9

Education, Knowledge and Data in the Context of the Sharing Economy

Gabriela Avram and Eglantina Hysa

Introduction

Many of the existing definitions of the collaborative economy refer to efficient access to underused goods and spaces making use of the internet and reputation systems (Sundarajan 2016). Schor (2014) speaks about recirculation of goods, increased utilisation of durable assets, exchange of services, sharing of productive assets and building of social connections. When attempting to apply such definitions to education, data and knowledge sharing, we are faced with difficulties. Benkler's (2004)

G. Avram (✉)

Computer Science and Information Systems Department,
University of Limerick, Limerick, Ireland
e-mail: gabriela.avram@ul.ie

E. Hysa

Department of Economics, Epoka University, Tirana, Albania
e-mail: ehysa@epoka.edu.al

approach that refers extensively to community building, social relationships, altruism, sustainable lifestyles and non-monetary exchanges as the main drivers of sharing or collaborative economies constituted for us a more appropriate context. In their discussion of the Sharing Economy, Schor et al. (2016, p. 75) refer to open learning as a practice 'that uses free or low-cost educational resources that are typically open access, peer-led, shareable, and digitally mediated'. The MOOCs (Massive Online Open Courses) discussed in this chapter, as well as a wide range of educational activities mediated by online platforms and open to large categories of the public, can be seen as open learning opportunities. Regarding both formal and nonformal education, there are a number of educational platforms widely used, such as Khan Academy, Udacity, Coursera, Skillshare, LinkedIn Learning, Udemy, Codecademy, and edX, that benefit students from all over the world. The attractiveness of these platforms is enhanced by general accessibility and the quality of the user experience offered. Nevertheless, a problematic aspect is potential commercial, social, and political influences that could introduce a bias in educational content. Aspects related to incorporating case studies, data and other content belonging to former students in the new versions of a course raise questions regarding the intellectual ownership of this content. Also, data analytics are used to improve the sequence and automate further the delivery often without enough attention given to obtaining the students' consent to participate in research, and their privacy, identity, and anonymity (Marshall 2014). These other priorities need to be clearly communicated to prospective students.

In this chapter, we prioritise the group of initiatives focusing on social innovation and striving for more sustainable economic and environmental models based on sharing access to goods and services, which have been the focus of our Sharing and Caring COST Action (Sharing and Caring 2021), while looking at how open education and knowledge sharing can be seen as part of the collaborative economy. These domains are not among the frequently discussed examples of collaborative economy initiatives; however, learning objects, knowledge, and skills are particularly important intangible assets in today's digital economy and are at the basis of a whole range of evolving services. The following sections of this chapter are dedicated to collaborative developments in

education, including examples of open education and shared resources in Europe, as well as knowledge and data sharing via open and inclusive approaches, providing examples of local European initiatives. We examined the Sharing and Caring COST Action collection of country reports (Klimczuk, Česnuitytė, and Avram 2021) and more than 130 short stories available on the Sharing and Caring website (Sharing and Caring 2021) and included a series of examples from the countries participating in the COST Action. Finally, the chapter offers a reflection on the particularities of these activities from the perspective of the sharing economy.

Collaborative Developments in Education

The use of open educational resources (OER)—that are freely licensed and remixable learning resources, has increased in the last decade, mainly due to the abundance of user-generated content and new types of content licensing such as Creative Commons. Open Educational Practices (OEP) are also evolving, supporting the opening and sharing of educational processes, and new collaborations between students and lecturers emerge, with the goal of improving access and empowering learners (Cronin and MacLaren 2018). New formats, such as open, connected courses (enabling students to connect with students and educators in other institutions and countries) and co-creation of open textbooks with students (Stagg and Partridge 2019), are also evolving. The learning theory promoted by George Siemens (2005) and Stephen Downes (2010) titled ‘connectivism’ looks at learning that takes place online across peer networks. Technologies such as web browsers, email, wiki, blogs, online forums, social networks, education games, platforms such as YouTube and Vimeo enable users to learn together and from each other and to share information with peers. A key feature of connectivism is that much learning can happen across peer networks that connect online. In line with the knowledge and skills gained through online learning and education, social learning and interaction are seen as important components of the educational framework. As Downes (2014) stated, applications and environments in social learning include: collaborative

(wiki-style document authoring); cooperative (social sharing of bookmarks and resources); and competitive (games and contests) learning. Siemens and Downes were the creators of the first MOOC—*Connectivism and Connected Knowledge*, that was offered at the University of Manitoba in 2008 (Hollands and Devayani 2014). This type of MOOC is ‘based on the idea that learning happens within a network, where learners use digital platforms such as blogs, wikis, social media platforms to make connections with content, learning communities and other learners to create and construct knowledge’ (Siemens 2012).

A couple of years later (2011), several famous universities such as Harvard, MIT and Stanford started online courses based on a traditional classroom structure, including pre-recorded video lectures and assessments (quizzes, tests, projects). These are usually centred around a teaching team rather than around an open community of learners. The Stanford-style MOOCs were designed to scale education originally offered face-to-face. Also, research undertaken in parallel with running these courses focused on structuring and sequencing efficiently the transmission of knowledge. The initial idea behind this offering was creating a global service by bringing in people that were until then excluded from higher education and turning them into online learners at some of the world’s best universities (Reich and Ruipérez-Valiente 2019). But in the end, these courses attracted mainly learners from well-off countries and neighbourhoods, who were using these courses to complement their education. To help distinguish between the two educational approaches, the terms ‘cMOOC’ and ‘xMOOC’ were coined, ‘c’ denoting the focus on connectivism and ‘x’ denoting exponential, focusing on the massive enrolments, or extension (Hollands and Devayani 2014). The use of the term open in MOOC is often disputed, as the content of xMOOCs is seldom open reusable content licensed under Creative Commons. More often than not, the content is strictly copyrighted. Although in the beginning, participation in such courses was completely free, in time, platforms such as Coursera, edX, FutureLearn and Udemy have started charging for certificates. Another important set of aspects of xMOOCs that were addressed by researchers is related to ethical issues. Back in 2012, when Harvard first got involved in MOOCs by developing the MOOC platform edX, its president was quoted in a press release stating

that the purpose for doing so was to extend its reach by conducting research into effective education (Marshall 2014). This way, he made clear that beyond the generous offer of elite university courses to anyone on the planet with good use of the English language and Internet access, the university's strategic goal was to build a better understanding of e-learning.

In Europe, Goldie (2016) examined the role of MOOCs, emphasising the role played by the European Commission in advocating open education through the use of MOOCs. Following this, a group of European Universities partnered and launched the Openup Ed initiative in 2013. Openup Ed focuses on online courses for large numbers of participants, courses that can be accessed by anyone anywhere via the Internet, open to everyone and offering a full course experience for free. Although based in Europe, Openup Ed has an international scope. The courses offered are hosted on various platforms.

Eshach (2007) created a taxonomy of education/learning types that can prove relevant when examining open education. Eshach distinguished the following three types: formal education, taking place mainly through the national education system, and including both academic studies and full-time specialised professional training; any organised educational activity happening outside the established education system, initiated for specific target groups, and having concrete learning objectives is categorised as nonformal education. Finally, the lifelong process of acquiring knowledge, skills, attitudes, and values in one's environment, without the express intention to learn, is termed as informal education. E-learning platforms offer both formal education (as in the cases of Coursera, edX, Udacity) and nonformal education/courses (the case of LinkedIn Learning, Instructables, Adobe, etc.). On the other side, informal learning happens daily and spontaneously when users check information on Wikipedia, consult YouTube or Vimeo user-generated content on a specific topic or ask questions on platforms such as Quora or Reddit. On the other hand, Reich (2020) considers three models of online learning: (1) MOOCs, where learning is guided by a human instructor (or team of instructors) following a set sequence; (2) Algorithm-led learning—where learners are assessed by software, and the sequence of lessons is reorganised automatically (Khan Academy) and (3)

Peer-guided learning, or networked environments learning, where the learners guide each other or learn from each other, like in the case of Do-It-Yourself (DIY) forums, crafts circles or sports group enthusiasts.

In today's world, the reach of e-learning platforms is going far beyond MOOCs. E-learning platforms are the mechanism that supports the sharing of diverse learning content with users, the gathering of learning analytics and the refinement of the content and sequence based on the users' response in a wide range of organisations, such as universities, specialised training companies, communities and large companies looking to train their staff or customers. During the COVID-19 pandemic, not only university education but also primary and secondary school activities, as well as numerous nonformal courses, were forced to shift online. Those institutions that already had an effective digital platform for either complementing face-to-face learning activities or for providing blended or fully online tuition were advantaged, as they were able to pivot online quickly and efficiently. Table 9.1 presents a selection of the most popular educational platforms in use worldwide.

Another concept based on sharing resources and large-scale collaboration is that of Open Science, seen as a movement seeking to 'leverage new practices and digital technologies to increase transparency and access in scholarly research' (van der Zee and Reich 2018, p. 2). Based on Open Science, van der Zee and Reich propose a framework for Open Education Science, including Open Access to publications, Open Design of educational resources and pedagogy, Open Data for collecting data on the outcomes, and Open Analysis for analysing the results. The idea of collaborative teaching and learning as peer learning and peer production also appears in the Peeragogy Project, initiated by Howard Rheingold in 2012 (Corneli et al. 2016). All these developments in education are supported by digital platforms and are based on sharing resources such as content, practices, and analytics, with or without financial incentives. Besides these educational platforms and initiatives, the Sharing and Caring COST Action also revealed a series of examples of networks and platforms from the participating countries in Europe and beyond that assist people to share knowledge and skills with each other, many using a digital platform and some also centred around a physical meeting place that is presented below in Table 9.2.

Table 9.1 Educational Platforms

Platform	For-profit/Non-profit	Origin	Starting year	Characteristics	Courses offer
Coursera	for-profit (start-up)	United States	2012	partnering with academic and governmental institutions—online courses, certifications, and degrees in a variety of subjects	Paid (7 days free taster) Plus version
edX	non-profit	United States	2012	online university-level courses in a wide range of disciplines to a worldwide student body, including some courses at no charge; created open-source platform offered to other organisations	Free Paid certification edX for business

(continued)

Table 9.1 (continued)

Platform	For-profit/Non-profit	Origin	Starting year	Characteristics	Courses offer
Khan Academy	non-profit	United States	2008	short lessons in the form of videos-initially maths but now expanded to include other domains	Free
Udacity	non-profit	United States	2012	academic, nanodegrees (upskilling)	Paid certification
Codecademy	non-profit	United States	2011	learning how to code	Free Codecademy pro – subscription-based
LinkedIn Learning (was Lynda.com)	for-profit	United States	1995	courses in creative media, programming, business In 2002, it started offering courses online It was acquired by LinkedIn in 2015 and became part of Microsoft in 2016 Renamed LinkedIn Learning in 2017	Paid

Platform	For-profit/Non-profit	Origin	Starting year	Characteristics	Courses offer
Skillshare	for-profit	United States	2011	courses based on educational videos in advertising, business, design, fashion and style, film and video, food and drink, music, photography, gaming, technology, and writing and publishing, often taught by industry leaders	Subscription-based Not accredited
Google Digital Garage	For-profit	United States	2015	Digital marketing courses for training employees, partners, and customers	Free Certification available

Source Own elaboration

Table 9.2 Examples of open education and shared resources in Europe

Initiative	Description
CoderDojo (Ireland) https://coderdojo.com	Initiated in 2011 by a young person in Ireland to support other school children to acquire coding skills at a young age. The model proliferated to cities and villages in many countries around the world, where volunteers who know how to code offer to teach children and teenagers a couple of hours a month, usually at a specific location in the neighbourhood. During the COVID pandemic, all the activities moved online
Brainster (North Macedonia) https://brainster.co	Designed to fill the gap in formal education, the online platform is used for offering courses in subjects connected to the needs of the labour market and creating a significant economic and social impact
My Education Club (Bulgaria) www.myeducationclub.com	Initiative offering older people the opportunity of developing new skills in subjects such as mathematics, history, geography and Bulgarian language, but also in nonformal subjects such as cooking, playing a musical instrument, sewing, embroidery or chess
Klearlending (Bulgaria) https://www.klearlending.com	A combination of peer-to-peer lending and free financial education, created by an innovative FinTech company
BeeHome Coworking Subotica (Republic of Serbia) http://crnjakovic.com/beehome-coworking-subotica/	Platform for supporting entrepreneurship and education
Seduo, Nostis (Czech Republic) https://www.seduo.cz https://www.nostis.org	Online platforms for education

(continued)

Table 9.2 (continued)

Initiative	Description
Floqq, Cursopedia (Spain) https://www.floqq.com https://www.plataformasdecursos.gratis/cursopedia/	Platforms allowing teachers to share knowledge on certain subjects by uploading video recordings made available for students for free or in exchange for a fee
BBOM (Baska bir okul mumkun) (Turkey) http://www.baskabirokulmumkun.org	An alternative school system that runs on a cooperative model. The BBOM coops integrate several ways of sharing and works with a lot of volunteer organisations to offer quality education
s:coop (Germany) https://www.scoop.vision	The platform was created to support commons-oriented innovation. It is the result of a collaboration between art students and educators. Its focus is on the creation of shared infrastructure and alternative innovation narratives to support the shift from start-up individualism to a collaborative agency
Speak (Portugal) https://www.speak.social/en	A platform that provides language lessons to non-local people, serving as a bridge towards social integration. Going beyond language teaching, the general goal is to familiarise newcomers with the local culture, support them in job search and integration in the local community. The classes are offered face-to-face
KIPOS3 (Garden in a Cube) (Greece) https://www.facebook.com/cityasare source	This initiative aims to support the transformation of vacant urban sites into community gardens. Gardening is used as a tool to turn the neighbourhood into an active and engaged community. Another goal is increasing the city's resilience through food production and the reappropriation of common urban space. The initiative's Facebook page serves as a platform for co-creating not only gardening knowledge but also discussing wider environmental and social issues

(continued)

Table 9.2 (continued)

Initiative	Description
Kaptar (Hungary) https://kaptarbudapest.hu/en/	This co-working space for freelancers, SMEs and digital nomads organise workshops for professional development for its members, as well as community events and a network of current and former members

Source Own elaboration, based on (Klimczuk, Česnuitytė, and Avram 2021; Sharing and Caring 2021)

Knowledge Sharing via Open and Inclusive Approaches

Besides education, there are other domains that benefitted heavily from the emergence of digital platforms and the opportunity of sharing information across the globe. Benkler (2004) introduced the term ‘shareable goods’ and illustrated his ‘commons-based peer production’ concept, seen as a large-scale cooperative effort in which what is shared among the participants is their creative effort, building on the example of Open-Source Software development communities. Benkler and Nissenbaum (2020, p. 70) stated that ‘socio-technical systems of commons-based peer production offer not only a remarkable medium of production for various kinds of information goods, but also serve as a context for positive character formation’. Inspired by the Open-Source Software movement, the Wikipedia project started in 2001 and demonstrated the potential of global collaboration in creating a free and open encyclopaedia that could be delivered ‘to every single person on the planet in their own language’ (Cohen 2008). Several other projects followed, such as OpenStreetMap (an open maps collaboration space), Quora (a questions and answers platform), Instructables (a space for sharing step-by-step instructions for DIY projects), Open Plaques (a crowdsourced collection of information on historical commemorative plaques), and WikiVoyage (a crowdsourced travel guide for travel destinations written by volunteers), to name but a few.

One of the domains that received a strong boost from the open global collaboration is innovation. As digital platforms offer a suitable environment for value creation and sharing, new open and distributed models of innovation emerged (Nambisan et al. 2018). Collaborative innovation has become a global trend, involving multiple stakeholders who engage in non-copyrighted innovation and create new solutions and technologies using open, collaborative platforms (Biasin and Kamenjasevic 2019), open to companies and individuals, creating new business models.

The open design movement focuses on developing physical products, machines, and systems by making use of publicly shared design information. Within this movement, one trend sees volunteers coming together and donating their time and skills working on projects for the common good—either because funding is lacking, or because there is not sufficient commercial interest, or for helping developing countries, promoting environmentally friendly or cheaper technologies (Pearce et al. 2010). A second trend is bringing together people and resources from different companies and countries for developing advanced projects and technologies that would be beyond the resources of any single company. Another trend involves the use of high-tech open-source solutions developed globally that is further adapted to respond to solving local challenges in a sustainable manner, sometimes labelled as ‘Design Globally, Manufacture Locally’. Schismenos et al. (2020) see this trend as being a new form of egalitarian and transnational collaborative networks (that they label as ‘cosmo-localism’), which could challenge the core values of capitalism and invite to further reflection going beyond its effects on production and distribution. These digital platforms provide the necessary infrastructure for individuals and organisations to share ideas online, work on joint projects and co-create products working together, supporting collaborative innovation that happens online (Biasin and Kamenjasevic 2019).

In order to illustrate the variety of digital platforms supporting online collaboration and co-creation worldwide, we include here a series of examples. For instance, AguaClara is an engineering group at Cornell University publishing an open-source design tool and CAD

designs for water treatment plants (AguaClara 2021), while Open Source Ecology (OSE) is a network comprising of farmers, engineers, architects, and supporters. The main goal of OSE is manufacturing a so-called Global Village Construction Set (GVCS), an open technological platform that will allow the fabrication of 50 types of industrial machines that would be necessary for 'building a small civilisation with modern comforts' (Open Source Ecology 2021). In a different vein, Wikispeed is an automotive manufacturer that produces modular design cars. The project participants apply scrum development techniques borrowed from the software world. They use open-source tools and lean management methods to improve productivity (Wikispeed 2021). In addition, focusing on 3D printing technology, some knowledge sharing projects such as e-NABLE and Thingiverse allow the dissemination of creativity outcomes online. e-NABLE is a global network of volunteers who are using their 3D printers, design skills, and personal time to create free 3D printed prosthetic hands for those in need—with the goal of providing them to underserved populations around the world (e-NABLE 2021). With a more general scope, Thingiverse is a platform dedicated to the sharing of user-created digital design files that provides mainly free, open-source hardware designs licensed under the GNU General Public License or Creative Commons licenses. Each contributor can select a user license type for the designs that they share. The digital blueprints shared can be used for creating physical objects using 3D printers, laser cutters, milling machines and other technologies. The platform is widely used by DIY enthusiasts and communities as a repository for shared innovation and dissemination of source materials to the public (Thingiverse 2021).

Knowledge sharing between various stakeholders, as Biasin and Kamenjasevic (2020) pointed out, is the common denominator across these kinds of platforms. Users and communities are enabled to collaborate online by using the advantages of new digital technologies. Open knowledge sharing contributes to the spread of designs and project ideas worldwide. However, some of the Open-Source projects, especially the ones related to open hardware, could face a few legal challenges. These are related mainly to privacy and data protection, as data are being widely

shared and manipulated, and to intellectual property rights, which can be complicated when participants reside in various countries and work for different organisations. Another complex issue is a liability—who will be responsible for the malfunctioning of an open-source car, water installation, or prosthetic? Table 9.3 presents a selection of open and inclusive sharing initiatives identified by the participants in the Sharing and Caring COST Action.

In this type of community, knowledge is offered freely for mutual benefit. It is also difficult to quantify individual contributions, making knowledge sharing a different type of transaction. This category sees the production of so-called ‘information goods’ (Benkler 2004) that are going into the design of both physical and digital products. Value is created from collaboration and synergy. Learning and community building are side effects of the collaboration, mirroring the ethos of the early days of Open-Source Software projects. Such collaboration projects supported by online platforms are enhancing resilience all around the globe, providing a solution to a wide range of problems. In difficult times—such as natural disasters, pandemics, conflict—this kind of project take off rapidly based on existing experience. One example is the Coronavirus Tech Handbook, initiated in the early weeks of the pandemic at Newspeak House, a London hackerspace, that received rapid contributions from thousands of volunteers (Maddyness 2020). The handbook is a library of tools, services and resources relating to the COVID-19 response that was crowdsourced. The site, launched in March 2020, is hosted as an interlinked collection of user-editable online documents allowing frequent updates.

Open and inclusive knowledge sharing initiatives facilitated by online platforms are stimulating innovation and allow individuals and communities with similar interests to find each other and work together. The role and importance of these activities have become even more prominent during the COVID-19 pandemic. Information, skills and competencies are shared locally and globally with notable results.

Table 9.3 Examples of open and inclusive sharing initiatives in Europe

Initiative	Description
SmartWolf (Austria) https://smartcities.at/projects/smartwolf/	SmartWolf is an Urban Lab established in 2016 in Vienna to encourage citizens' participation in the redesign of the public space in the city centre. Physical space was created in a vacant building as a meeting place for groups working on different ideas for revitalising the city centre. Several initiatives have emerged in the space, such as a Repair Café, a People's Kitchen, etc
Ekofil (Turkey) https://ekofilyayinlari.org	Ekofil is an initiative of a group of writers, illustrators, translators, editors, and readers who came together to design, implement, and develop a community-supported publishing model that takes into consideration the well-being of the planet and humanity
Fragnebenan (Austria) https://fragnebenan.com	The platform was founded in 2015 as a vehicle for neighbourly help in Austria. It supports the sharing of material goods, timesharing, and the sharing knowledge, experiences, and information. Its concept is based on geographical proximity: people register with their home address and receive an activation code by post. After activating their account, registered users can contact neighbours in a radius of 750 m. There are no fees for using the platform. Its impact is the promotion of communication among neighbours, the exchange of goods, support, and experience, as well as the re-use of unused products and idle resources

(continued)

Table 9.3 (continued)

Initiative	Description
K-space (Estonia) https://www.k-space.ee	A community-driven hackerspace founded in 2016. It is located on TalTech campus, IT College, in Tallinn, Estonia. Its facilities include a cybersecurity lab, a digital fabrication lab, a server room, a common kitchen, and co-working areas. It hosts several topic-related meetups, such as those of <i>Tallinn Sec</i> , a non-profit organisation of information security professionals, practitioners and enthusiasts, or <i>Hack the Box</i> , an online platform for penetration testing skills. Other events hosted include code clubs, crypto parties, or beer brewing

Source Own elaboration based on (Klimczuk, Česnuitytė, and Avram 2021; Sharing and Caring 2021)

Platforms Facilitating Collaborative Information Production and Consumption

The European Commission sees data-driven innovation as a ‘key enabler of growth and jobs in Europe (European Commission 2018, p. 1). Data sharing is seen by the Commission as an economic activity. Richter and Slowinski (2019) point out the absence of a generally accepted definition when it comes to data sharing. The term ‘sharing’ involves a benign connotation and makes a connection to the ‘sharing economy’. Based on defining the sharing economy as ‘the more efficient use of resources – mostly products and services – as a consequence of a technically enabled reduction of transaction costs’ (Richter and Slowinski 2019, p. 8) and on considering ‘data sharing’ as virtually all sorts of data flows between companies, with customers and even within companies—the perspective of the EU Commission (2018), the focus is put on sharing platforms as (third-party) enablers for sharing data. Access to information stored in digital datasets plays a major role in both societal development and the well-being of citizens. The possibilities of data-driven innovation based

on machine learning and other technologies are based on the availability of extensive datasets for training the algorithms (Richter and Slowinski 2019). Lately, several citizen initiatives have started to explore how citizens could harness the value of their personal data themselves. We focus here on peer-to-peer data sharing and data sharing initiatives that rely on crowdsourcing. While in a lot of such data initiatives, there are no financial incentives, there are specific examples where individuals come together to form cooperatives and harness the economic value of data for the benefit of members.

Patients LikeMe, a private venture, started as an initiative persuading patients with rare conditions to donate their data for the use of professional medical researchers to help research progress faster. New European initiatives such as MiData (van Velthoven et al. 2019) raise awareness on the value of personal health data and encourage individuals to join forces in a cooperative so that they can be the ones who decide how their data is being used. Salus, is a citizen data cooperative based in Spain and focused on legitimising the right of citizens to maintain control over their own data while being able to facilitate data sharing to accelerate research and innovation in the health sector.

Citizen science projects invite the public to contribute the data they collect following specific guidelines to large-scale projects (Riesch and Potter 2014). While science should respond to citizens' concerns and needs, the citizens themselves must be able to produce reliable scientific knowledge. In this case, the peer-to-peer relationship is replaced with the centralisation of data for the general benefit of science. When the data collected is aggregated, analysed, and shared for the benefit of the public, a virtuous cycle is created, encouraging sustained participation. Reporting invasive species (Schade et al. 2019) is an activity that was made more attractive and accessible using smartphone applications that support both identification and geographic localisation of reports. An initiative that allowed citizens to map the noise levels data over a period in a specific area using a Smart Citizen kit was seen as useful for requesting a revision of legislation for bars and cafes (Balestrini et al. 2015). Another example of data crowdsourcing that benefits the wider

community is citizen sensing and reporting projects that focus on air quality that complement the official sources of information (Wesseling et al. 2019). Many such projects are the result of grassroots initiatives, where contributors are sharing data with each other and also publicly. Table 9.4 presents a selection of data sharing initiatives revealed by participants in the Sharing and Caring COST Action.

Data sharing is by no means a new activity. However, examining data sharing from the perspective of the sharing economy has the advantage of revealing the importance of data as a resource in both peer-to-peer exchanges and transactions involving third parties.

Table 9.4 Examples of data sharing initiatives in Europe

Initiative	Description
Invasive Species (Ireland) https://invasivespecies.limerick.ie	Mobile phone application developed to address the issue of invasive plants spread, by educating citizens and facilitating easy reporting of this phenomenon. The local council collaborated with national organisations, farmers, community groups and local development companies to develop the concept. The resulting platform supports users to report invasive plants sightings by uploading a photograph with GPS coordinates of the location. After verifications, these reports appear on the map as open data and are added to a central national biodiversity database
GROW Observatory https://growobservatory.org	Platform for collecting and sharing information on soil, the land and on crops through growers' participation across Europe. Data collection was achieved via low-cost sensing technology kits communicating with citizens' own devices The outcome is a hub of open knowledge and data created and maintained by growers, which supports both growers and other specialist communities

Source Own elaboration based on (Sharing and Caring 2021)

Summary

The activities included in this chapter: sharing education resources, knowledge and data, are seldom mentioned as being part of the sharing economy. Sharing intangible digital resources such as learning resources, domain knowledge and huge quantities of data—from personal data to analytics and sensor-generated data—have become the norm in today's world. According to the definition of the digital sharing economy elaborated by Pouri and Hilty (2021, pp. 129–130), the resources we discussed in this chapter qualify as durable immaterial goods, including 'durable information and competencies'—when examined from the shareable resources' perspective. With regard to the sharing practices, there are a variety of models employed. Initially, access to MOOCs was free, in principle 'without reciprocity or compensation' (Pouri and Hilty 2021, p. 131). However, both the content of students' assignments and learning analytics were used to improve successive versions of both the learning resources and pedagogic practices. In open knowledge sharing communities, participants contribute time, competencies and information without reciprocity or compensations. Where companies get involved in such communities, they usually support the digital infrastructure and offer premium access as a way to monetise content (as in the case of Instructables).

In all three domains presented in this chapter, open education, knowledge and data sharing, the role of online platforms is paramount. These types of sharing are made possible and facilitated by the platforms that set the terms of collaboration and support coordination in all these cases. Given the immaterial nature of the goods being shared, the inclusion of these exchanges in the sharing economy is disputed by many authors (see, for example, Frenken et al. 2015). Instead of dealing with idle capacity, these resources are highly shareable, and besides the direct creation of new services and products, they contribute to creating community, increasing social capital, and contributing to the common good. In all these cases, re-use, scaling, peer production, and consumption are made possible by the existence of digital platforms as a coordination mechanism.

References

- AguaClara. 2021. <http://aguaclara.cornell.edu>.
- Balestrini, Mara, Tomas Diez, Paul Marshall, Alex Gluhak, and Yvonne Rogers. 2015. 'IoT Community Technologies: Leaving Users to Their Own Devices or Orchestration of Engagement?.' *EAI Endorsed Transactions on Internet of Things* 1 (1). <https://doi.org/10.4108/eai.26-10-2015.150601>.
- Benkler, Yochai, and Helen Nissenbaum. 2020. 'Commons-Based Peer Production and Virtue' (reprint). In *The Handbook of Peer Production*, edited by O'Neil, Mathieu, Christian Pentzold, Sophie Toupin, John Wiley & Sons, 70–86, <https://doi.org/10.1002/9781119537151.ch6>.
- Benkler, Yochai. 2004. 'Sharing Nicely: On Shareable Goods and the Emergence of Sharing as a Modality of Economic Production.' *Yale Law Journal* 114: 273–358. <https://doi.org/10.2307/4135731>.
- Biasin, Elisabetta, and Erik Kamenjasevic. 2019. 'Made4You/Careables.org: D5. 3-White Paper on Legal Guidelines.' <https://doi.org/10.5281/zenodo.408614>.
- Biasin, Elisabetta, and Erik Kamenjasevic. 2020. 'Open Source Hardware and Healthcare Collaborative Platforms: Common Legal Challenges.' *Journal of Open Hardware* 4 (1): 1–8. <https://doi.org/10.5334/joh.31>.
- Cohen, Noam. 2008. 'Open-Source Troubles in Wiki World', *The New York Times*. <https://www.nytimes.com/2008/03/17/technology/17wikipedia.html>.
- Corneli, Joseph, Charles Jeffrey Danoff, Charlotte Pierce, Paola Ricaurte, and Lisa Snow MacDonald. 2016. 'The Peeragogy Handbook.' <https://peeragogy.org>.
- Cronin, Catherine, and Iain MacLaren. 2018. 'Conceptualising OEP: A Review of Theoretical and Empirical Literature in Open Educational Practices.' *Open Praxis* 10 (2): 127–143. <https://doi.org/10.5944/openpraxis.10.2.825>.
- Downes, Stephen. 2010. 'New Technology Supporting Informal Learning.' *Journal of Emerging Technologies in Web Intelligence* 2 (1): 27–33.
- Downes, Stephen. 2014. 'Vision 2030: Redesigning Education for the Future.' 28 October 2014. <https://www.downes.ca/files/2018%2010%2028%20-%20Vision%202030.pdf>.
- e-NABLE. 2021. <http://enablingthefuture.org/>.

- Eshach, Haim. 2007. Bridging In-school and Out-of-school Learning: Formal, Non-Formal, and Informal Education. *Journal of Science Education and Technology* 16: 171–190. <https://doi.org/10.1007/s10956-006-9027-1>.
- European Commission. 2018. 'Commission Staff Working Document, Guidance on Sharing Private Sector Data in the European Data Economy, Accompanying the Document Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions 'Towards a Common European Data Space' {COM (2018) 232 final} <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52018SC0125&rid=2>.
- Frenken, Koen, Toon Meelen, Martijn Arets, and Pieter Van de Glind. 2015. 'Smarter Regulation for the Sharing Economy.' *The Guardian* 20: 5. <https://www.theguardian.com/science/political-science/2015/may/20/smarter-regulation-for-the-sharing-economy>.
- Goldie, John Gerard Scott. 2016. 'Connectivism: A knowledge learning theory for the digital age?.' *Medical Teacher* 38 (10): 1064–1069.
- Hollands, Fiona M., and Devayani Tirthali. 2014. 'MOOCs: Expectations and Reality.' Full Report, *Center for Benefit-Cost Studies of Education, Teachers College, Columbia University* 138. https://teachonline.ca/sites/default/files/moocs/moocs_expectations_and_reality.pdf.
- Klimczuk, Andrzej, Vida Česnuiytė, and Gabriela Avram, eds. 2021. *The Collaborative Economy in Action: European Perspectives*. Limerick, Ireland: University of Limerick.
- Maddyness. 2020. 'Coronavirus Tech Handbook', *Maddyness*, 26 March 2020, <https://www.maddyness.com/uk/2020/03/26/coronavirus-tech-handbook/>.
- Marshall, Stephen. 2014. 'Exploring the ethical implications of MOOCs.' *Distance Education* 35 (2): 250–262, <https://doi.org/10.1080/01587919.2014.917706>.
- Nambisan, Satish, Donald Siegel, and Martin Kenney. 2018. 'On Open Innovation, Platforms, and Entrepreneurship.' *Strategic Entrepreneurship Journal* 12 (3): 354–368. <https://doi.org/10.1002/sej.1300>.
- Open Source Ecology. 2021. <https://www.opensourceecology.org>.
- Pearce, Joshua, C. Blair, Kristen Laciak, Rob Andrews, Amir Nosrat, and Ivana Zelenika-Zovko. 2010. '3-D Printing of Open Source Appropriate Technologies for Self-Directed Sustainable Development.' *European Journal of Sustainable Development* 3 (4): 17–29. (hal-02120493).
- Pouri, Maria J., and Lorenz M. Hilty. 2021. 'The Digital Sharing Economy: A Confluence of Technical and Social Sharing.' *Environmental Innovation*

- and *Societal Transitions* 38: 127–139. <https://doi.org/10.1016/j.eist.2020.12.003>.
- Reich, Justin, and José A. Ruipérez-Valiente. 2019. ‘The MOOC Pivot.’ *Science* 363 (6423): 130–131. <https://doi.org/10.1126/science.aav7958>.
- Reich, Justin. 2020. *Failure to Disrupt: Why Technology Alone Can't Transform Education*. Harvard University Press. <https://doi.org/10.4159/9780674249684>.
- Richter, Heiko, and Peter R. Slowinski. 2019. ‘The Data Sharing Economy: On the Emergence of New Intermediaries.’ *IIC-International Review of Intellectual Property and Competition Law* 50 (1): 4–29.
- Riesch, Hauke, and Clive Potter. 2014. ‘Citizen Science as Seen by Scientists: Methodological, Epistemological and Ethical Dimensions.’ *Public understanding of science* 23 (1): 107–120, <https://doi.org/10.1177/0963662513497324>.
- Schade, Sven, Alexander Kotsev, Ana Cristina Cardoso, Konstantinos Tsiamis, Eugenio Gervasini, Fabiano Spinelli, Irena Mitton, and Roberto Sgnaolin. 2019. ‘Aliens in Europe. An Open Approach to Involve More People in Invasive Species Detection.’ *Computers, Environment and Urban Systems* 78:1–14. <https://doi.org/10.1016/j.compenvurbsys.2019.101384>.
- Schismenos, Alexandros, Vasilis Niaros, and Lucas Lemos. 2020. ‘Cosmologicalism: Understanding the Transitional Dynamics towards Post-Capitalism.’ *tripleC: Communication, Capitalism & Critique. Open Access Journal for a Global Sustainable Information Society* 18 (2): 670–684. <https://doi.org/10.31269/triplec.v18i2.1188>.
- Schor, Juliet B. 2014, October. *Debating the Sharing Economy, Great Transition Initiative*. Available at <http://greattransition.org/publication/debating-the-sharing-economy>.
- Schor, Juliet B., Connor Fitzmaurice, Lindsey B. Carfagna, Will Attwood-Charles, and Emilie Dubois Poteat. 2016. ‘Paradoxes of Openness and Distinction in the Sharing Economy.’ *Poetics* 54: 66–81.
- Sharing and Caring COST Action CA16121. 2021. ‘*Short Stories*.’ Accessed April 15, 2021. <http://sharingandcaring.eu/short-stories>.
- Siemens, George. 2005. ‘Elearnspace. Connectivism: A Learning Theory for the Digital Age.’ https://jotamac.typepad.com/jotamacs_weblog/files/Connectivism.pdf.
- Siemens, George. 2012. ‘MOOCs are Really a Platform.’ *Elearnspace: Learning, Networks, Knowledge, Technology, Community*. 25 July 2012. <http://www.elearnspace.org/blog/2012/07/25/moocs-are-really-a-platform/>.

- Stagg, Adrian, and Helen Partridge. 2019. 'Facilitating Open Access to Information: A Community Approach to Open Education and Open Textbooks.' *Proceedings of the Association for Information Science and Technology* 56 (1): 477–480. <https://doi.org/10.1002/pr2.76>.
- Sundararajan, Arun. 2016. *The Sharing Economy: The End of Employment and the Rise of Crowd-Based Capitalism*. Cambridge, MA: MIT Press. <https://doi.org/10.1017/beq.2018.31>.
- Thingiverse. 2021. <https://www.thingiverse.com>.
- van der Zee, Tim, and Justin Reich. 2018. 'Open Education Science.' *AERA Open* 4 (3). 2332858418787466.
- van Velthoven, Michelle Helena, Carlos Cordon, and Goutam Challagalla. 2019. 'Digitization of Healthcare Organizations: The Digital Health Landscape and Information Theory.' *International journal of medical informatics* 124: 49–57. <https://doi.org/10.1016/j.ijmedinf.2019.01.007>.
- Wesseling, Joost, Henri de Ruiter, Christa Blokhuis, Derko Drukker, Ernie Weijers, Hester Volten, Jan Vonk, Lou Gast, Marita Voogt, Peter Zandveld, Sjoerd van Ratingen and Erik Tielemans. 2019. 'Development and Implementation of a Platform for Public Information on Air Quality, Sensor Measurements, and Citizen Science.' *Atmosphere* 10(8): 445–464. <https://doi.org/10.3390/atmos10080445>.
- Wikispeed. 2021. <https://wikispeed.com>.

Suggested Readings

- Belk, Russell W., Giana M. Eckhardt, and Fleura Bardhi. 2019. 'Introduction to the Handbook of the Sharing Economy: The Paradox of the Sharing Economy.' In *Handbook of the Sharing Economy*, edited by Belk, Russell W., Giana M. Eckhardt, and Fleura Bardhi. Edward Elgar Publishing, 1–8, <https://doi.org/10.4337/9781788110549>.
- John, Nicholas A. 2013. 'The Social Logics of Sharing.' *The Communication Review* 16 (3): 113–131.
- Liew, Anthony. 2007. 'Understanding Data, Information, Knowledge and Their Inter-Relationships.' *Journal of knowledge management practice* 8 (2): 1–16.
- Mejias, Ulises A. and Nick Couldry. 2018. 'Consumption as Production: Data and the Reproduction of Capitalist Relations.' In *The Oxford Handbook of Consumption*, edited by Frederick F. Wherry and Ian Woodward, 269–282, <https://doi.org/10.1093/oxfordhb/9780190695583.013.14>.
- Zhang, Xi, Shan Jiang, Yuting Xiao, and Yihang Cheng. 2018. 'Global Challenges and Developmental Lessons in the Knowledge Sharing Economy.' *Journal of Global Information Technology Management* 21 (3): 167–171. <https://doi.org/10.1080/1097198X.2018.1505071>.

Relevant Websites

- Global Partnership for Sustainable Development, Data Initiatives: <https://www.data4sdgs.org/initiative-listing>.
- Sharing and Caring COST Action CA16121 website: <http://sharingandcaring.eu>.

Open Access This chapter is licensed under the terms of the Creative Commons Attribution 4.0 International License (<http://creativecommons.org/licenses/by/4.0/>), which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.