Diego Law Review 619.
[366] Maroš Šefčovič, 'Europe 4.0' (*EurActiv*, 28 January 2016).
[367] The European Consumer Organisation (BEUC), Digital products: EU consumers need clear rights, BEUC position paper, 2012, p. 7.
[368] Andy Neely, Duncan McFarlane and Ivanka Visnjic, 'Complex Service Systems–identifying Drivers, Characteristics and Success Factors', *18th International Annual EurOMA Conference, Exploring Interfaces* (Cambridge University Press, 2011).
[369] Melanie E Kreye, Jens K Roehrich and Michael A Lewis, 'Servitizing Manufacturers: The Impact of Service Complexity and Contractual and Relational Capabilities' [2014] Production Planning & Control, p. 2.
[370] Evert Gummesson and others, 'Viable Service Systems and Decision Making in Service Management' (2012) 23 Journal of Service Management 498.
[371] Kreye, Roehrich and Lewis (n 368).
[372] Nigel D Caldwell and Vince Settle, 'Incentives and Contracting for Availability: Procuring Complex Performance' in Irene Ng and others (eds), *Complex Engineering Service Systems* (Springer London 2011) 150; Christopher J Hockley, Jeremy C Smith and Laura J Lacey, 'Contracting for Availability and Capability in the Defence Environment' in Irene Ng and others (eds), *Complex Engineering Service Systems* (Springer London 2011); Partha P Datta and Rajkumar Roy, 'Cost Modelling Techniques for Availability Type Service Support Contracts: A Literature Review and Empirical Study' (2010) 3 CIRP Journal of Manufacturing Science and Technology 142.

the product, it has been argued that in the long term, suppliers may find it in their interest to invest in designing more reliable products and more efficient repair and logistics capabilities to increase profitability. Consequently, the added benefit of outcome-based contracts is that the supplier will be incentivised to think of innovative ways to prevent equipment breakdown.[373] In complex engineering support, such as for fast jet aircrafts, services typically range from routine and planned maintenance, to unscheduled repairs to inserting upgrades such as new technology into existing systems or platforms. Moreover, targets, Key Performance Indicators (KPI) and performance criteria on the customer are increasingly emerging in such contracts, referring to how quickly a company responds to breakdowns, the speed in which the equipment can be repaired, how efficient is maintenance etc. It is claimed that outcome-based contracts reduce the cost of servicing over the longer term for the customer, because if partners share ownership of an entity, such as an outcome, and are both 'mutual hostages' to the outcome, their incentive to behave opportunistically is likely to decrease.[374] These contractual solutions are, however, blurring the traditional boundaries of ownership, design and post-construction performance.[375] What is being purchased is therefore not goods or services, but a complex performance.[376] Considering that this performance is usually spread over a long-time period, drafting of the contracts for this purpose is increasingly complex and requires from lawyers not only to be familiar with the legal framework covering the contract but also specific risks that may occur during the life of a contract.

4.4 Solution-oriented approach in public procurement

Servitisation, however, does not only apply to B2C and B2B relationships, but increasingly also to business-to-government (B2G) relationships.[377] Servitisation may in this respect considerably change the solutions public bodies get for the

[373] Irene C.L. Ng and Sai S. Nudurupati, 'Outcome-based Service Contracts in the Defence Industry – Mitigating the Challenges' (2010) 21 Journal of Service Management 656, 659.
[374] Irene CL Ng, Xin Ding and Nick Yip, 'Outcome-Based Contracts as a New Business Model: The Role of Partnership and Value-Driven Relational Assets' (2013) 42 Industrial Marketing Management 730, 739.
[375] Caldwell and Settle (n 371) 151–160.
[376] In management scholarly papers a concept of Procuring Complex Performance (PCP) has been developed for this purpose – Michael A Lewis and Jens K Roehrich, 'Contracts, Relationships and Integration: Towards a Model of the Procurement of Complex Performance' (2009) 2 International Journal of Procurement Management 125; Nigel D Caldwell, Jens K Roehrich and Andrew C Davies, 'Procuring Complex Performance in Construction: London Heathrow Terminal 5 and a Private Finance Initiative Hospital' (2009) 15 Journal of Purchasing and Supply Management 178.
[377] Jens K Roehrich and Nigel D Caldwell, 'Delivering Integrated Solutions in the Public Sector: The Unbundling Paradox' (2012) 41 Industrial Marketing Management 995.

taxpayers' money. In the EU, solution-oriented approach in public procurement was made possible by the directives explicitly providing not only the lowest price as the basis for the award of tenders, but also for the most economically advantageous tender. The latter implies that other award criteria may also be taken into account, in addition to the price (e.g. technical merit, environmental characteristics, running costs, after sales service and technical assistance etc.).[378] Despite this legal foundation, public procurement is in practice still too focused on lowest cost tenders, rather than outcomes, through life cost, value for society, quality and innovation. This was found as a central limitation for innovation and validation of creative solutions by the EU High Level Group on Business Services.[379] Nevertheless, the list of cases focusing on integral solutions is increasingly long. For example, in France, companies such as Flander Artois and Manger Bio have specialised in supplying organic products to schools as well as in assisting public canteens in designing seasonal menus.[380] In this respect, servitisation may be perceived as a driver to foster innovation through public procurement.[381] ICT related innovative procurement is thus increasingly attractive for governments, because of the rapid technological change that improves public management. In the field of defence, several innovations launched by the digitising industry refer to smart warfare – from missile-equipped drones, smart bullets, laser guns or even robot soldiers.[382] Moreover, many EU Member States have so far already developed criteria for sustainable (ecological) procurement aiming at fostering innovative sustainable products that save energy. Environmentally friendly criteria thus come before price.[383] Several smart technologies will in the future enable more efficient use of resources, not just by private, but also public customers, such as smart water management, where it is no longer necessary for cities to employ meter readers to walk through neighbourhoods and take manual meter readings. Digitising industry is thus a basis of projects for developing smart cities and intelligent regions.

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[378] Katriina Parikka-Alhola, Ari Nissinen and Ari Ekroos, 'Green Award Criteria in the Most Economically Advantageous Tender in Public Purchasing', *G. Piga and K.V. Thai (eds), Advancing public procurement*, vol 2006 (PrAcademics Press, Boca Raton 2006) 257–258. See also Christopher Bovis, *EU Public Procurement Law* (Edward Elgar Publishing 2012).

[379] European Commission, High-Level Group on Business Services, Final Report, April 2014, p. 14.

[380] Kevin Morgan and Roberta Sonnino, 'Empowering Consumers: The Creative Procurement of School Meals in Italy and the UK' (2007) 31 International Journal of Consumer Studies 19, 21.

[381] Jakob Edler and others, 'Innovation and Public Procurement–Review of Issues at Stake' [2005] ISI Fraunhofer Institute Systems and Innovation Research, Karlsruhe 8. See also Directive 2014/24/EU **on public procurement,** OJ L 94, 28.3.2014, p. 65–242, rec. 95 and 123.

[382] Miller (n 80) 203.

[383] More in Beate Sjåfjell and Anja Wiesbrock, *Sustainable Public Procurement Under EU Law: New Perspectives on the State as Stakeholder* (Cambridge University Press 2015).

Whenever public bodies purchase product-service systems the 2014 Public Procurement Directive emphasises assessments on the basis of the best price-quality ratio, thereby advocating the life-cycle costing approach.[384] The latter is one of the foundations of servitisation philosophy; however, in the past, failure to distinguish between direct purchasing cost and overall cost proved to be one of the most important barriers to innovative procurement.[385] It is hoped that the emphasis on life-cycle costing will lead to a different behaviour in the future, where not just private companies and consumers, but also public bodies will adopt a more holistic approach to purchasing products and services, advocating outcome-based contracting[386] by defining the result and then asking a *'solution provider'* to deliver it for them. In this respect, Neely states that in the UK, the government has privatised some of its prisons. An incentive scheme is included in the contract, which means the providers are paid more if the reoffending rates of prisoners leaving their care are lower than the national average. The advantage of this approach is that the solutions' provider and the customer share the same incentive – they both want to reduce reoffending rates.[387] Innovative contracting (out-come based or contracting for availability) is particularly important for the post-financial-crisis austerity programmes that are compounding plans to cut public spending. Budget pressures mean that the traditional in-house approach is unaffordable, mandating a new approach – partnering with industry on long-term, output based incentivised contracts to achieve projected cost savings.[388] As an illustration, in the UK, the Ministry for Defence is already using contracts for availability across the RAF fast-jet fighters with a prime contractor promising guaranteed outputs (e.g. aircraft availability, flying hour levels etc.),[389] while Terminal 5 at London's Heathrow Airport was built by the British Airport Authority using incentivised contracts with payments for saving made based on a share of a reward fund.[390] Servitisation is therefore challenging not only companies, but also public bodies with a renewed way of thinking about value for money.

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[384] Directive 2014/24/EU, rec. 89-92.
[385] Edler and others (n 246) 10.
[386] Irene C.L. Ng and Sai S. Nudurupati (n 238).
[387] Andy Neely (n 121) 12. Such contractual incentives for performance have a long history, considering that some 18th century ships transporting prisoners from England to Australia were already incentivised on an outcome, i.e. number of prisoners delivered alive, which deterred those responsible for transportation from excessive speeding, consumption of the food and drink intended for the prisoners etc. - Caldwell and Settle (n 237) 150.
[388] Nigel Caldwell and Mickey Howard, 'Contracting for Complex Performance in Markets of Few Buyers and Sellers: The Case of Military Procurement' (2014) 34 International Journal of Operations & Production Management 270, 279.
[389] ibid.
[390] Caldwell, Roehrich and Davies (n 241) 181–182.

4.5 Intellectual property rights – fostering innovation

Considering the central place of innovation in servitisation,[391] legal study of this business trend necessarily also touches intellectual property (IP) aspects.[392] As with other legal aspects also here the relationship between servitisation and law is interactive with IP law having important implications for servitisation, while at the same time there may also be opportunities for servitisation to influence IP law – particularly considering that the current framework of IP is still bound to protect innovation in the development of products rather than services.[393] In this respect, IoT technology raises issues concerning patentability, joint infringement, and patent quality.[394] IoT relies on communication between two or more smart objects and consumers and it is challenging whether inventors of certain types of IoT applications will be able to overcome the test for patent eligibility. Moreover, even if they obtain patents on new methods and protocols, the patents may still be very difficult to enforce against multiple infringers.[395]

Furthermore, 3D printing is perhaps the most challenging aspect of servitisation from the IP law point of view. Osborn accentuates that 3D printing will *'erode the dividing line between the physical and the digital worlds and will bring millions of laypeople into intimate contact with the full spectrum of intellectual property laws'*.[396] Although many things may potentially be manufactured via 3D printing, just thinking of Phillips' new lamp line or Lego bricks,[397] Osborn predicts that one of the areas most affected by 3D printers will be 3D art. Some of the world's best museums are digitising their collections so that they may be shared and printed. Moreover, 3D printing is creating opportunities for creators of aesthetically pleasing furniture and housewares. Although artists have long had creative ideas for lamps, silverware and furniture, many of those ideas could not be produced by traditional manufacturing techniques

[391] Baines (n 8).
[392] Sandra Sophia Redekere et al in Peter Bräutigam and Thomas Klindt (n 197) 58–75.
[393] Michael Isler and Stephen Weyer, 'The Role of IP in Servitized Technology' 2015 4 <https://www.walderwyss.com/publications/1643.pdf>.
[394] W Keith Robinson, 'Patent Law Challenges for the Internet of Things' (2015) 15 Wake Forest Journal of Business and Intellectual Property Law 657, 658.
[395] W Keith Robinson, 'Economic Theory, Divided Infringement and Enforcing Interactive Patents' (2015) 67 Florida Law Review 1961.
[396] Lucas Osborn, 'Of PhDs, Pirates, and the Public: Three-Dimensional Printing Technology and the Arts' (2014) 1 Texas A&M Law Review 813. See also Lucas S Osborn, 'Regulating Three-Dimensional Printing: The Converging Worlds of Bits and Atoms' (2014) 51 San Diego L. Rev. 553.
[397] Kim Rixecker, 'Lego Aus Dem 3D-Drucker? Das Denken Die Spielzeugmacher über Den Trend' (*t3n Magazin*, 4 March 2014).

and so they remained a science fiction.[398] 3D printing technology frees these designs that stayed trapped in the minds, because it enables orienting of geometrically complex shapes.[399] However, their enthusiasm for fostering creative works might be hampered by concerns over massive piracy. Although 3D printing requires technical ability and knowledge, once having 3D objects design (CAD file) 3D printing is facilitated, which opens the floodgate for piracy – considering modern possibilities that enable not only to scan an object and print it, but also to share the file on the Internet, allowing many people to print the object.[400] As found by Kulkarni, *'once in digital forms, things become easy to copy. This means protecting intellectual property will be just as hard as it is in other industries that have gone digital'.*[401] The Pirate Bay, the Swedish file-sharing website that is known as the world's largest facilitators of illegal downloading, announced already in 2012 the *'next step'* for the sharing society, where people can share schematics for 3D printable objects.[402] Since 3D printed product will not come into being without the CAD file, it remains to be cleared whether a CAD file may be protected under copyright law. Considering the EU Software Directive[403] copyright protection is attached to the expression of the computer code and does not extend to the functionality of the software. In this respect, Rideout is of opinion that CAD design file only 'resembles' computer software, considering that they are *'just a triangular representation of a 3D object.'*[404] Nevertheless, the EU Court held in a series of cases that a copyright work should demonstrate the *'own intellectual creation of its author'.*[405] The emphasis is therefore on the right form of authorial input as opposed to the category of copyright works.[406] However, the EU Court held in

[398] Hod Lipson and Melba Kurman, *Fabricated: The New World of 3D Printing* (John Wiley & Sons 2013) 1, 175.
[399] Osborn, 'Of PhDs, Pirates, and the Public' (n 262) 816.
[400] Dinusha Mendis, "'Clone Wars" Episode II—The Next Generation: The Copyright Implications Relating to 3D Printing and Computer-Aided Design (CAD) Files' (2014) 6 Law, Innovation and Technology 265, 266; Osborn, 'Of PhDs, Pirates, and the Public' (n 262) 824.
[401] D Mendis, 'The Clone Wars'–Episode 1: The Rise of 3D Printing and Its Implications for Intellectual Property Law– Learning Lessons from the Past' (2013) 35 European Intellectual Property Review 155, 155. The most exposed to piracy has until now naturally been music industry - Oscar F. Bustinza and others, 'Music Business Models and Piracy' (2013) 113 Industrial Management & Data Systems 4.
[402] Thomas Dubuisson, '3D Printing And The Future Of Complex Legal Challenges: The Next Great Disruptive Technology Opportunity Or Threat?' SSRN Scholarly Paper ID 2718113, p. 6.
[403] Directive 2009/24/EC on the legal protection of computer programs, OJ L 111, 5.5.2009, p. 16–22.
[404] Brian Rideout, 'Printing the Impossible Triangle: The Copyright Implications of Three-Dimensional Printing' (2012) 5 The Journal of Business, Entrepreneurship & the Law 6, 161–168.
[405] Case C-5/08, Infopaq Int, ECLI:EU:C:2009:465; Case C-145/10, Eva Maria Painer, ECLI:EU:C:2011:798; Case C-604/10, Football Dataco, ECLI:EU:C:2012:115. For a comment see Andreas Rahmatian, 'Originality in UK Copyright Law: The Old "Skill and Labour" Doctrine Under Pressure' (2013) 44 IIC-International Review of Intellectual Property and Competition Law 4; Paolo Guarda, 'Looking for a Feasible Form of Software Protection: Copyright or Patent, Is That the Question?' (2013) 35 European Intellectual Property Review 445.
[406] Mendis (n 399) 270.

Brezpečnostni[407] that the ordinary law of copyright could protect the graphic user interface of a computer programme. It can therefore be concluded that CAD designs should normally be afforded with copyright protection. However, 3D printing does not only involve copyright law and piracy, but a much wider legal framework including design,[408] patents[409] and trademarks.[410] While 3D printing a product may thus not infringe one IP right, it is quite possible that it will breach another IP right. IP implications of 3D printing are thus far from clear, which leads to the conclusion that a reconsideration of the law will be necessary to determine the proper IP protection for CAD-based designs.

4.6 Data perspective as the next frontier for productivity

The next aspect of servitisation that is briefly explored within this section, i.e. the issue of data, connects all the three topics above – competition, consumers and intellectual property. Collecting and analysing data has, until now, been more in the domain of the software companies; however, this is now progressively spreading also to manufacturing companies, which have started to exploit the possibilities arising from collection and exploitation of potential data, so that added value can be created.[411] Data has thus become the raw material of production, a new source of immense economic and social value.[412] Considering that through servitisation manufacturers get more information about their customers than if they were pure product manufacturers, servitisation is thought as a data intensive process. In this respect, it is believed that servitisation has become a necessary, but not sufficient,

[407] Case C-393/09, Bezpečnostni, ECLI:EU:C:2010:816, para. 35.
[408] Hjalte Worm Frandsen, 'Personal 3D Printing & Intellectual Property Rights - How 3D Printing Technology Challenges the Effectiveness of Copyright and Design Law in Relation to the Protection of Objects of Applied Art' SSRN Scholarly Paper ID 2406626.
[409] Haritha Dasari, 'Assessing Copyright Protection and Infringement Issues Involved with 3D Printing and Scanning' (2013) 41 AIPLA Quarterly Journal 279; Deven R Desai and Gerard N Magliocca, 'Patents, Meet Napster: 3D Printing and the Digitization of Things' SSRN Scholarly Paper ID 2338067; Davis Doherty, 'Downloading Infringement: Patent Law as a Roadblock to the 3D Printing Revolution' (2012) 26 Harv. JL & Tech. 353; Tyler Macik, 'Global Data Meets 3-D Printing: The Quest for a Balanced and Globally Collaborative Solution to Prevent Patent Infringement in the Foreseeable 3-D Printing Revolution' (2015) 22 Indiana Journal of Global Legal Studies 149; Daniel Harris Brean, 'Asserting Patents to Combat Infringement via 3D Printing: It's No'Use" (2013) 23 23 Fordham Intellectual Property Media & Entertainment Law Journal.
[410] Mendis (n 399) 159.
[411] Nik Bessis and Ciprian Dobre, *Big Data and Internet of Things: A Roadmap for Smart Environments* (Springer 2014); Opresnik and Taisch (n 25). Opresnik and Taisch (n 26) 183; See also David Opresnik and others, 'Information – The Hidden Value of Servitisation' in Vittal Prabhu, Marco Taisch and Dimitris Kiritsis (eds), *Advances in Production Management Systems. Sustainable Production and Service Supply Chains* (Springer 2013).
[412] Jules Polonetsky and Omer Tene, 'Privacy in the Age of Big Data: A Time for Big Decisions' (2012) 64 Stanford Law Review Online 63, 63. Opresnik and Taisch (n 26) 175.

condition for the sustained success of manufacturing companies in developed economies.[413] To derive more value from servitisation, in particular to avoid the service paradox, data perspective arises as the next strategic step after adopting servitisation.[414] The information obtained from the customers may be used to develop new systems that improve the product performance and the company's position in the value chain, as well as increase its innovation potential.[415] This data thus constitutes a competitive advantage towards smaller or newer competitors, who cannot afford to build up the same information systems. The central way of achieving this advantage is by reuse of data – either internally by 'data re-purposing' or by selling these data as a new 'product' to interested third parties.[416] This is particularly accentuated in situations of ICT enabled servitisation, where sensors on the products or internet enabled applications support automatic data collection.

Given the mass of data generated through those channels, information overload is becoming a major problem, while at the same time opening new exploiting opportunities. In respect of automatic collection of data, a concept of *'Big Data'* has been developed – referring to data collections so large or complex that traditional data processing applications are inadequate.[417] Modern systems for data analytics can, however, analyse data from different types of devices and use it in creative ways[418] – e.g. by producing market intelligence that is showing similar products to the one just observed or adjusting advertisements on the Internet to individuals' preferences, such as the controversial use of Big Data by Target to *inter alia* determine women, who were pregnant, to market baby goods.[419]

[413] Opresnik and Taisch (n 26) 174.
[414] Jules Polonetsky and Omer Tene (n 411) 63.
[415] Erik Sundin, 'Life-Cycle Perspectives of Product/Service-Systems: In Design Theory' in Tomohiko Sakao and Mattias Lindahl (eds), *Introduction to Product/Service-System Design* (Springer 2009). Tukker and Tischner (n 55).
[416] Glover Ferguson, Sanjay Mathur and Baiju Shah, 'Evolving From Information to Insight' 2005 MIT Sloan Management Review 50, 50.
[417] Mohak Shah, 'Big Data and the Internet of Things' [2015] arXiv preprint arXiv:1503.07092 <http://arxiv.org/abs/1503.07092> accessed 20 October 2023; Bessis and Dobre (n 277); Opresnik and Taisch (n 26); Kagermann and others (n 94); Miller (n 80) 37.
[418] It is claimed that "Big Data" need to be transferred into "Smart Data" - Andy Mulholland, 'Internet of Things; Requires Big Data to Be Turned Upside down to Become Smart Data' <https://www.constellationr.com/content/internet-things-requires-big-data-be-turned-upside-down-become-smart-data>.
[419] Dennis D Hirsch, 'That's Unfair! Or Is It? Big Data, Discrimination and the FTC's Unfairness Authority' (2014) 103 Kentucky Law Journal 345, 350.

Moreover, IoT opens up the possibility that every object that is manufactured can be tracked from cradle to grave, not just through the linear supply chain from manufacturer to end-user, but to every user it comes in contact with, as well as the reverse chains that lead to recycling and disposal (so-called circular economy).[420] For example, the before mentioned British Gas *'Hive Active Heating'* provides the company data covering all aspects of their customers' use of energy from temperatures required at different times of day, boiler use and efficiency helping the company organise their planning and supply operations, whereas marketing gains hugely valuable data on their customers. IoT with Big Data technology thus presents manufacturers an opportunity to repackage their offerings into services adding new value for their customers. For this reason, Big Data has been identified as the *'next big thing in innovation',*[421] *'the fourth paradigm of science'*[422] and as *'the next frontier for innovation, competition, and productivity'.*[423] On the other hand, however, this information explosion (also called *'data deluge'*)[424] unlocks various legal concerns that could stimulate a regulatory backlash. Open questions rang from who is entitled to use this data, can data be traded and, if so, what rules apply to this. To prevent diminishing the data economy and innovation, *'smart'* regulation is needed to establish a balance between beneficial uses of data and the protection of privacy, non-discrimination and other legally protected values. In this respect, the EU has adopted an updated regulatory framework on data protection[425] to insure its continued effectiveness in practice considering the near constant change in the technology sector and the fact that Internet barely existed when the previous legislation was adopted.[426]

The harvesting of large data sets and the use of modern data analytics presents a clear threat for the protection of fundamental rights of European citizen, including the right to privacy.[427] The tasks of ensuring data security and protecting privacy

[420] Luis Araujo and Martin Spring (n 72).
[421] MaryAnne M Gobble, 'Big Data: The Next Big Thing in Innovation' (2013) 56 Research-Technology Management 64.
[422] George O Strawn, 'Scientific Research: How Many Paradigms?' (2012) 47 EDUCAUSE Review 26, 34.
[423] Manyika James and others, 'Big Data: The next Frontier for Innovation, Competition, and Productivity' [2011] The McKinsey Global Institute.
[424] 'The Data Deluge' *The Economist* (25 February 2010).
[425] European Commission – Press release (IP/12/46), Agreement on Commission's EU data protection reform will boost Digital Single Market, 15 December 2015.
[426] Peter Hustinx, 'EU Data Protection Law: The Review of Directive 95/46/EC and the Proposed General Data Protection Regulation', Transcript of a lecture at EUI, 2014, p. 26. See also Viviane Reding, 'The Upcoming Data Protection Reform for the European Union' (2011) 1 International Data Privacy Law 3.
[427] Maja Brkan, 'Data Protection and European Private International Law' 2015 SSRN Scholarly Paper ID 2631116; Orla Lynskey, 'Deconstructing Data Protection: The "Added-Value"of a Right to Data Protection in the EU Legal Order' (2014) 63 International and Comparative Law Quarterly 569.

become harder as information is multiplied and shared around the world.[428] Data regarding individuals' everyday actions, habits, health, location, purchasing behaviour, electricity use etc. is exposed to scrutiny.[429] This raises concerns about discrimination, particularly when one considers that employers, insurers, bankers etc. increasingly analyse various data about potential employees and clients.[430] Traditionally, organisations used various methods of de-identification (encryption of anonymisation) to distance data from real identities and allow analysis to proceed while at the same time containing privacy concerns.[431] Nowadays, however, computer scientists have shown that even anonymized data can often be re-identified and attributed to specific individuals.[432] As observed by Ohm, *'reidentification science disrupts the privacy policy landscape by undermining the faith that we have placed in anonymisation'*.[433] This has high regulatory implications, considering that numerous business models, particularly in the context of health data, online advertising, and cloud computing, are founded upon the premise of de-identification.[434] This observation is further highlighted when considering so-called *'sensor fusion'* that refers to a combination of sensor data from different sources to create a resulting set of information that is better than if the information is used separately. Sensor fusion thus leads to a world in which *'everything reveals everything'* and permits insurers, employers, lenders and other economic actors to distinguish more finely between potential insureds, employees, and borrowers.[435] While this may be economically beneficial from the perspective of the former, it may lead to severe discrimination on the basis of age and other prohibited grounds for discrimination.[436] Privacy (and even security) concerns are further increased when

[428] Jules Polonetsky and Omer Tene (n 411) 65.
[429] Kevin L Doran, 'Privacy and Smart Grid: When Progress and Privacy Collide' (2009) 41 U. Tol. L. Rev. 909; Cheryl Dancey Balough, 'Privacy Implications of Smart Meters' (2011) 86 Chicago Kent L. Rev. 161; Scott R Peppet, 'Unraveling Privacy: The Personal Prospectus and the Threat of a Full-Disclosure Future' (2011) 105 Nw. UL Rev. 1153.
[430] Scott R. Peppet, 'Regulating the Internet of Things: First Steps Toward Managing Discrimination, Privacy, Security, and Consent' 93 Texas Law Review 85, 118.
[431] Article 29 Data Protection Working Party, Opinion 05/2014 on Anonymisation Techniques, adopted on 10 April 2014.
[432] Latanya Sweeney, 'Simple Demographics Often Identify People Uniquely' (2000) 671 Health (San Francisco) 1.
[433] Paul Ohm, 'Broken Promises of Privacy: Responding to the Surprising Failure of Anonymization' (2010) 57 UCLA Law Review 1701, 1704.
[434] Jules Polonetsky and Omer Tene (n 411) 65; Scott R. Peppet (n 429) 131. Notwithstanding all this, however, other computer scientists warn that although there is always some risk of reidentification, in any such attempt there are uncertainties in this process, particularly related to the fact that such reidentification often cannot be authenticated - Betsy Masiello and Alma Whitten, 'Engineering Privacy in an Age of Information Abundance.', *AAAI Spring Symposium: Intelligent Information Privacy Management* (2010) 122.
[435] Scott R. Peppet (n 429) 120–124.
[436] For example, there are many other implications of servitisation in the field of medical law, in particular in relation to the Mobile Health Apps, e.g. a smart phone that is acting as a thermometer or as a blood pressure

taking into consideration new forms of Internet worms that target small IoT devices, such as home routers, smart TVs and Internet-connected security cameras.[437] Broad privacy concerns also arise in relation to remotely piloted aircrafts (drones) that easily enable the collection of a wide variety of information, with a high risk of bulk data gathering and possible unlawful multipurpose uses.[438] In this respect, it is paramount that the new EU Data Protection Regulation is explicitly recognising '*Privacy by Design'*, i.e. a general principle that demands taking privacy into account from the start.[439] Nevertheless, in practice it is claimed that data controllers have little clue how they should go about 'designing in' privacy and that embedding privacy in technical design will be more complicated and expensive than having lawyers to draft privacy notices.[440]

Moreover, Big Data revolution is not just about privacy of the humans, but also about data confidentiality. The fundamental issue in IoT scenarios is to guarantee that only authorised entities can access and modify data. This is particularly relevant in business context, where data represent a means to safeguard competitiveness.[441] Although various access control techniques have been proposed to ensure confidentiality, unauthorised access still occurs and is likely to increase considering the spread of wireless channels that increase the risk of violation.[442] In this respect, media has reported that US Justice Department was investigating a report by Uber that 50.000 of its drivers' names and their licence numbers had been improperly downloaded, although its driver database has only been accessible with a digital

monitor, applications that tract events, retrieve medical content, or allow patient-doctor communication - Sara Digiulio, 'Mobile Health Apps': (2014) 36 Oncology Times 60. See also Commission Communication, eHealth Action Plan 2012-2020 - Innovative healthcare for the 21st century, **COM/2012/0736 final.**

[437] Scott R. Peppet (n 429) 133. See also Article 29 Data Protection Working Party, Opinion 8/2014 on the on Recent Developments on the Internet of Things, adopted on 16 September 2014 and Commission Communication, Internet of Things – An action plan for Europe, COM (2009) 278 final.

[438] In respect of this issue a special opinion was adopted under the EU Data Protection Directive – see Article 29 Data Protection Working Party, 'Opinion 01/2015 on Privacy and Data Protection Issues Relating to the Utilisation of Drones' (2015) 01673/15/EN WP 231 29; see also Chris Schlag, 'The New Privacy Battle: How the Expanding Use of Drones Continues to Erode Our Concept of Privacy and Privacy Rights' (2012) 13 Pittsburgh Journal of Technology Law and Policy [i].

[439] Peter Hustinx (n 425) 28.

[440] Bert-Jaap Koops and Ronald Leenes, 'Privacy Regulation Cannot Be Hardcoded. A Critical Comment on the "privacy by Design" Provision in Data-Protection Law' (2014) 28 International Review of Law, Computers & Technology 159, 160, 167; Deirdre K Mulligan and Kenneth A Bamberger, 'What Regulators Can Do to Advance Privacy Through Design' (2013) 56 Communications of the ACM 20, 20.

[441] Daniele Miorandi and others, 'Internet of Things: Vision, Applications and Research Challenges' (2012) 10 Ad Hoc Networks 1497, 1505.

[442] ibid 1507.

security key.[443] Increasingly widespread application of cloud computing in manufacturing, progressed into cloud manufacturing brings further privacy and confidentiality concerns.[444] While it is claimed that manufacturers have *'their heads in the cloud'*[445] and the European Commission is promoting the rapid adoption of cloud computing in order to boost productivity,[446] many related legal issues need to be considered in order to avoid difficulties, particularly in respect of data ownership[447] – i.e. when data is put in a cloud, who owns it and what happens if the cloud provider encounters operating difficulties or even goes bankrupt. At EU level, it is foreseen that the proposed Common European Sales Law (CESL)[448] will offer the general regulatory framework also for cloud computing; nevertheless, to regulate issues not covered by CESL, including data preservation after termination of the contract, ownership of the data, direct and indirect liability change of service by cloud providers and subcontracting, model contract terms should be developed by the Commission.[449]

Big Data is further revealing as a potentially 'big' competition law problem for the EU.[450] Problems may arise in situations, when Big Data present a significant and durable entry barrier. It is thus considered that when it comes to large online companies, they should face competition law liability for refusing to provide user data in their possession to competitors or for collecting additional user data by expanding into new product lines. Although there are strong opponents of such a competition law enforcement, claiming that Big Data only rarely has anything to do with market definition or competitive effects,[451] the Commissioner in charge of competition, Margrethe Vestager, has revealed EU plans to *'take a harder look at whether the collection of vast troves of consumer data by big Internet companies violates competition rules'*.[452] She explained this plan by holding that *'(i)f just a few companies control the data*

[443] Joseph Menn and Dan Levine, 'U.S. Justice Dept Probes Data Breach at Uber -Sources' *Reuters* (18 December 2015).
[444] Christos Kalloniatis and others, 'Towards the Design of Secure and Privacy-Oriented Information Systems in the Cloud: Identifying the Major Concepts' (2014) 36 Computer Standards & Interfaces 759; Lifei Wei and others, 'Security and Privacy for Storage and Computation in Cloud Computing' (2014) 258 Information Sciences 371.
[445] Craig Hodges, 'Collaboration Is Job No. 1 in Manufacturing', Microsoft Blog, 24 June 2010.
[446] In September 2012, the Commission adopted a strategy for "Unleashing the Potential of Cloud Computing in Europe", COM(2012) 529 final.
[447] Barbara J Evans, 'Much Ado about Data Ownership' (2011) 25 Harvard Journal of Law & Technology 69.
[448] COM(2011) 635 final.
[449] COM(2012) 529 final (n. 298), p. 12. See also Article 29 Data Protection Working Party, Opinion 05/2012 on Cloud Computing, adopted 1 July 2012.
[450] Alexander Birnstiel in Peter Bräutigam and Thomas Klindt (n 197) 154–155.
[451] Darren S Tucker and Hill B Wellford, 'Big Mistakes Regarding Big Data' (2014) 14 Antitrust Source 1.
[452] 'EU Competition Chief to Eye "Big Data" Concerns in Merger Probes' *Reuters* (17 January 2016).

you need to satisfy customers and cut costs, then you can give them the power to just drive rivals out of the market'.[453]

Finally, Big Data also raises concerns for intellectual property law, a primary goal of which is to encourage technological disclosures to speed innovation.[454] This aspect is therefore based on the assumption that the only purpose of intellectual property is not to encourage invention, but also to encourage the dissemination of those new ideas, so that the public receives the benefit of those inventions. Borgman in this respect asserts that *'If the rewards of the data deluge are to be raped, then researchers who produce those data must share them'*.[455] Conversely, Big Data producers are reluctant to reveal the data, because they view the data as valuable trade secrets that provide a competitive advantage. This along with technical and regulatory barriers significantly limits the data's potential for future reuse. Consequently, Big Data's disclosure problem suggests that IP law is not meeting its goal of spurring innovation by encouraging technological disclosures in an important new technological field.[456]

4.7 Servitisation v. globalisation

EU regulatory responses focused upon servitisation may not, however, ignore the other economic megatrend of the modern time, i.e., globalisation. Since EU-wide harmonisation cannot achieve all business aims related to the new economy, it is essential to invest effort into achieving regulatory counterparts at the international level. New ways of more accurate measuring of trade show that services' share of exports is *'significantly greater'* than had previously been believed, particularly when services provided by manufacturing companies are also taken into consideration.[457] Nevertheless, increasing occurrence of product-service systems and their placement on the international markets are facing restrictions due to the barriers on free movement of goods and services at the global level. As an illustration, even though Japan has no tariffs on cars from the EU, they impose a range of barriers to delivery of associated services, such as distribution, insurance, financial solutions and

[453] Ibid.
[454] Mark A Lemley, 'The Surprising Virtues of Treating Trade Secrets as IP Rights' [2008] Stanford Law Review 311, 332–333.
[455] Christine L Borgman, 'The Conundrum of Sharing Research Data' (2012) 63 Journal of the American Society for Information Science and Technology 1059, 1059.
[456] Michael Mattioli, 'Disclosing Big Data' (2014) 99 Minnesota Law Review 535, 549.
[457] World Input Output Database (WIOD); High-Level Group on Business Services, Final Report, April 2014, p. 25.

maintenance and repair of vehicles. Due to the higher costs of services associated with owning foreign vehicles compared to Japanese ones, a study showed that popular European cars are sold at 90 percent mark-up in Japan compared to European listed prices.[458] Several other types of servitisation transactions are not possible at international level considering that services liberalisation in temporary movement of physical persons is one of the most restricted areas of international trade.[459] Stringent restrictions apply for temporary relocation, either in the form of staff between subsidiaries of a company (i.e. intra-corporate transfers), or through the form of independent providers temporary moving to proximity of the client (as contract service suppliers or independent professional) for installation, technical consulting and training. Such movement of professionals is particularly important for knowledge intensive sectors and current lack of liberalisation in this respect is preventing development of proximity between a manufacturer and the consumer.[460] Furthermore, requirements for local establishment often severely restrict access to the market of foreign product-services providers. Norway, for example, requires registrants for the *'.no'* domain, which makes an online service more visible to Norwegian consumers to establish a local company or a branch in the country.[461] Moreover, current rules regarding technical barriers to trade (TBT) focus on barriers to goods in the form of regulations, standards, testing and certification procedures; however, when services are embedded in the product or delivered together with the product, services barriers can be like TBT-barriers and have TBT-like effects.[462]

Additionally, servitisation process enhanced by the Internet[463] gives rise to new types of trade barriers. The Internet economy is radically transforming international trade, making it increasingly possible for companies of all sizes to sell to customers around the world, not just for large companies that have the resources to open international offices and deal with numerous related challenges. However, a *conditio sine qua non* for this is an open Internet. Although the WTO rules govern all trade in goods and services, including international trade over the Internet, barriers to this lie in the fact

[458] Hosuk Lee-Makiyama, 'FTAs and the Crisis in the European Car Industry' [2012] ECIPE Policy Brief 11.
[459] Hosuk Lee-Makiyama, 'Future-Proofing World Trade in Technology: Turning the WTO IT Agreement [ITA] into the International Digital Economy Agreement [IDEA]' (2011) 66 Aussenwirtschaft: schweizerische Zeitschrift für internationale Wirtschaftsbeziehungen ; the Swiss Review of international economic relations 279, 21.
[460] Emilie Aner and Magnus Rentzhog (n 49) 21.
[461] Gerwin (n 91) 5.
[462] Emilie Aner and Magnus Rentzhog (n 49) 23.
[463] Lee-Makiyama says the Internet is *"perhaps the most important innovation for globalisation since the maritime shipping lanes"* - Lee-Makiyama (n 410) 24.

that governments worldwide are adopting increasing restrictions on the Internet and digital trade.[464] Data protectionism may be justified by privacy and national security issues; however, it is often directly driven by economic protectionism.[465] Considering that free flow of data is not yet included in any trade agreements in a comprehensive way,[466] this presents a serious problem for digitising industry.[467] The German Engineering Association (WDMA) has called the policy makers to *'remove trade barriers for Industrie 4.0 products in cybersecurity and protection of company data as part of trade agreements with third countries.'*[468]

In this respect it is also important to note that the Information Technology Agreement (ITA) was concluded in December 1996 providing for participants to completely eliminate duties on IT products covered by the Agreement.[469] Nevertheless, when the ITA came into force, CDs were still the most common medium for music, DVDs did not yet exist and VHS tapes were still the market-leading standard for video.[470] The ITA hence needs to be adapted to the technological developments since the introduction of the Internet. Protectionist interests by the EU and subsequent disputes against it[471] have thus disrupted liberalisation process in the IT field and progress was hard to see.[472] Nevertheless, in June 2012, negotiations for the expansion of the product coverage of the ITA to

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464 Gerwin (n 91) 4.

465 Brian Hindley and Hosuk Lee-Makiyama, *Protectionism Online: Internet Censorship and International Trade Law* (Brussels 2009).

466 Although there is growing discussion around it, particularly in negotiations on TTIP - 'U.S. Boosted by Digital Trade but Internet Barriers Remain -Report' *Reuters* (15 August 2013); Catherine Stupp, 'Officials Call for TTIP Digital Trade Boost as US-EU Tech Tensions Linger' (*EurActiv*, 24 July 2015). Also the 2016 World Economic Summit in Davos was titled "Mastering the Fourth Industrial Revolution" - Georgi, 'Davos Pitches "tech Revolution" in the Face of Mounting Pessimism' (*EurActiv*, 20 January 2016).

467 Joshua Paul Meltzer, 'The Internet, Cross-Border Data Flows and International Trade' (2015) 2 Asia & the Pacific Policy Studies 90.

468 WDMA European Office (n 203) 13.

469 Michael Anderson and Jacob Mohs, 'The Information Technology Agreement: An Assessment of World Trade in Information Technology Products' [2010] Journal of International Commerce & Economics 1; Iana Dreyer and Brian Hindley, 'Trade in Information Technology Goods: Adapting the ITA to 21st Century Technological Change' (ECIPE Working Paper 06/2008 European Centre for International Political Economy 2008).

470 Barbara A Fliess and Pierre Sauve, 'Of Chips, Floppy Disks and Great Timing: Assessing the Information Technology Agreement' (1997) 8 Paper prepared at the Institute Francais des Relations Internationales (IFRI) and the Tokyo Club Foundation for Global Studies.

471 WTO, European Communities and its Member States — Tariff Treatment of Certain Information Technology Products, DS375, DS376, DS377. For a comment see Tsai-Yu LIN, 'Systemic Reflection on the EC-IT Product Case Establishing an "Understanding" on Maintaining the Product Coverage of the Current Information Technology Agreement in the Face of Technological Change' (2011) 45 Journal of World Trade 401. Cf WTO, China – Measures affecting trading rights and distribution services for certain publications and audiovisual entertainment products, WT/DS363/R.

472 Matthew B Adler and others, 'What's on the Table? The Doha Round as of August 2009' SSRN Scholarly Paper ID 1456478.

include a number of products which, in light of new technological developments, should be added to the list were launched. On 19 December, at the WTO ministerial conference in Nairobi the members confirmed the expansion,[473] which is, according to the WTO Director General a part *'of the biggest reforms in global trade policy for 20 years'*.[474] The agreement should lead to removing customs duties on 201 high-tech products by 2019.[475]

Moreover, in respect of EU regulatory response to the servitization trend it is essential to emphasise that since July 2014 the EU and 16 other WTO members have been negotiating an Environmental Goods Agreement (EGA), whose aim is to remove barriers to trade in environmental or 'green' goods. 'Green goods' are seen as a vital component in sustainable development and cover areas as diverse as tackling air pollution, managing waste, or generating renewable energy like wind or solar, e.g. carbon dioxide scrubbers, recycling machinery, heat pumps, thermostats, measuring equipment, wind turbines, solar panels etc.[476] According to the Commission, at the first stage the talks will focus on removing tariffs on a broad list of environmental goods. The negotiators build on a list of 54 products on which the member countries of Asia-Pacific Economic Cooperation (APEC) have agreed to reduce their tariffs to 5% or less by 2015. In addition, the intention is for the EGA is to become a 'living agreement' which would allow the addition of new products in the future. As a world leader in import and export of environmental goods, the EU's ambition is also to include services related to exports of environmental goods (e.g. repair and maintenance of wind turbines) and to tackle non-tariff barriers, such as local content requirements or restrictions on investment. At this stage, only some WTO members have chosen to take part in the talks. This is why they are described as 'plurilateral'.[477] Once it is adopted its benefits will be applied to all WTO members

[473] WTO members secure "historic" Nairobi Package for Africa and the world, Ministerial Conference, 10TH, Nairobi, 19 December 2015, https://www.wto.org/english/news_e/news15_e/mc10_19dec15_e.htm (accessed 23 October 2023).

[474] Azevêdo: Build on historic success of Nairobi to tackle urgent challenges facing the WTO, 19 January 2016, https://www.wto.org/english/news_e/spra_e/spra109_e.htm (accessed 23 October 2023).

[475] Trillion-euro global high-tech trade deal agreed, http://trade.ec.europa.eu/doclib/press/index.cfm?id=1355 (accessed 23 October 2023).

[476] EU Commission, EU in joint launch of WTO negotiations for green goods agreement, Press Release, 24 January 2014.

[477] Australia, Canada, China, Costa Rica, Chinese Taipei, the European Union, Hong Kong (China), Japan, Korea, New Zealand, Norway, Switzerland, Singapore, United States, Israel, Turkey and Iceland. Together, these countries account for the majority of the world trade in environmental goods.

using the Most Favoured Nation (MFN) principle[478] and will thus liberalise international trade with the environmental product-service systems.

The initiative shows how trade policy can positively contribute to environment protection and tackling climate change. It can boost global trade in green goods and services; support green industry globally, help meet climate and energy targets to be agreed in the new Climate Agreement end 2015 in Paris; provide cheaper access to these technologies worldwide as well as to create an impetus for talks on green goods and services in the World Trade Organisation. Moreover, the initiative is also in line with the Commission's 2015 trade strategy that *'the rise of services embedded in manufacturing calls for still greater focus on liberalising services both within the EU and with the rest of the world'*, underlining that it is increasingly essential to improve market access for manufacturing and services in conjunction with each other, thereby moving beyond traditional separation of liberalisation commitments for goods and services in trade negotiations.[479]

Finally, it is noteworthy that specific legal challenges arise also in relation to the double use products that are still subject to export control with the purpose of avoiding the proliferation of nuclear, chemical, biological, and ballistic arms. Under EU legislation, controlled dual-use items may not leave the EU customs territory without an export authorisation issued by the relevant authority in the Member State in which the exporter is established.[480] The list of double use products includes cryptography products that are essential for the secure operation of nearly all organizations, and are key to protecting the privacy of individuals worldwide. Cryptography allows for the protection of sensitive information, either in storage or in communication.[481] Many IT products, services, and businesses depend upon strong cryptography. E-commerce would not have flourished had customers feared that every time they made a purchase online, they were placing their credit card information at risk of compromise. Nevertheless, by controlling the use of cryptography, countries hinder the development of their IT and e-commerce

[478] Commission, The Environmental Goods Agreement (EGA): Liberalising trade in environmental goods and services, News archive, 8 September 2015.
[479] Commission Communication, Trade for all, COM (2015) 497 final (n. 271), p. 11.
[480] Regulation (EC) No 428/2009 setting up a Community regime for the control of exports, transfer, brokering and transit of dual-use items, OJ 134, 29.5.2009, p. 1-269.
[481] Nathan Saper, 'International Cryptography Regulation and the Global Information Economy' (2012) 11 Nw. J. Tech. & Intell. Prop. xv, 673.

markets in general.[482] Restrictions on importation and use of cryptography also have substantial effects on the operations of multinational companies.[483] Forcing disclosure of source codes or keys thus presents a problem for digitising economy in general[484] and there is a rising pressure to remove trade barriers of this kind.[485] Despite this pressure, however, Banisar's prediction from nearly two decades ago that *'the battle will continue for the foreseeable future because the stakes are too high for everyone',*[486] still stands.

4.8 Ecological aspects – servitisation as a means of a resource efficient Europe

In the domain of environmental law it is broadly acknowledged that since present trends in economic and population growth continue, the natural environment is increasingly being stressed.[487] As already evident from the previous sections, it is one of the cornerstones of servitisation that in addition to strengthening alliances among the parties involved in the business it may also aim to bolster sustainability.[488] It can provide an incentive for suppliers to increase the durability of the products by changing their business models and redesigning products. Practical examples include business models such as bike and car sharing, ride sharing, systems for renting cars, aircrafts, machines or irrigation systems instead of buying them etc. Consequently, servitisation has a strong potential to reduce environmental impacts associated with linear production-consumption systems based on product sales, ownership, and disposal models and thereby enabling businesses to compete in a relatively regulated market.[489]

[482] ibid 684.
[483] ibid 685. See also Ellen Messmer, Encryption Restrictions', Network World, 14 March 2004 and F Lynn McNulty, 'Encryption's Importance to Economic and Infrastructure Security' (1998) 9 Duke Journal of Comparative & International Law 427.
[484] Bärbel Sachs in Peter Bräutigam and Thomas Klindt (n 197) 140.
[485] WDMA European Office (n 203).
[486] David Banisar, 'Stopping Science: The Case of Cryptography' 1999 SSRN Scholarly Paper ID 1806222, 35.
[487] Oksana Mont, 'Editorial for the Special Issue of the Journal of Cleaner Production on Product Service Systems' (2003) 11 Journal of Cleaner Production 815.
[488] Craig A Hart, *Climate Change and the Private Sector: Scaling Up Private Sector Response to Climate Change* (Routledge 2013); Fernanda Hänsch Beuren, Marcelo Gitirana Gomes Ferreira and Paulo A Cauchick Miguel, 'Product-Service Systems: A Literature Review on Integrated Products and Services' (2013) 47 Journal of Cleaner Production 222, 225.
[489] Andrius Plepys, Eva Heiskanen and Oksana Mont, 'European Policy Approaches to Promote Servicizing' (2015) 97 Journal of Cleaner Production 117, 118.

Circularity and servitisation are also seen as very correlated by the Council of the EU. In this respect, its Recommendation on climate neutrality of 2022 sets forth:

"Circular value retention activities, including repair, re-use, remanufacturing and servitisation business models, can foster affordable and sustainable access to goods and services. They also generate jobs and opportunities at various skill levels, including for women, persons with disabilities and groups in vulnerable situations, through social economy entities active in those areas. By promoting product circularity, they reduce carbon emissions vastly, while the jobs created are in proximity to the products that need to be maintained, refurbished or shared."[490]

Servitisation could thus play a major role in a more circular economy in the future and result in resource savings because if products are provided per use rather than sold, the vendors and manufacturers have an interest in prolonging the life of the product as long as possible to get the maximum use from it.[491] On the other hand, consumers are provided with the economic incentive to use products in a more efficient way[492] and manufacturers adopting the servitisation strategy may increase consumer's interest in environmental issues.[493]

Moreover, many sustainable solutions improving the quality of the global environment are offered by the digitising industry, where the expansion of smart objects enables introduction of smart cities with smart infrastructure, where sensors observe continuing safety of a bridge by monitoring data on vibration and pressure; smart public lighting that can allegedly cut a city's energy costs up to 80 percent; smart waste management with sensors on garbage collection; or even smart farms with smart irrigation (that supposed to lead to 60 percent decrease of water consumption).[494] Private customer-oriented solutions include smart homes with energy efficient ovens, thermostats and refrigerators that adjust power consumption

[490] Council Recommendation of 16 June 2022 on ensuring a fair transition towards climate neutrality, OJ 2022/C 243/04, para. 12.
[491] 'Project Proposes Policy Packages for Servitisation - Eco-Innovation Action Plan - European Commission' (n 26); Frank Tietze and Erik G Hansen, 'To Own or to Use? How Product Service Systems Facilitate Eco-Innovation Behavior' (2013) SSRN Scholarly Paper ID 2244464.
[492] Commission Communication (n 27).
[493] Ezio Manzini, Carlo Vezzoli and Garrette Clark, 'Product-Service Systems. Using an Existing Concept as a New Approach to Sustainability' (2001) 1 Journal of Design Research.
[494] Michael Miller, *The Internet of Things: How Smart TVs, Smart Cars, Smart Homes, and Smart Cities Are Changing the World* (Que 2015) 263–280.

to cheaper rates of electricity during the nights.[495] This way, servitisation can help minimizing the consumption of scarce resources and environmental degradation.[496]

4.8.1 What if environmental improvement of servitisation is marginal only?

Notwithstanding optimistic expectations by a long line of researchers, some scholars recently realized that the correlation between servitisation and dematerialization is considerably more complex than it appeared at first. As pointed out by Tukker in a review of eight different types of Product Service Systems (PSS), the majority will result in marginal environmental improvements at best, while some (such as product lease) could even lead to less responsible user behaviour and hence to increased environmental impacts, because PSS makes users less responsible for careful use of the product.[497]

While Vasques and Ono found that services for shared usage of washing machines and dryers among neighbours seem to be better accepted when they promote convenience and comfort for low price, instead of taking care of the environment,[498] Möhlmann, Moeller and Wittkowski even found no effect of environmentalism on preferring renting instead of owning good, when surveying accommodation, car sharing and online peer-to-peer network.[499] It is moreover hard to see, why is Uber that is performing transportation services using diesel machine cars more environmentally sustainable than for example conventional taxis running on bio-gas. Consequently, there is no irrefutable evidence regarding the link between environmental motivations and participation in the sharing economy. There are also increasingly problematic social sustainability dilemma related to this business model

[495] Miller, ibid. Additionally, Miller (at p. 290) mentions CO2 sensors that monitor automobile emissions, pollution from factories and even toxic gases generated on farms; water sensors that monitor water quality in oceans, rivers, and lakes, and determine whether water is suitable for fish and plant life; radiation sensors that monitor radiation levels etc.

[496] TS Baines and others, 'State-of-the-Art in Product-Service Systems' (2007) 221 Proceedings of the Institution of Mechanical Engineers, Part B: Journal of Engineering Manufacture 1543.

[497] Tukker (n 25).

[498] Rosana Aparecida Vasques and Maristela Mitsuko Ono, 'When Sharing Is (Almost and/or Possibly) Better than Owning: A Case Study on a "Full Service" Collective Laundry' (2016) 14 Quando o Compartilhamento é (Quase e/ou Possivelmente) Melhor que a Posse: um Estudo de Caso em um 'Serviço Completo' de Lavanderia Coletiva. 97.

[499] Mareike Möhlmann, 'Collaborative Consumption: Determinants of Satisfaction and the Likelihood of Using a Sharing Economy Option Again' (2015) 14 Journal of Consumer Behaviour 193; Sabine Moeller and Kristina Wittkowski, 'The Burdens of Ownership: Reasons for Preferring Renting' (2010) 20 Managing Service Quality: An International Journal 176.

that concern the danger of broad precarisation of the labour market.[500] Services economy, lease economy and sharing economy are thus not per se environmentally sustainable.

4.8.2 Regulatory incentives for sustainable servitisation

Notwithstanding all the above considerations, servitisation is still primarily economically motivated and its sustainability does not come automatically. Services providers and consumers alike will act sustainably only if regulation supports such orientation of servitisation business models. Internet enables advanced services. Yet, regulation is needed for this advancement to be both environmentally and socially sustainable. Servitisation can provide an incentive for suppliers to increase durability of products by changing their business models and redesigning products.[501]

Consequently, it is important for policy makers and regulators to promote these positive aspects of servitisation – be it on voluntary or mandatory basis. This is more so, considering that the shift from products to services cannot be assumed to be eco-efficient and there are a number of potential rebound effects.[502] Particularly powerful players in the market may thus oppose servitisation solutions because their specific competitive advantage lies in mass production.[503] Policy makers have essentially two forms of enhancing sustainable manufacturing.

On the one hand, there are direct policy instruments addressed to the manufacturers, who are encouraged through regulatory or other policy instruments to incorporate mechanisms of sustainability into their production and service system. On the other hand, however, there are more indirect instruments that are addressed to the consumer to achieve the aim of sustainable consumption and thus a reduction in the usage of scarce natural resources. This refers to more or less binding rules, practices and awareness raising with the purpose of reducing the use of natural resources and

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[500] Cristiano Codagnone, Fabienne Abadie, and Federico Biagi, 'The Future of Work in the Sharing Economy : Market Efficiency and Equitable Opportunities or Unfair Precarisation?'

[501] A Plepys, E Heiskanen and O Mont, 'European Policy Approaches to Promote Servicizing' (2015) 97 Journal of Cleaner Production 118.

[502] Matteo Bartolomeo and others, 'Eco-Efficient Producer Services—What Are They, How Do They Benefit Customers and the Environment and How Likely Are They to Develop and Be Extensively Utilised?' (2003) 11 Journal of Cleaner Production 829.

[503] Plepys, Heiskanen and Mont (n 41) 119; Kai Hockerts and Rolf Wüstenhagen, 'Greening Goliaths versus Emerging Davids—Theorizing about the Role of Incumbents and New Entrants in Sustainable Entrepreneurship' (2010) 25 Journal of Business Venturing 481.

toxic materials as well as the releases of waste over the life cycle of the service or product that consumers are purchasing and using, which then influence the conduct of manufacturers.[504]

When framing the EU response to the servitisation trend the EU institutions first of all need to respect the EU multi-level governance system, thereby respecting the competences of various levels of governance.[505] EU industrial policy is horizontal in nature and aims at securing framework conditions favourable to industrial competitiveness.[506] It falls among those policies, where the EU has competence to carry out actions to support the actions of the Member States (Article 6 TFEU). Consequently, it is the Member States that are the holders of their respective industrial policies, thereby adopting corresponding national strategies on digitalization of manufacturing.[507] The EU's response, revealed in the Commission's action plan on the digitising industry,[508] is in this respect focused on coordination between national and EU-level initiatives and in developing policy actions, such as investments in digital innovations and infrastructure, accelerating the development of ICT standards, exploring regulatory conditions and adaptation of the workforce, including up-skilling. Moreover, EU industrial policy is well integrated into a number of other EU policies such as those relating to competition, consumers, trade, the internal market, research and innovation, employment, environmental protection and public health. This interleaving between industry and other policies logically affects the servitisation trend as well. The majority of these fields are, however, not within exclusive competence of the EU institutions and even though regulation at the EU level is in most instances crucial so as to prevent a myriad of different national approaches that would create chaos and partition of the internal market, authorities at national and local level, in line with the principles of subsidiarity and

[504] More on this in Lucia A. Reisch, John Thøgersen, Handbook of Research on Sustainable Consumption, Edward Elgar Publishing, 2017.
[505] Marks and others, 'European Integration from the 1980s: State-Centric v. Multi-Level Governance' (1996) 34 JCMS: Journal of Common Market Studies 341.
[506] Commission **Communication, Industrial Policy in an Enlarged Europe, COM (2002) 714 final.**
[507] In Germany the development of manufacturers equipping their products and machines with intelligent digital systems is referred to as *'Industrie 4.0',*[507] the French term for the same is *'Industrie du Futur'*, in the Netherlands and in Slovakia strategists talk about *'Smart Industry'*, in the UK about *'Catapult'* (High Value Manufacturing), in Spain about *'Industria Conectada 4.0',* and in Italy it is referred to as '*Fabbrica Intelligente'*. More in Bauernhansl, 'Industry 4.0: Challenges and Limitations in the Production. Keynote' [2013] ATKearney, Factory of the year; Dujin and others, 'INDUSTRy 4.0: The New Industrial Revolution' [2014] Roland Berger Strategy Consultants, Munich.
[508] Commission Communication, Digitising European Industry Reaping the full benefits of a Digital Single Market, COM (2016) 180 final. This communication is accompanied by three further communications, i.e. on a European Cloud Initiative, on Priorities for ICT Standardisation, the E-Government action plan and the Staff Working Document on the Internet of Things.

proportionality, need to get involved. Moreover, other constitutional and institutional settings have to be respected in the regulatory process, including industry involvement and self-regulation in line with the 'New Approach' so that the market itself defines the technical solutions while public authorities only set the general regulatory requirements.[509]

Considering these constitutional restrictions, EU regulatory response progresses from various soft law documents towards binding and generally applicable EU legislation. Servitisation is consistent with the goals defined in the EU Commission's Communication entitled *'The Roadmap to a Resource Efficient Europe'*[510] that outlines how we can transform Europe's economy into a sustainable one by 2050. It proposes ways to increase resource productivity and decouple economic growth from resource use and its environmental impact. Although the vision is an ambitious one the practical tools to directly steer this development are currently fairly limited.[511] While there is no specific policy focus on supporting servitisation by the EU Commission, several EU strategies are targeting the aims of sustainable consumption and production as well as resource and energy efficiency,[512] such as the 2020 Circular Economy Action Plan[513] and the 2021 update of the EU Industrial Strategy.[514] In this respect, servitisation is occasionally mentioned. In the New Legislative Framework (NLF) of 2022,[515] the Commission admits wide-spread occurrence of servitisation business models, but states that the NLF does not define new aspects in the value chain, such as the increased role of services within products and what this means from a regulatory perspective at the point in time of placing on the market. In contrast, the NLF focuses on ensuring product safety in respect of the post market placement, as services are typically provided once the product is in operation.

[509] See Commission Communication, A vision for the internal market for industrial product, COM (2014) 25 final, p. 5 and Commission Staff Working Document, Evaluation of the New Legislative Framework, SWD/2022/0364 final. See also Klindt in Bräutigam and Klindt (n 197) 100–106; Weber and Weber, *Internet of Things: Legal Perspectives* (Springer Science & Business Media 2010) 23.
[510] **Communication from the Commission, Roadmap to a Resource Efficient Europe**, COM(2011) 571 final.
[511] Susanne Fischer and others, 'Leasing Society' (European Parliament, Economic and Scientific Policy 2012).
[512] Plepys, Heiskanen and Mont (n 496).
[513] COM(2020) 98 final.
[514] COM(2021) 350 final.
[515] Commission Staff Working Document, Evaluation of the New Legislative Framework, SWD/2022/0364 final.

Service business model is concretely visible in the Energy Efficiency Directive,[516] which calls for a common framework that *'should give energy utilities the option of offering energy services to all final customers, not only to those to whom they sell energy. This increases competition in the energy market because energy utilities can differentiate their product by providing complementary energy services.'*[517] Energy services that include a variety of activities, such as energy analysis and audits, energy management, maintenance and operation, monitoring and evaluation of savings etc.,[518] are thus a response to the constantly increasing criticality of energy-related issues that lead to the situation, where a mere fuelling is no longer considered as equivalent to energy supply.[519] The EU Energy Efficiency Directive may hence be perceived as direct instruments in support of servitisation and it is expected that this "support" will further increase under the Commission's proposal to recast this Directive, as part of the 'fit for 55' package.[520]

Additionally, the EU has a broad policy on waste management. This policy is based on the so-called *principle of extended producer responsibility (EPR)* requiring manufacturers of products containing toxic or environmentally unsustainable materials[521] to take responsibility for management throughout key parts of their lifecycle, especially for management of post-consumer waste.[522] According to Thomas Lindhqvist, who first introduced EPR,[523] it refers to *'an environmental protection strategy to reach an environmental objective of a decreased total environmental impact from a product, by making the manufacturer of the product responsible for the entire life-cycle of the product and especially for the take-back, recycling and final disposal of the product'*.[524] The concept thus implies that responsibilities, which

[516] Directive 2012/27/EU on energy efficiency, OJ L 315, 14.11.2012, p. 1–56.
[517] Ibid., preamble, rec. 20. Additionally, the Directive obliges the Member States to set up national energy efficiency obligation schemes for energy utilities or other alternative policy measures that achieve the same amount of energy savings.
[518] Paolo Bertoldi, Silvia Rezessy and Edward Vine, 'Energy Service Companies in European Countries: Current Status and a Strategy to Foster Their Development' (2006) 34 Energy Policy 1818. More on energy services in: Thorsten Helms, 'Asset Transformation and the Challenges to Servitize a Utility Business Model' [2015] Energy Policy; Miriam Benedetti and others, 'A Proposal for Energy Services' Classification Including a Product Service Systems Perspective' (2015) 30 Procedia CIRP 251; Yudi Fernando and Sofri Yahya, 'Challenges in Implementing Renewable Energy Supply Chain in Service Economy Era' (2015) 4 Procedia Manufacturing 454.
[519] Benedetti and others (n 58) 252. For public procurement aspects of energy services see Colin Nolden, Steve Sorrell and Friedemann Polzin, 'Innovative Procurement Frameworks for Energy Performance Contracting in the UK Public Sector'.
[520] Proposal for a Directive on energy efficiency (recast), COM (2021) 558.
[521] E.g. paint, batteries, beverage containers, pesticide containers, electronics, packaging, cell phones, sharps, radioactive devices, motor oils, plastic bags and smoke detectors.
[522] Clifton Curtis and others, 'Extended Producer Responsibility and Product Stewardship for Tobacco Product Waste' (2014) 4 Int J Waste Resources 2, 2.
[523] Thomas Lindhqvist, *Extended Producer Responsibility in Cleaner Production: Policy Principle to Promote Environmental Improvements of Product Systems*, vol 2000 (Lund University 2000) ii.
[524] The definition was published in English for the first time in: Thomas Lindhqvist, 'Extended Producer Responsibility as a Strategy to Promote Cleaner Products' (Lund University).

were traditionally assigned to consumers and authorities responsible for waste management, are to be shifted to the producer of the products and is thus consistent with the polluter pays principle. The environmental benefits deriving from widespread application of EPR potentially include more efficient use of resources, cleaner products and technologies, more efficient manufacturing, increased recycling and greener consumption.[525] The Packaging Directive[526] provides in the preamble that *'it is essential that all those involved in the production, use, import and distribution of packaging and packaged products become more aware of the extent to which packaging becomes waste, and that in accordance with the polluter-pays principle they accept responsibility for such waste'*. Recent proposal of 30 November 2022 for a Packaging Regulation[527] that will replace and upgrade the current Packaging Directive further strengthens this by aiming to harmonise monitoring and reporting obligations, including producer reporting obligations under EPR schemes.[528]

Additionally, the Directive on Waste Electric Equipment (WEEE Directive)[529] provides for the creation of collection schemes where consumers return their WEEE free of charge, however, *'in order to give maximum effect to the concept of producer responsibility'*, each producer is responsible for financing the management of the waste from his own products.[530] The current Batteries Directive[531] is providing that financing schemes for the management of waste batteries and accumulators should *'help to achieve high collection and recycling rates and to give effect to the principle of producer responsibility'*.[532] It is expected that the proposed Batteries Regulation of October

[525] Allen L. White, Mark Stoughton and Linda Feng, 'Servicizing: The Quiet Transition to Extended Product Responsibility' (Tellus Institute 1999) US Environmental Protection Agency 20. See also Dorothy Maxwell and Rita Van der Vorst, 'Developing Sustainable Products and Services' (2003) 11 Journal of Cleaner Production 883.
[526] Directive 94/62/EC of 20 December 1994 on packaging and packaging waste.
[527] Proposal for a Regulation on packaging and packaging waste, COM (2022) 677.
[528] Ibidem, p. 3.
[529] Directive 2002/96/EC on waste electrical and electronic equipment (WEEE), OJ L 37, 13.2.2003, p. 24-39.
[530] Ibid., rec. 20. More on this in: M Altvater and C Brandmann, 'Extended Producer Responsibility: The EU WEEE Directive Goes Global - Strict Law and Order Required or Self-Regulating Market Power a Promising Alternative?', *Electronics Goes Green 2012+, ECG 2012 - Joint International Conference and Exhibition, Proceedings* (2012); Grit Walther and others, 'Implementation of the WEEE-Directive — Economic Effects and Improvement Potentials for Reuse and Recycling in Germany' (2010) 47 International Journal of Advanced Manufacturing Technology 461. In autumn 2022 the Commission started the evaluation of the progress made under the Directive – see here https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/13420-Waste-from-electrical-and-electronic-equipment-evaluating-the-EU-rules_en.
[531] Directive 2006/66/EC on batteries and accumulators and waste batteries and accumulators, OJ L 266, 26.9.2006, p. 1.
[532] Ibid., rec. 19. More on this in Thomas Lindhqvist, 'Policies for Waste Batteries' (2010) 14 Journal of Industrial Ecology 537.

2020[533] that should repeal the Directive will further increase EPR schemes and bring the playing field for EPR schemes for EV and industrial batteries.

Moreover, the Euratom Radioactive Waste Directive[534] provides in *Article 7* that '*Member States shall ensure that the prime responsibility for the safety of spent fuel and radioactive waste management facilities and/or activities rest with the licence holder.'* Although critics say that the implementation of EPR is not always successful in practice[535] or that the collection targets stipulated by the directives are not always as high as they could be,[536] the directives encourage manufacturers to add corresponding services to the products. Although they are offering recycling services due to the legal requirements for waste handling, these recycling services have become for many companies a source of income that have increased customer loyalties by taking care of waste for customers.[537]

The central EU legislation in the field of chemicals is the so-called REACH Regulation,[538] that aims to improve the protection of human health and the environment through the better and earlier identification of the intrinsic properties of chemical substances. This is done by the four processes of REACH, namely the registration, evaluation, authorisation and restriction of chemicals. REACH also aims to enhance innovation and competitiveness of the EU chemicals industry. The REACH Regulation places responsibility on industry to manage the risks from chemicals and to provide safety information on the substances. Manufacturers and importers are required to gather information on the properties of their chemical substances, which will allow their safe handling, and to register the information in a central database in the European Chemicals Agency (ECHA) in Helsinki. The Regulation also calls for the progressive substitution of the most dangerous

[533] Proposal for a Regulation concerning batteries and waste batteries, COM(2020) 798 final.
[534] Council Directive 2011/70/Euratom establishing a Community framework for the responsible and safe management of spent fuel and radioactive waste, OJ L 199, 2.8.2011, p. 48-56.
[535] Kieren Mayers and others, 'Implementing Individual Producer Responsibility for Waste Electrical and Electronic Equipment through Improved Financing' (2013) 17 Journal of Industrial Ecology 186; Noah Sachs, 'Planning the Funeral at the Birth: Extended Producer Responsibility in the European Union and the United States' (2006) 30 Harvard Environmental Law Review 51.
[536] Lindhqvist (n 58).
[537] Emilie Aner and Magnus Rentzhog (n 49).
[538] Regulation (EC) No 1907/2006 of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), OJ L 396, 30.12.2006, p. 1–849.

chemicals (referred to as "substances of very high concern") when suitable alternatives have been identified.[539]

Moreover, the **Eco-design Directive** is setting eco-design requirements for energy-using products.[540] The proposal for a *new Ecodesign for Sustainable Products Regulation*,[541] published on 30 March 2022, builds upon this directive, while not being limited to the energy-related products. The proposed regulation is called *"the cornerstone of the Commission's approach to more environmentally sustainable and circular products"* and establishes a framework to set ecodesign requirements for specific product groups to significantly improve their circularity, energy performance and other environmental sustainability aspects. The Commission has stated it would start legislating for high-impact industries with gaps in sustainability rules, such as textiles, furniture, mattresses, tyres, detergents, paints, and lubricants, as well as iron, steel, and aluminium.[542] In this respect, e.g., the *EU Strategy for Sustainable and Circular Textile*,[543] specifically addresses the need to implement extended producer responsibility in the field of the **fast fashion**, by boosting reuse and recycling of textile waste. Moreover, it is worth noting at this point, that improved recycling efficiencies and higher material recovery for packaging materials, as aimed by the before mentioned Proposal for a Regulation on packaging and packaging waste also include textile.[544]

Finally, on 13 July 2023 the Commission proposed a new Regulation on **end-of-life vehicles**.[545] In line with the European Green Deal and with the Circular Economy Action Plan, the proposal for an ELV Regulation builds on and replaces two existing Directives: Directive 2000/53/EC on end-of-life vehicles and Directive

[539] See more in: John Goodier, 'EU Chemicals Regulation: New Governance, Hybridity and REACH' [2016] Reference Reviews 35.
[540] Directive 2005/32/EC of 6 July 2005 establishing a framework for the setting of ecodesign requirements for energy-using products, OJ L 2005 191. Recently proposed to be amended – Ecodesign for Sustainable Products Regulation, COM (2022) 142. More on this Van Acker Liesbet, The new Ecodesign Package: an important step towards a circular economy, Ars Aequi: Juridisch Studentenblad, 2020 (69) 793-801.
[541] Proposal for a Regulation establishing a framework for setting ecodesign requirements for sustainable products and repealing Directive 2009/125/EC, COM (2022) 142.
[542] On making sustainable products the norm COM (2022) 140 final, p. 9.
[543] 30.3.2022 COM (2022) 141 final.
[544] According to the Proposal for a Regulation on packaging and packaging waste, COM (2022) 677, all packaging will be fully recyclable by 2030, Extended Responsibility Schemes fees will be properly modulated and mandatory targets for recycled content for plastic packaging will be set – see page 101.
[545] Proposal for a Regulation of the European Parliament and of the Council on circularity requirements for vehicle design and on management of end-of-life vehicles, amending Regulations (EU) 2018/858 and 2019/1020 and repealing Directives 2000/53/EC and 2005/64/EC, COM/2023/451 final.

2005/64/EC on the type-approval of motor vehicles with regard to their reusability, recyclability and recoverability.

The proposed new rules cover all aspects of a vehicle from its design and placement on the market until its final treatment at the end-of-life:

- improve circular design of vehicles to facilitate removal of materials, parts and components for reuse and recycling;
- ensure that at least 25% of plastic used to build a vehicle comes from recycling (of which 25% from recycled ELVs);
- recover more and better-quality raw materials, including CRMs, plastics, steel and aluminium;
- ensure that producers are made financially responsible for vehicles when they become waste, to ensure proper financing for mandatory ELV treatment operations and incentivise recyclers to improve quality;
- put a stop to vehicles going "missing", through more inspections, interoperability of national vehicle registration systems, improved distinction of used vehicles from end-of-life vehicles and a ban on exporting used vehicles that aren't roadworthy;
- cover more vehicles, and gradually expand EU rules to include new categories such as motorcycles, lorries, and buses, ensuring a proper end of life treatment.

1.1.1. Interim conclusion

From the perspective of environmental sustainability of the economic system, servitisation covers a variety of business models, from those where products are fused with separate services, such as waste management of electronic equipment and energy services provided by energy suppliers, to smart products, like smart thermostat, smart lightning system for private houses or public buildings and even streets, where service is based on sensors connected to Internet. Moreover, a new revolution is happening with the new business models that are based upon access-based consumption, where customers pay for the time with a product, without needing to own it. Similar revolution may be witnessed in respect of sharing economy. Access based business models have an enormous impact on reduced consumption, because they refer to better usage of underutilised resources like swapping clothes we do not use anymore, carpooling, using a neighbour's car,

renting a room in someone's house for the weekend, bartering, bike sharing, and so on. Regulation has crucial role to play in protecting and enhancing those servitisation models that are at the same time positive for the European economy and the environment, while restricting those business activities that have the opposite effects. While servitisation at one hand highlights those services of manufacturers and suppliers of goods that are environmentally sustainable, it may in some aspects also have a rebound effect upon the environment. It is the role of regulation, both at the EU and national level, to curtail those effects.

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5 The collaborative and sharing economy

The emergence of fast and powerful ICT like the Internet with its vast reach capabilities is playing a leading role in improving existing business models.[546] ICT is the key enabler of the so-called sharing or collaborative economy that has been on the rise with smartphone applications allowing access to platforms that connect buyers with sellers.[547] The services of Internet platforms for ride-sharing or home-sharing have disrupted various sectors like a hurricane hitting a town. The sharing or collaborative economy concept enables goods to be converted into services and underleveraged service assets to be transformed into more valuable ones whereby consumers pay to use them rather than own them.[548] In economic terms, it is astonishing that some start-up companies providing such services with ICT assistance have received outstanding market valuations at levels previously reserved for just a few large companies, thereby signalling that this is a true social revolution. The digitalisation that enables sharing platforms is thus bringing the greater democratisation of entrepreneurship and innovation by reducing the entry barriers for the creators of applications and providers of digital platforms. Yet it is not just about start-up companies since giants like Ikea or Kingfisher are now actively

[546] Kalakota, Robinson (n 65); Lightfoot et al (n. 6).
[547] Felländer, Ingram and Teigland (n 87).
[548] Walker Smith J. (n 283) 385; also see Tietze et al (n. 285) 50.

supporting the sharing and sustainable economy. What is seen to lie ahead is thus "*a shift in the dominant business model, one in which all consumer goods will be available as a service and all consumer services will be available on demand*".[549] Consumers will simply press a button on their smartphones and service providers will step in to pick up their dirty laundry and bring it back all cleaned or deliver food, thereby saving time for consumers. A study shows the five main sectors of the collaborative economy (peer-to-peer finance, online staffing, peer-to-peer accommodation, car sharing and music video streaming) hold the potential to lift their global revenues from around EUR 13 billion today to EUR 300 billion by 2025.[550]

However, it is important to assure that this modern, technologically driven way of doing business is appropriately regulated to control the associated hazards while enabling the industry to flourish. At the same time, regulation must leave enough flexibility to avoid the law restricting technological progress. As the industry and consumers become ever smarter, the regulatory solutions need to keep pace[551] and strike the right balance between safety, liability and competition on one side and innovation and flexibility on the other. Namely, regulatory requirements must both carefully limit the new business models and also encourage them.

The United States leads the global platform economy market, with 46% of the market, followed by China, with 35% (made up mainly of giants Alibaba and Tencent). On the other hand, Europe holds an 18% share: still, an extremely large share, in terms of absolute value.[552] **The EU's platform economy is growing quickly. From an estimated €3 billion in 2016 it has reached €14 billion in revenues in 2020. More than 500 digital labour platforms are now operating in the EU, facilitating access to services for customers and creating opportunities for businesses and people.**

This chapter briefly examines different business models that build on the concept of the collaborative economy and sharing economy, certain efforts to define and differentiate them, as well as the most pertinent legal challenges arising from these new business models.

[549] Walker Smith, 383.
[550] PricewaterhouseCoopers LLP, 'The Sharing Economy' Report, Consumer Intelligence Series, 2015, 14.
[551] Günther Oettinger, 'Europe's Future Is Digital, Speech at Hannover Messe' *Speech 15-4772* (15 April 2015).
[552] DTF report, Unlocking the value of the platform economy, November 2018.

5.1 The platform economy and access-based consumption

Business models consistent with the sharing and collaborative economy concept are based on the philosophy of access-based consumption where, instead of buying and owning things, consumers want access to goods and prefer to pay for the experience of temporarily accessing them. Ownership is no longer the ultimate expression of consumer desire.[553] In this way, consumers can avail themselves of goods they could not otherwise afford or which they would rather not own due to concerns like space limitations or the environment, thereby paying for use rather than ownership.[554] While publicly accessing goods such as books in public libraries or public transport has been known for centuries, the Internet facilitates new business models of access-based consumption at a time of global economic crisis when consumers are reconsidering their values and spending habits along with urbanisation and high-density living that create a "critical mass" of supply and demand and support better matches.[555] Indeed, consumption models have proliferated that enable access through the sharing or pooling of resources/products/services as redefined via technology and peer communities. Examples of access models vary from car- or bike-sharing programmes (Zipcar, Hubway) to online borrowing programmes for DVDs, bags, fashion or jewellery (Netflix, Bag Borrow or Steal, Rent the Runway, Borrowed Bling).

Access-based business models underpin Rolls Royce's "Power-by-the-Hour" model or the models adopted by BMW and Daimler which, on top of car production, offer membership-based car-sharing systems (called Drive now and Car2Go, respectively) with users paying an annual membership fee and a price per kilometre.[556] Such car-sharing services are today also widely offered by companies that do not produce cars (like Zipcar and Hertz). Moreover, companies such as Uber and Lyft connect car owners and those in need of transport through an online platform (i.e. ride-sharing), with many companies and cooperatives (such as Zipcar or Modo Co-op) offering a membership-based car-sharing system where people pay an annual membership fee

[553] Durgee JF and Colarelli O'Connor G, 'An Exploration into Renting as Consumption Behavior' (1995) 12 Psychology and Marketing 89; Lovelock C and Gummesson E, 'Whither Services Marketing? In Search of a New Paradigm and Fresh Perspectives' (2004) 7 Journal of service research 20.
[554] Bardhi F and Eckhardt GM, 'Access-Based Consumption: The Case of Car Sharing' (2012) 39 Journal of Consumer Research 881; Walker Smith (n. 283) 385.
[555] Hatzopoulos V and Roma S, 'Caring for Sharing? The Collaborative Economy under EU Law' (2017) 54 Common Market Law Review 81.
[556] Gardiner B, 'Big European Players Embrace the Car-Sharing Trend' *The New York Times* (19 November 2013).

and a price per kilometre. Whereas some shops now not only sell tools but also offer to rent them for a short time, Uber-like platforms such as Snap-Goods enable tools and other household items to be rented directly from their owners.

5.2 The difference between a sharing and collaborative economy

A sharing or collaborative economy is defined as including the renting, bartering, loaning and swapping of assets that are typically underutilised, including a variety of tangible and intangible assets.[557]

In practice, the terms "sharing economy", "peer economy", "collaborative economy", "on-demand economy" and "collaborative consumption" are often used interchangeably. In 2010, Botsman and Rogers published the first book on the sharing economy, explaining how it may become more than a niche economy (as required from an environmental sustainability perspective) and proposed the following distinction between the different forms:[558]

- Collaborative consumption: an economic model based on sharing, swapping, trading or renting products and services, enabling access over ownership. It reinvents not just what we consume but how we consume.
- Collaborative economy: an economy built on distributed networks of connected individuals and communities versus centralised institutions, transforming how we can produce, consume, finance and learn.
- Sharing economy: an economic model based on the sharing of underutilised assets, from spaces, skills through to items for monetary or non-monetary benefits. It is currently mainly discussed in relation to peer-to-peer (P2P) marketplaces but business-to-consumer (B2C) models also hold the same potential.

These definitions may be coupled with Belk's study that distinguishes between "sharing" and "pseudo-sharing", i.e., collaborative consumption. True sharing is associated with lending driven by social concerns and pseudo-sharing with renting

[557] Felländer, Ingram and Teigland (n 87) 13.
[558] Botsman and Rogers (n 283) 15. also see Gansky L, *The Mesh: Why the Future of Business Is Sharing* (Penguin 2010); Bauwens M, *The Political Economy of Peer Production. CTHEORY* (Net 2005); Sundararajan A, *The Sharing Economy: The End of Employment and the Rise of Crowd-Based Capitalism* (MIT Press 2016).

out mainly for economic gains.[559] This points to the dual or paradoxical character of the sharing economy that is located between alternative economic and traditional capitalist systems.

In a European Agenda for the Collaborative Economy from 2016, the European Commission uses the two concepts interchangeably.[560] A collaborative economy is thus defined as including »business models where activities are facilitated by collaborative platforms that create an open marketplace for the temporary usage of goods or services often provided by private individuals«. Transactions in a collaborative economy generally do not involve a change of ownership and can be for profit or not-for-profit and may entail some transfer of ownership of intellectual property. The Commission states the collaborative economy includes three categories of actors:

- service providers that share assets, resources, time and/or skills – these can be private individuals offering services on an occasional basis ("peers") or service providers acting in a professional capacity ("professional service providers");
- the users of these items; and
- intermediaries that connect – via an online platform – providers with users and facilitate transactions between them ("collaborative platforms").

The Commission also states the collaborative economy is a rapidly evolving phenomenon and its definition may develop accordingly.

5.3 The need for a European approach

Apart from defining the concepts, the central issues concern how the regulators should fundamentally approach the collaborative economy (i.e., leniently or prohibitively) and the institutional alternatives (i.e. who is competent to regulate

[559] Belk R, 'Sharing versus Pseudo-Sharing in Web 2.0' (2014) 18 The Anthropologist 7; Böcker L and Meelen T, 'Sharing for People, Planet or Profit? Analysing Motivations for Intended Sharing Economy Participation' [2017] Environmental Innovation and Societal Transitions 28.
[560] SWD(2016) 184 final, ft 7

such an economy). Both EU institutions and the member states are working on the most appropriate regulatory approaches.

The Commission carried out a public consultation in which most consumer respondents took the view that "*collaborative economy platforms provide sufficient information on service providers, consumer rights, characteristics and modalities of the offer and statutory rights"* (First Brief Results of the Public Consultation: 2016). In line with these results, the Commission's announcement it would give "*a chance to new business models"* and so avoid Europe becoming "*the only continent which denied new business models"* is a sign of the EU executive's greater support for the sharing economy than has been shown by national governments. Moreover, Commissioner for Industry Elżbieta Bieńkowska made the case for a light regulatory approach, arguing in favour of "*clear guidelines related to existing regulations",* thereby ruling out specific EU legislation to regulate transactions in the sharing economy.[561]

The Single Market Strategy adopted in October 2015[562] declared the Commission *"will develop a European agenda for the collaborative economy, including guidance on how existing EU law applies to collaborative economy business models"*. In this respect, the Commission stated it would seek to identify innovative markets where innovative regulatory approaches could be piloted to verify the feasibility and sustainability of innovative solutions. The collaborative economy also forms part of the Commission's Digital Single Market Strategy[563] since supporting the collaborative economy is vital to meeting the objectives of the digital single market by providing better access for consumers and businesses to online goods and services across Europe.

Based on these strategic documents, in the summer of 2016 the Commission adopted *"A European agenda for the collaborative economy".*[564] It asserted that it enables the more efficient use of resources and provides new opportunities for Europe to create growth, jobs and benefits for consumers. The Agenda provides guidance on how existing EU law should be applied to the collaborative economy, clarifying certain issues faced by market operators and public authorities, such as consumer

[561] Jorge Valero, 'Brussels to Issue Sharing Economy "Guidelines" in March' *EurActiv* (28 January 2016); Rebecca Christie, 'Uber, Airbnb May Gain From EU Push for Growth Without Deficits' *The Washington Post with Bloomberg* (14 January 2016).
[562] COM (2015) 550 final.
[563] SWD(2015) 100 final.
[564] SWD(2016) 184 final.

law, employment relations and taxation, while also pointing out that the agenda's goal is to ensure balanced and sustainable development of the collaborative economy, as announced in the single market strategy. Moreover, the Commission stated the collaborative economy can also encourage greater asset-sharing and the more efficient use of resources, contributing to both the EU's sustainability agenda and the transition to a circular economy. The Commission is therefore not planning to adopt legislation on certain legal aspects of the collaborative economy, instead placing the latter within the existing legal framework.

It is noted that even before the recent single market strategies and the collaborative economy agenda, the Commission had supported several projects to help better understand the sharing economy's potential. These projects ranged from a resource-efficient economy to optimising bike-sharing and car-sharing services in European cities. Optimising Bike Sharing in European Cities (OBIS) is a European Commission project to advance the role and opportunities of bike-sharing as a valuable instrument for fostering clean and energy-efficient sustainable modes of mobility in urban areas.[565] The More Options for Energy Efficient Mobility through Car-Sharing (MOMO CAR-SHARING) project sought to establish and increase car-sharing as part of the new mobility culture and viewed it as a more intelligent and resource-efficient transport solution than car ownership. The MOMO Car-sharing project raised awareness about car-sharing and made recommendations on how to develop and establish new car-sharing schemes.[566]

In June 2017, the European Parliament adopted a Resolution on the Agenda,[567] thereby calling for clearer European guidelines. The Parliament welcomed the communication on a European agenda for the collaborative economy but stressed that it should be seen as the first step towards a well-balanced, more comprehensive and ambitious EU strategy on the collaborative economy. It noted that, if developed responsibly, the collaborative economy can create significant opportunities for citizens and consumers who will benefit from the enhanced competition, tailored services, increased choice and lower prices. As growth in this

[565] DeMaio P, 'Bike-Sharing: History, Impacts, Models of Provision, and Future' (2009) 12 Journal of Public Transportation.
[566] Katzev R, 'Car Sharing: A New Approach to Urban Transportation Problems' (2003) 3 Analyses of Social Issues and Public Policy 65; Prettenthaler FE and Steininger KW, 'From Ownership to Service Use Lifestyle: The Potential of Car Sharing' (1999) 28 Ecological Economics 443.
[567] 2017/2003(INI).

sector is consumer driven, the Parliament believes it also allows consumers to play a more active role. Moreover, it highlights the need to enable businesses to grow by removing the barriers, duplication and fragmentation that hinder cross-border development, thus encouraging the member states to provide legal clarity and not to view the collaborative economy as a threat to the traditional economy. The Parliament contends it is thus important to regulate the collaborative economy in such a way that it is facilitating and enabling rather than restrictive. Nevertheless, the Parliament acknowledges the collaborative economy can significantly impact long-established regulated business models in many strategic sectors such as [568]transport, accommodation, the restaurant industry, services, retail and finance.

It is thus up to the member states to respond to the various pressing legal problems arising from the collaborative economy. On the frontline here are the national courts which have been called upon to resolve tensions among different stakeholders affected by the growing sharing economy.

One of the best examples of a collaborative economy platform is Uber which offers an arena for connecting people who offer transport services and those looking for a ride to a certain destination. Across the entire world, Uber has basically made the same statement about its legal status: we are not a taxi company, but a technology company. This assertion was rejected by the EU Court of Justice on 20 December 2017 in *Uber Spain* when it ruled the service Uber provides by connecting individuals with non-professional drivers is covered by services in the transport field. Member states can therefore regulate the conditions for providing that service, e.g. licences and authorisations provided under national law. Consequently, Uber cannot rely on the free movement of services that applies to information society services. Based on this, on 10 April 2018 the Court ruled in *Uber France*[569] that member states may prohibit and punish, as a matter of criminal law, the illegal exercise of transport activities in the context of the UberPop service, without notifying the Commission in advance of the draft legislation prescribing criminal penalties for such activities. As already noted by Advocate General Szpunar, treating Uber primarily as a transport company is justified because Uber controls the economically important aspects of the urban transport service offered on its platform. Four points were made in this respect:

[568] Case C-434/15, Asociación Profesional Elite Taxi v Uber Systems Spain SL, ECLI:EU:C:2017:981.
[569] Case C-320/16, ECLI:EU:C:2018:221.

- Uber imposes conditions which drivers must fulfil in order to take up and pursue the activity;
- it financially rewards drivers who make a large number of trips;
- it exerts control, albeit indirect, over the quality of drivers' work, which may even result in drivers being excluded from the platform; and
- it effectively determines the price of the service.[570]

These features combined mean Uber cannot be regarded as a mere intermediary between drivers and passengers. In addition, in the context of the composite service offered on the Uber platform, there is no doubt that transport (namely the service not provided by electronic means) is the main item being supplied and gives the service an economic meaning.

As evident from the above case law, national and local regulators are also slow to respond to the challenges brought by the collaborative and sharing economy, typically by creating institutional boundaries between the sharing and regular economy by putting a cap on sharing activity. For example, an increasing number of cities allow home-sharing for a fixed number of days (e.g. 30, 60 or 90 days) (e.g. in London or Amsterdam).[571] As Frenken and Schor note, this 'cap' logic can be applied to the operators of home restaurants and the owners of boats, campers and parking spaces.[572] The principle of a cap thus avoids cases where people purchase goods or houses for the purpose of renting them out on a permanent basis. With such caps, governments solve two problems at once because they meet the incumbent businesses halfway by creating a clear dividing line between a professional provider and an incidental provider, and they pragmatically solve the tax avoidance practice engaged in by users as the sums gained by incidental providers are small enough that they can be ignored or otherwise fall under the existing tax exemption (except for home-sharing where the tax revenues foregone are sizeable). Nevertheless, the 'cap' rule is hard to enforce since there are many more platforms than just one and providers can easily switch to another platform after they meet the cap on a particular platform.

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[570] Advocate General's Opinion in Case C-434/15, Uber Spain, SL, ECLI:EU:C: 2017:364.
[571] Booth R and Newling D, 'Airbnb Introduces 90-Day Annual Limit for London Hosts' *The Guardian* (1 December 2016).
[572] Frenken K and Schor J, 'Putting the Sharing Economy into Perspective' Environmental Innovation and Societal Transitions, vol. 23, 2017, 3-10.

5.4 Multidimensional legal challenges

Thus far, it is already clear that the sharing and collaborative economy is challenging the established legal system in several ways. Archetypes of the sharing economy such as Uber and Airbnb have come under scrutiny due the effects their business models have had on their competitors and their allegations of unfair competition. It is claimed they avoid certain taxes, professional and safety regulations, and are shifting the burden of risk from the trader to the consumer.[573] Airbnb has therefore come under fire from hotel groups and governments across the globe for avoiding the duty to pay the tourist taxes that are typically included in the cost of renting a hotel room, and local safety laws. Airbnb responds by saying that safety inspection is replaced by a peer-to-peer review system.[574] In relation to Uber, it is worth noting that it initially offered its services to off-duty taxi drivers who held licences to operate taxi-like services, before expanding to include individuals who did not have a taxi licence but did have cars. This helped Uber to compete on price. Ordinary taxi drivers are now the biggest opponents of Uber, organising protests across Europe. The taxi industry and many cities and states are demanding that Uber comply with the existing taxi regulations, including entry control and price fixing.[575] Germany and Spain have tried to ban Uber's services, arguing it undercuts the local competition, and in Paris riots by taxi drivers and the arrest of two Uber executives led the company to suspend its lower cost Uberpop service. Conversely, Uber relies on the notion that the expanded *'ride-sharing'* model is sufficiently different from a taxi service to make the laws regulating taxis inapplicable. The company's position is that it does not employ anyone – Uber merely connects willing purchasers of rides with willing sellers. Uber hence sees itself as a technology firm rather than a transport firm because it is based on a 'simple' interface and an advanced IT system that conducts big data analytics. This explanation was supported by the High Court in London, which ruled that the driver's smartphone containing the driver's app is not a device for calculating fares, thereby making taxi regulations inapplicable.[576]

[573] Rogers (n 197) 85.
[574] Baker (n 292).
[575] Posen (n 294).
[576] Transport for London v Uber London Ltd, Case No: CO/1449/2015, judgement of 16 October 2015, [2015] EWHC 2918 (Admin), para. 17.

Further, even before the sharing economy started to attract the attention of managers and public policymakers, it came into the spotlight of scholars concerned with sustainability. It has broadly been claimed that the sharing economy may significantly contribute to sustainable economic growth because it allows an increase in living standards and quality of life using the existing resources while promoting less energy-intensive values than the consumer society.[577] It is not just about Airbnb, the online peer-to-peer platform that lets people rent out residential accommodation on a short-term basis, or Uber, the online peer-to-peer platform that provides taxi or "ridesharing" services,[578] but about an ever longer line of options appearing in a variety of sectors, from time banks, food swaps, makerspace and open-access education.[579] By shifting the paradigm away from individual ownership to collectivity and sharing, the lower demand for consumer goods may give way to a new economy able to take on problems like pollution and excessive energy consumption.[580] As Tukker points out, the renting and sharing of products implies the same product is now used more intensively, which can bring about high impact reductions, in particular if the more complicated access to a product leads to a lower-use situation, or to the more frequent use of more environmental friendly alternatives.[581] Car-sharing seems the form of the sharing economy with the most apparent environmental benefits.[582] The negative environmental impacts of car production and car ownership are well known and it has been repeatedly shown that car-sharing can help alleviate these problems.[583] According to Martin and Shaheen, each vehicle in a car-sharing club replaces 9 to 13 privately-owned vehicles, while car-sharing members are shown to use cars 31% less than when they owned their own vehicles, replacing the car with walking, cycling or public transport, thereby significantly reducing carbon emissions.[584] Sharing thus holds the potential to reduce environmental harm and stimulate reflection on conventional and sometimes

[577] Bonciu F and Balgar A-C, 'Sharing Economy as a Contributor to Sustainable Growth, an EU Perspective Null' [2016] Romanian Journal of European Affairs 42.
[578] Martin CJ, 'The Sharing Economy: A Pathway to Sustainability or a Nightmarish Form of Neoliberal Capitalism?' (2016) 121 Ecological Economics 149.
[579] Schor JB and others, 'Paradoxes of Openness and Distinction in the Sharing Economy' (2016) 54 Poetics 66.
[580] Prothero A and others, 'Sustainable Consumption: Opportunities for Consumer Research and Public Policy' (2011) 30 Journal of Public Policy, 36.
[581] Tukker (25) 256.
[582] Böcker, Meelen (551) 28.
[583] Firnkorn J and Müller M, 'What Will Be the Environmental Effects of New Free-Floating Car-Sharing Systems? The Case of Car2go in Ulm' (2011) 70 Ecological Economics 1519.
[584] Martin E and Shaheen S, 'The Impact of Carsharing on Household Vehicle Ownership' (2011) 1 ACCESS Magazine.

wasteful behaviours.[585] These general warnings against oversimplifying the sustainability issues related to servitisation business models also hold true with respect to the sharing economy. As opposed to 76% of consumers who agreed in a study that the sharing economy is more eco-friendly,[586] Böcker and Meelen warn that it is still far from clear what the sharing economy's environmental effects will be given that several motivational studies of sharing-economy users found a minor role for the environmental motivators for participating in the sharing economy.[587] While Vasques and Ono found that services for neighbours' shared use of washing machines and dryers seem to be better accepted when they are promoted for their convenience and comfort at a low price, instead of taking care of the environment,[588] Möhlmann, Moeller and Wittkowski even found environmentalism had no effect on preferring to rent instead of owning a good when surveying accommodation, car-sharing and an online peer-to-peer network.[589] Moreover, it is hard to see why Uber which provides transport services using diesel-powered cars is more environmentally sustainable than, for example, conventional taxis running on bio-gas. Consequently, there is no irrefutable evidence regarding the link between environmental motivations and participation in the sharing economy. The service economy, lease economy and sharing economy are thus not per se environmentally sustainable. As Tukker concludes, the sharing economy is in general no panacea for achieving radical environmental improvements and simply thinking that development of the sharing economy will automatically result in an environmental/economic win-win situation is nothing more than a myth.[590] Most alternative business models are driven by business aspirations and the long-term motivation of both consumers and business owners is needed to align servitisation and sustainability.

Finally, there is also an increasingly problematic social sustainability dilemma arising from this business model that concerns the danger of making the labour market broadly precarised.[591] Sharing economy services also raise new consumer safety concerns considering that the risk is shifted from the service provider to the

[585] Banister D, 'The Sustainable Mobility Paradigm' (2008) 15 Transport Policy 73.
[586] Hasan R and Birgach M, 'Critical Success Factors behind the Sustainability of the Sharing Economy' [2016] 2016 IEEE 14th International Conference on Software Engineering Research, Management and Applications (SERA), 3.
[587] Böcker, Meelen (n. 551) 28.
[588] Vasques, Ono (n. 492) 97.
[589] Möhlmann, Moeller and Wittkowski (n. 493) 193.
[590] Tukker (n. 25).
[591] Codagnone et al. (n. 494).

consumer. Taxation has also proved to strongly impact the application of sharing-economy schemes which are understandably more greatly used in countries with above-average overall taxes on the ownership of goods. Conversely, in the member states that provide fiscally preferential treatment to private car owners the incentive to rely on car-sharing is low. Moreover, the Big Data revolution is not just about the privacy of humans, but also about data confidentiality. The fundamental issue is to ensure that only authorised entities can access and modify data. This is particularly relevant in the business context where data are a way to safeguard competitiveness.[592] Although various access-control techniques have been proposed to ensure confidentiality, unauthorised access still occurs and is likely to grow due to the spread of wireless channels that increase the risk of violation. In this respect, the media reported that the US Justice Department was investigating a report by Uber that 50,000 of its drivers' names and their licence numbers were improperly downloaded, even though its driver database was only accessible with a digital security key.[593]

[592] Miorandi (n. 439) 1505.
[593] Menn, Levine (n. 441).

6 Conclusions

The answer to the title question is therefore clearly positive. Not only there is theoretical need for EU regulatory intervention in respect of the servitisation megatrend. This regulation has already been proposed, adopted and it is being amended where it has been assessed that its ambit could be broadened. As pointed out by the Commission in respect of the package of measures protecting platform workers, a *"common set of EU rules will provide increased legal certainty, therefore enabling digital labour platforms to benefit fully from the economic potential of the Single Market and a level playing field."*[594] The same can be held for many other legal aspects of servitisation.

Although servitisation is not a legal term of art, law has important implications for the development of a variety of business models that connect products and services. Researching legal aspects of servitisation is important as scholarship on servitisation brings fuller understanding of global business trends. Even if servitisation is not adopted as a legal term of art, law makers need to be well aware of this trend in order to properly adjust legal rules to this development and to consider where and why the traditional legal division between products and services still matters.

[594] Commission proposals to improve the working conditions of people working through digital labour platforms, Press Release, 21/6605.

A sharp distinction between products and services existed already in Roman law with distinct types of contracts and separate types of actions available in cases of breach of those contracts. With the increase of the services economy in the last decades and with new types of services contracts this distinction became ever more fundamental. Nevertheless, a services society also brought increasingly complex contracts, where it is not always clear, what part of a contract refers to products and what part means selling services. Moreover, the servitisation trend increases the importance of European services' standards to complement the products standards and consequently remove another aspect of current restrictions on the sale of product-service combinations. Services standards would give to the customer an assurance of the degree of professionalism, speed and suitability of the service provider; however, they are currently still underdeveloped.

Considering that servitisation presents a megatrend in the business community it may be expected that gradually more and more legal documents will adopt the concept if not the term itself. Servitisation will hardly be recognized as a legal term of art, due to its broad nature and lack of agreement among business scholars, which business models fall under the term. Even when policy makers and lawyers get better acquainted with servitisation it is difficult to imagine binding legal provisions to refer to "servitisation" as a term that is clear and closed enough in its meaning to attach certain legal consequences upon it.

Nevertheless, servitisation is a market fact that regulators need to take into consideration. Although many legal scholars call for greater convergence between rules on movement of goods and services when it comes to the EU internal market and even though the Commission adopted a unified approach towards goods and services when negotiating the future Environmental Goods Agreement, the difference between goods and services will remain important in many aspects within the legal scholarship and practice. When business community discusses servitisation as offering of combinations of goods and services, lawyers see a myriad of distinct legal situations and questions: what part of a combination is dominant (goods or services); was ownership on the product transferred or not; what roles do the entities involved have in a transaction in case something goes wrong and liability issues appear? Despite various efforts to simplify legal provisions, it is hard to imagine that lawyers would stop analysing what part of a servitisation model is the service and what part is the product, considering the traditionally separate development of legal

provisions concerning goods and services, be it at the national, EU or international level. More important than this, however, is that this regulation assures legal advancement of various servitisation business models. What stands for advanced services in business theory needs to be supplemented with regulation that will guarantee social and environmental advancement as well.

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7 Workshops' materials

7.1 Workshop A: Rented e-scooters about to be prohibited in Leuven

Leuven is the next city after Paris planning to ban e-scooters. Negotiations between a) My Mobelity that is producing and renting out e-scooters in Leuven, b) Group of Leuven townspeople that are opposing the use of rented e-scooters in the town of Leuven and c) the City Council are about to take place. In groups, put forward your arguments and exchange them in class.

7.2 Workshop B: Banning Airbnb in Leuven

Association of Hotels in Leuven has put forward a proposal to the Leuven City Council to ban Airbnb in similar lines to those recently adopted in New York. Negotiations between a) Hotel Association, b) Leuven small owners' group and c) the City Council are about to take place. Put forward your arguments in groups and exchange them in class.

7.3 Workshop C: Recycling used textile in Leuven

Leuven City Council is considering applying for EU funding intended to increase the share of recycled textile in Leuven. The mayor is organising a public consultation between the main city stakeholders on the subject – a) Fashion Shop (largest Leuven

retailer of new textile, supporting "Fast Fashion"), b) Clothes Library (first Leuven second-hand shop) and c) Text-Exp (largest Belgian exporter of used textile to Africa that owns a number of collection containers for textile in Leuven). Put forward your arguments on potential measures to be adopted in this field to the Mayor of Leuven and exchange them in class.

7.4 Workshop D: Recycling used vehicles in Leuven

Leuven City Council is considering applying for EU funding intended to increase the recycling of used vehicles in town. The mayor is organising a public consultation between the main city stakeholders on the subject – a) Automobile Shop (largest Leuven retailer of new cars), b) Brossel (a small Belgian producer of new cars) and c) Car-Exp (largest Belgian exporter of used cars to Asia). Put forward your proposals of measures that could be adopted to the mayor and exchange them in class.

Regulatory Aspects of Servitisation: Study Materials for Global Law Course

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This course material was prepared as a support for a lectures series under Global Law Programme organised by the Catholic University Leuven (Belgium), Faculty of Law and Criminology. The course dealt with EU regulatory challenges arising from the servitisation of manufacturing and the related sustainability and digitalisation process in the EU economy. Servitisation is a complex interdisciplinary concept that essentially stands for bringing together products and services. Servitization as an economic megatrend reflects consumers' oriented business models, offering not just products to the buyers, but solutions to their problems. This solution offering is enhanced by digitalisation of the economy that makes the relationship between product-service providers and their customers easier to maintain due to various mechanisms of distant communication and monitoring. Moreover, servitisation is at the centre of the endeavours to establish a more sustainable circular economy. Adding services to products can prolong their consumption time, decrease the amount of materials needed for certain effect and improve waste management. Increasingly, however, it is clear that servitisation is not just related to environmental sustainability, but social as well. These services often require people to be performed and digital applications tend to decrease their rights as workers to the benefit of the owners of these applications.

Ključne besede:
servitisation,
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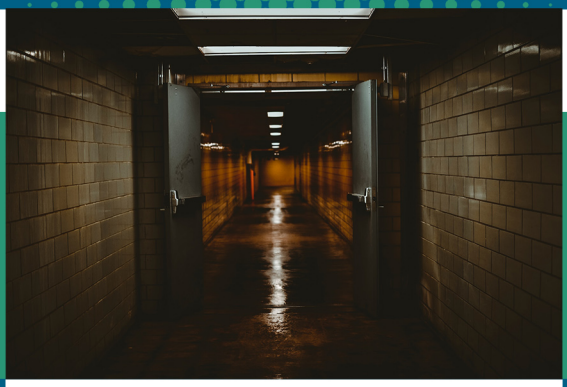

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