7   Open Provision: Changing Economic and Human Development Perspectives

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Introduction

This chapter starts with the premise that the impacts of open activities on economic and human development are large and increasing. These impacts come through a variety of mechanisms and are affecting all sectors. Governments are starting to recognize the opportunities presented thereby and are enacting related policies. As of early 2020, seventy-eight countries have made commitments to "make their governments more open and accountable"[1] (see chapters 10 and 11 for more on open government activities). Many countries are enacting policies in support of open educational resources (OER), with the hope of improving quality while reducing costs for education (see chapter 12 for more on OER). Nongovernmental organizations (NGOs) and community organizations are taking advantage of free software tools, content, and the ease of connecting with others. To wit, around the world, there have been over 90,000 deployments of Ushahidi, an open-source crowdsourcing platform, to address local issues.[2] Private-sector companies are similarly extracting economic value through new open business models. Studies by the Computer and Communications Industry Association have estimated the share of open activities in economic production in the United States to be about one-sixth of gross domestic product (GDP) in 2010 (Benkler 2011, 314–315), and it is growing fast.[3]

In this chapter, we focus specifically on how these changes, brought about through various open practices, might necessitate new economic understandings and explanations, specifically concerning the role of economic policy and theory in international development. The perspective is primarily micro, with some more macro dimensions of open provision explored later.

The starting point for this exploration is *open provision;* that is, the provision of the innumerable goods, services, and benefits that the private, public, and nonprofit

sectors make available to consumers and recipients free of direct charge or price. The viability of open provision is based on leveraging open informational resources and voluntary human resources at little or no direct cost, together with—in the private sector in particular—revenue streams from many kinds of marketing, as well as selling consumer and/or market data to suppliers. Its expansion has been very innovative with respect to inventing and applying new provision processes and institutions. As we will see in this chapter, open provision is happening in the context of the rapidly expanding number and form of open practices throughout economic, political, social, and cultural endeavors.

This chapter begins by further defining and providing examples of open provision, and then briefly sketches two main frameworks to examine the economic dimensions of open activities: normative welfare economics, which focus on the provision of goods and services (henceforth referred to as *goods*); and the human development and capability approach (HDCA), which focuses on the expansion of human capabilities and freedoms (economic, political, social, cultural, and ethical). Following this is a policy-oriented exploration of the relationships among private, public, and open goods. This exploration reveals, in particular, that open provision extends (or, with negative goods, diminishes) both public and private goods and freedoms, thus changing the role of markets, nonprofits, and governments in providing them. Finally, the chapter provides a number of perspectives on policy and practice, with the objective of expanding the roles of open activities in the provision of goods and the advancement of human well-being.

Openness and Open Provision

Openness has many uses and meanings (Lundgren and Westlund 2016; Pomerantz and Peek 2016). Here, we draw on Smith and Seward (2017), who argue that openness is better understood in terms of processes and practices (e.g., sharing), rather than artifacts (e.g., open goods or services). They identify three main types of open processes: *open production*, *open distribution*, and *open consumption*. Each process consists of a series of open practices that drive the process. A quick overview of open processes and practices, with examples from the private, nonprofit, and public sectors, is provided in table 7.1.

Open Provision Definitions and Dimensions
If the provision of goods amounts to their production, distribution, and consumption, we define *open provision* to be the provision of goods and freedoms that include open practices in one or more of the provision components (production, distribution,

Table 7.1
Open practice examples in the nonprofit, public, and private sectors.

Open practice	Nonprofit sector	Public sector	Private sector
Peer production	Open-source software production; Wikipedia; open (collaborative) science (e.g., consulting blogs to solve math proofs)	Open legislation	iFixIt (a collaboratively produced repair knowledge base)
Crowdsourcing	Ushahidi applications (e.g., HarassMap) Citizen-science crowdsourcing (e.g., crowdsourcing research questions) Kiva (online development lending organization)	ICT-enabled citizen-voice (e.g., Maji Voice, Por Mi Barrio) Citizen-sourcing (e.g., e-consultation, online referendum, editing and commenting on city design plans)	TripAdvisor, Yelp Outsourcing tasks (e.g., Mechanical Turk) Crowdsourced innovation (e.g., collecting ideas from customers) Crowdfunding (e.g., Kickstarter.com)
Share, republish	Open data; OER; open access repositories; MOOCs	Open government data	OER such as MIT's OCW; Java programming language; MOOCs
Retain, reuse, revise, remix	Teachers, students reusing OER; NGOs reusing government data; researchers replicating research or working with open data	Public data interpretation	Global positioning system (GPS) data applications (companies using open government data)

or consumption). The examples provided in this chapter indicate that few (if any) goods and freedoms are completely open; at a minimum, most have important information and communication elements that use information and communication technology (ICT) infrastructure and services provided by nonopen proprietary market practices.

In terms of artifacts, open goods and open freedoms have open practices *prominently* in their provision components. But as noted, we prefer a process view of provision due to its accuracy and clarity. In this view, open provision is the provision of goods and freedoms that include open practices in one or more of its components. The provision components—production, distribution, and consumption—are further disaggregated in the following examples. The principal open practices are *peer production*, *crowdsourcing*, *sharing/republishing*, and *retaining/reusing/revising/remixing* (the 4 Rs). In addition, *nonproprietary* is a characteristic common to open practices, and *free to consumers* is typical of goods with open practices prominent in their provision.

Open Provision Cases

In this section, we present a few types of open provision that incorporate the three open practices of sharing, peer production, and crowdsourcing. All of the examples presented here are important in both less and more developed economies and societies, with some having particular importance within developing countries. It is important to note the following:

- These examples cover the full provision process (input provision, production, distribution, and consumption) of the good or freedom.
- These are stylized provision business models that do not include any focus on revenue and viability issues.
- These are types rather than specific cases (e.g., open-source software versus Mozilla Firefox or Open Office).
- These tables leave out intermediate inputs and focus on the provision of value-added and end-use consumption. Intermediate inputs typically include open activities in their provision; as a result, there are few (if any) goods and freedoms that are completely nonopen.

While we provide five case types in the following discussion, we have outlined provision models for many other specific cases. The striking feature of these instances is not that they fit easily into specific typologies, but in fact that they are dramatically diverse. The extent of innovation and adaptation of open practices in provision of goods and freedoms is truly remarkable.

Open Peer Production Provision

Examples of open peer production provision (e.g., open-source software) abound and include the popular web browser Mozilla Firefox and the Apache web server that, as of April 2017, was estimated to serve about half of all the existing websites.[4] The Open Medical Records System (OpenMRS) is a collaboratively developed, open-source electronic medical record system platform that was developed to work in resource-constrained environments.

When open-source code is developed and maintained collaboratively, open-source software provision entails open practices throughout the provision process, with market components mainly being in the ICT platforms used. However, like many other open informational resources, there are also private-sector companies that make their code open source for a variety of reasons.

This commons-based peer production model is also applied in areas outside software development, typically with the same set of open practices throughout the provision

Table 7.2
Commons-based peer production provision and the role of open and nonopen practices throughout the provision cycle.

Provision cycle	Open practices	Nonopen practices
Input provision		
Finance	Little	Market
Knowledge	Voluntary contributions	Market
Labor, skills	Volunteer	Market
Physical capital	Little	Market
Connectivity/ICT		Market/public
Management	Peer production	Market
Production/assembly	Peer production	Market
Marketing and delivery	Sharing (often via a searchable repository)	
Consumption or use	Retain, reuse, revise, remix	

cycle. For example, India's Open Source Drug Discovery project hosts an open and collaborative research platform "to accelerate drug development for neglected diseases" (Masum et al. 2013, 113). Wikipedia, one of the most highly accessed and used websites in the world, is also a variant of the peer production model. Similarly, iFixIt is a wiki-based, privately run website with collaboratively produced do-it-yourself (DIY) repair manuals for devices. Their business model includes selling the parts and tools required.

A critical element of peer production is that the open practices it entails can spawn cycles of knowledge growth, reuse, and sharing, which lead to increasing returns and knowledge spillovers (Garzarelli et al. 2008).

Crowdsourced Provision Models
Ushahidi is an open-source crowdsourcing platform developed in Kenya (and is now also offered as a software service by a private software company).[5] It has been locally implemented tens of thousands of times in both developed- and developing-country contexts for a variety of purposes, such as security, transparency, and crisis survival and management. One Ushahidi implementation, HarassMap,[6] is an Egyptian crowdmapping site for reports and testimonials of sexual harassment. The NGO that implemented HarassMap goes beyond the collection of knowledge voluntarily from participants (crowdsourcing) and leverages the open sharing of data as part of a larger process of social mobilization and sensitization, as well as change.

The public sector can also engage in *citizensourcing*, the crowdsourcing of data by soliciting information from citizens. Citizensourcing is one of a larger set of open

Table 7.3
NGO-implemented, crowdsourcing-based provision and the role of open and nonopen practices throughout the provision cycle.

Provision cycle	Open practices	Nonopen practices
Input provision		
Finance	Little	External donor funding
Knowledge	Voluntary contributions	
Labor, skills	Sharing (volunteer)	
Physical capital	Little	
Connectivity/ICT		Market
Management	NGO-led	
Production/assembly	Crowdsourcing	
Marketing and delivery	Sharing	
Consumption or use	Retain, reuse, revise, remix by NGOs	

government practices that taps into the collective knowledge of the public to produce public value creation (Hilgers and Ihl 2010).

Similar examples, but with different social and economic implications, are private sector–based crowdsourcing initiatives that then share the gathered information as part of a service. For example, TripAdvisor is a travel information service that can be accessed via either a website or a mobile app.[7] The principal data for this service come by crowdsourcing the knowledge of travelers in their reviews of places, hotels, restaurants, and other travel businesses, freely provided and shared with everyone. The rest of the provision activities are market provided (see table 7.4). Revenue to the site appears to come primarily from advertising and the selling of user data to travel and other service providers. Many similar private services, such as Yelp, also hinge on views, reviews, and evaluations by consumers and users.[8]

These services are expanding in every subsector of the economy. In finance and investment, for example, direct trading platforms provide free market data and research to investors, deriving revenue from large volumes of trades and sale of market activity and user data. In real estate, sites increasingly provide free data (e.g., assessments) and links to service providers (e.g., financial, legal, or staging).

Sharing and Republishing
In this section, we will examine two examples: OER and open government data. OER are defined as "teaching, learning, and research resources that reside in the public domain or have been released under an intellectual property (IP) license that permits

Table 7.4

Private sector–based crowdsourcing provisions (e.g., TripAdvisor) and the role of open and nonopen practices throughout the provision cycle.

Provision cycle	Open practices	Nonopen practices
Input provision		
Finance		Market
Knowledge	Voluntary contributions	
Labor, skills	Sharing (volunteer)	Market
Physical capital	Little	
Connectivity/ICT		Market
Management	Firm-led crowdsourcing	
Production/assembly	Crowdsourcing	
Marketing and delivery		Market
Consumption or use		

free use and re-purposing by others" (Smith and Casserly 2006, 9). The first prominent example of OER came in the form of the Open CourseWare (OCW) offered by the Massachusetts Institute of Technology (MIT), where MIT made the content of their courses openly available on their website in 2002.[9] Since then, OER have taken thousands of forms, from open textbooks to online course modules to massive open online courses (MOOCs), with important implications for the societies and governments of countries in the Global South (Smith 2013).

There are a huge variety of OER available and a very diverse set of production models for their creation. For example, Siyavula Education, an education technology company in South Africa, emerged out of a group that facilitated a collaborative authoring process of openly licensed textbooks. Open textbooks are freely available to teachers and students across the country to download and use as desired. Another model of open production was tried in the state of Utah, when the government decided to support open textbooks in key curriculum areas in 2012. A pilot study found that this model of producing open textbooks can reduce costs by 50 percent or more (Wiley et al. 2012).

OER have many users, and educational initiatives can leverage the existence of a wide variety of high-quality OER. For example, the Darakht-e Danesh project, run by the nonprofit group Canadian Women for Women in Afghanistan, created a web portal for open educational content from around the world, and curated and translated to fit the Afghanistan curriculum (Oates and Hashimi 2016). Afghanistan's teachers can and do contribute content to the web portal as well. Another example is the Rumie

Table 7.5
Typical OER provision model showing the role of open practices throughout the provision process.

Provision cycle	Open practices	Nonopen practices
Input provision		
Finance		Market
Knowledge	Sharing, 5 Rs	
Labor, skills		Market
Physical capital		(Little)
Connectivity/ICT		Market
Management		NGOs
Production/assembly	Crowdsourcing	
Marketing and delivery	Sharing	
Consumption or use	Retain, reuse, revise, remix	

Initiative, run by a nonprofit organization based in Canada. Experts and communities choose top-quality open educational materials, put them on tablets, and provide them to underresourced schools in developing countries and to First Nations communities in Canada. The principal inputs for the Rumie Initiative are OER, ICT connectivity, very low-cost tablets produced by a supplier in China, financing (partly crowdsourced online), and management (a virtual network of individuals and organizations).

Open government data are publicly shared governmental informational resources. Governments typically disclose their data for a variety of reasons that "run on a spectrum between *service delivery* and *public accountability*" (Yu and Robinson 2012, 182) ideally resulting in a wide range of potential economic, social, and political benefits (Verhulst and Young 2016). One example of a public accountability application of open data in Uruguay is A Tu Servicio, an app that provides an easy-to-use interface to open government health data, allowing citizens to compare local healthcare providers based on a variety of key indicators (A Tu Servicio is discussed in more detail in chapter 11). The traditional provision cycle of open government data contains only a few open practices at the delivery and consumption end (see table 7.6).

There are several other models of open government data provision beyond governments making existing data available. Governments and NGOs, for example, run crowdsourcing processes to generate relevant data. Assessments of when such ICT-enabled citizen voices lead to government responsiveness is provided by Peixoto and Fox (2016). It is also common for intermediaries such as NGOs to work with open government data, often repackaging and republishing the information for a particular purpose and audience (van Schalkwyk et al. 2014). In other instances, NGOs might

Table 7.6

Typical open government data provision model showing the role of open practices throughout the provision process.

Provision cycle	Open practices	Nonopen practices
Input provision		
Finance		
Knowledge		Public
Labor, skills		Public
Physical cap.ital		Little
Connectivity/ICT		Market
Management		Public (bureaucracy)
Production/assembly	Crowdsourcing	Public (bureaucracy)
Marketing and delivery	Sharing	
Consumption or use	Retain, reuse, revise, remix	

gather government-held data through a variety of means (such as freedom of information requests), compile and curate them, and then share them publicly as open government data. For example, in Mexico, the Mejora Tu Escuela (Improve Your School) project works to encourage parents' engagement in the education of their children and to combat corruption in the education sector (Verhuslt and Young 2016). It does so through a portal that presents (mostly previously inaccessible) data from Mexico's Ministry of Education, including information on school infrastructure, locations, standardized test results, and teacher assessments. The portal also includes some national census data, which were not originally released by the government but were leaked to NGOs (Verhulst and Young 2016).

Open Provision Platforms

Key parts of the open provision ecosystem are the platforms that enable open practices and the provision of goods and freedoms, which themselves have varying provision models. The platforms can be either technological infrastructure (such as the Internet) or the application layer (typically websites or apps). The Internet is mainly privately provided and not free to users. The major access and social platforms, including those of Google and Apple as well as Facebook and Twitter, are generally free to users. Their services do come at some cost to the user in terms of privacy and loss of control over the data that they generate from using the platforms; indeed, the huge number of users makes the platforms highly valuable for advertising, as well as consumer and market data acquisition.

Emergence and Economics of Open Provision

Sharing digital informational resources at scale, typically over the Internet, has emerged as a central practice since the middle of the 1990s. The rise of the prevalence of open processes is directly linked to the increasing spread of low-cost connectivity and information capabilities of the digital revolution, in the form of increasingly accessible and less costly Internet and information technology platforms and means.

This rise of open processes and provision in all institutional economic sectors—public, private, nonprofit, and personal (individual and household)—has meant that the economic impacts of open provision have grown considerably in the last two decades (Benkler 2013). This economic activity emerges not just from new models of peer-to-peer production that fall outside of the public and private sectors, as Benkler describes, but also from state (e.g., open government data) and private actors.

The reason that open practices are gaining in significance is because they can add value and reduce cost (i.e., increase efficiency in the provision of goods and freedoms) or provide novel and more effective means to accomplish specific goals or fill particular demands (see table 7.7 for a brief overview of the benefits and costs of engaging in the various open practices). Of course, there is no such thing as a free lunch—content might be free (in terms of price), but there are always some associated costs, be they connecting to the Internet or other resource costs or abdicating control over personal data and privacy. These costs need to be covered in some manner in order for provision to be viable. Open practices in provision also often help to reduce information asymmetries between providers and users, thus helping with another aspect of inefficiency in market provision.

Many of the kinds of benefits and costs in table 7.7 are very difficult, if not impossible, to measure. This is because open activities typically are free to users, and their inputs are often voluntary—that is, there is no wage or price attached to them or they are difficult or impossible to value for other reasons. Consequently, their value does not receive proper consideration or weight in national accounts and productivity estimates.

Economic Frameworks and Open Provision

Normative Welfare Economics

Economic analysis of open provision needs a particular economic framework. Here, we draw on what we consider to be the two most relevant frameworks: normative welfare economics (market economics plus public finance) and the human development and capability approach (HCDA). The former, which focuses on the provision of goods and services, has been at the heart of the postwar Western economies and globalization.

Table 7.7
Benefits and costs of engaging in open practices.

Open practice	Benefits	Costs
Sharing	Democratization of knowledge (increasing access to knowledge)	Hosting costs
	Improved quality of content through self-monitoring (knowing that content will be seen by many) and building reputation	Time to produce and share content
		Reinforcing/exacerbating existing inequalities
		The risk that sharing poor-quality content hurts reputation
Transparency	Build legitimacy, trust	Cynicism (negative information decreases trust and legitimacy)
	Greater efficiency and effectiveness of services through reduced corruption	Resistance and undermining of transparency measures
Reuse	Time and cost savings	Time to find content
	Innovation around shared content (e.g., apps based on open data)	Filtering poor content
		Cost of support, maintenance, support
Revise	Locally appropriate content	Time, cost of customization
	Economic/cultural innovation	Training staff
Remix	Creation of novel content	Time
	Economic/cultural innovation	
Crowdsourcing	New, low-cost source of ideas, data, content, funds, and human resources	Costs (e.g., running a crowdsourcing platform)
		Verification and validation of data sources
Peer production	Improved quality of content through peer feedback	Costs of hosting and governance of the peer-production process
	High-quality content	Lack of support for produced content
	New communities	

Source: Adapted from Smith (2014).

The latter is, in fact, much broader than an economic framework per se, as it focuses on the provision of capabilities and freedoms—economic, political, social, cultural, and ethical.

Normative welfare economics, as described by Smith et al. (2011, 83n13), are observed to be a "body of economic theory that addresses maximizing the material welfare of a society and its individuals—welfare derived from consumption of goods and services— and public finance for public goods and services.…Normative welfare economics includes equity as well as efficiency considerations, and provides analysis of equity

characteristics of market functioning and of public economic activity—expenditures, taxes, policies, and regulations."

Normative welfare economics recognize that governments play a key role in the provision of public goods such as national defense, health, education, law/justice, environmental protection, and social services. These goods are either not typically organized by market mechanisms (defense and justice) or privately provided in suboptimal amounts (health and education). Public goods comprise about a quarter of the GDP of most economies, and, next, we explore their characteristics in detail in comparison with those of open goods.

The Human Development and Capability Approach

Our second economic framework is the HDCA. A detailed introduction of this concept is beyond the scope of this chapter, but its central ideas include human functionings, capabilities, freedoms, and agency.

The definitions of the key terms of the HDCA are as follows:

- *Functionings*, as noted by Sen (1999a, 75), are defined as "the various things a person may value doing or being." In other words, functionings are valuable activities and states that make up people's well-being, such as being healthy and well nourished, being safe, being educated, having a good job, and being able to visit loved ones. They are also related to goods and income, but they describe what a person is able to do or be with these. For example, when people's basic need for food (a commodity) is met, they enjoy the functioning of being well nourished.

- *Capability* refers to the freedom to enjoy various functionings. In particular, the term is defined, by Sen (1992, 40), as "the various combinations of functionings (beings and doings) that the person can achieve…reflecting the person's freedom to lead one type of life or another." In other words, capabilities are "the substantive freedoms [that a person] enjoys to lead the kind of life he or she has reason to value" (Sen 1999a, 87).

- *Agency*, in turn, is defined as the ability to pursue goals that one values and has reason to value. An agent, therefore, is "someone who acts and brings about change" (Sen 1999a, 19).

Perhaps the key area of difference between normative welfare economics and the HDCA framework is that the latter focuses on more dimensions of human prosperity or flourishing—specifically, social, political, cultural, and ethical dimensions—than just material (i.e., economic) ones (Sen 1999a). Table 7.8 provides an overview of the differences between normative welfare economics and the HDCA.

Table 7.8
Comparing normative welfare economics with the HDCA.

	Normative welfare economics	HDCA
Principal goal	Economic growth; the expansion of material production/consumption on average	Human flourishing as the expansion of freedoms (with agency) for everyone
Equity	Disputed	Built-in
Dimensions of prosperity	Material (economic)	Economic, social, political, cultural, and ethical

Welfare economics draws a blank on what specific public goods should be produced and consumed because consumers' preferences do not translate directly into production decisions, as with markets and private goods. One central pursuit of the HDCA, therefore, has been to develop workable theories and processes of social choice and justice (Sen 1999b). In this respect as well, work that has extended the original HDCA conceptualization recognizes and emphasizes the central role of power—and the interests of the powerful—in governance and policymaking (Spence and Deneulin 2010). This is a dimension often absent in the analytic focus of normative welfare economics on efficiency and equity.

Open informational resources, practices, and provisions appear to have strong implications, in terms of both potential and challenges, for equity, informed public discourse, social and public choice, and the provision of all varieties of freedoms.

Open, Public, and Private Goods and Freedoms

Many meanings of the term *public goods* are in current use, based on attributed characteristics of the goods (artifacts). We review these perspectives here before suggesting better process (provision) views or definitions of public goods.

As previously mentioned, normative welfare economics considers public goods as those that the market or the nonprofit sector would not provide in the right amounts (or forms), and thus their provision is organized and also might be carried out by government. In this conception, public goods, in fact, are mostly services. Government provides physical goods, such as roads and military equipment, but most government economic involvement is by providing services, including organizing the provision of services, financing them, and actually producing and delivering them. Government organizes and finances defense, for example, and military forces (which are essentially governmental) deliver the service, while private industry provides military hardware

and much of the technology. In many countries, sectors such as education and health are both publicly and privately provided. Government is also involved in regulation in all sectors, and regulatory services are particularly prominent in some.

Public goods have also been characterized in terms of two main aspects—excludability (whether individuals can be excluded from use of the good) and rivalry (whether one individual's use of a good reduces its availability to others). These concepts have been key to arguments about why their provision is not done at all, or not done well, by markets. A well-known matrix that characterizes (material) goods and services is shown in table 7.9.

Public Goods in the Digital World

We suggest that this characterization of public and private goods requires some updating. The world has changed considerably since this original formulation, in particular with the advent of increasingly abundant free and open informational resources and the emergence of open practices and provision. Hence, it would be informative to bring this table up to date and include newer examples of goods and services that contain open processes. These examples challenge the idea that goods are rivalrous or excludable by nature, regardless of how the component activities of their provision are organized. They also help to explain the underlying reasons for rivalry and exclusion, which look particularly important in the current world of digital content. In this section, we offer an alternative to the rivalrous or excludable matrix to understand public and private goods in relation to open goods.

The notion behind excludable goods, which include doughnuts and journal subscriptions, is that it is possible to restrict who can consume them. Because each individual receives all the benefit, sellers can appropriate the revenue, and these goods are

Table 7.9
Private and public goods.

		Excludability	
		Easy (exclusive)	Difficult (nonexclusive)
Subtractibility (Rivalrousness)	High	Private goods Personal computers, doughnuts, food, cars, and personal electronics	Common-pool resources Libraries, irrigation systems, fish stocks, timber, and coal
	Low	Toll or club goods Journal subscriptions, day-care centers, private parks, cable and satellite television, Netflix	Public goods Useful knowledge, sunsets, free-to-air television, national defense

Source: Adapted from Hess and Ostrom (2007).

generally provided and sold by private market organizations. Nonexclusive goods, such as libraries and free-to-air television, are typically provided by public and nonprofit organizations (although sometimes by the private sector as well) free of direct charge (i.e., price) to consumers.

However, the distinction between exclusive and nonexclusive goods, as originally made, does not hold as accurately now, particularly with the advent of the Internet and digital goods. In practice, it is perhaps more accurate to assess exclusion versus inclusion on the basis of how the good is provided (process), rather than its inferred nature (artifact). Movies and television programs, for example, are nonexclusively provided on free-to-air television via antennae (of which there are few left), exclusively on cable or paid Internet services (such as Netflix or Hulu), and inclusively on free-to-user Internet services (such as YouTube).

The notion of rivalry is also not as clear cut in a digital world. The basic notion is that consumption or use by one person either prevents or detracts from use by, and benefit to, others. On the side of exclusive goods, this separates out *club goods*, which are physically consumed jointly by users (cinemas, private parks, or airplane, train, and bus rides) but still are paid separately by each consumer. Some club goods (movies) can be rivalrous or not in different provision models (cinemas, Netflix). Club goods comprise a relatively small subset of exclusive goods—those physically consumed collectively.

On the side of nonexclusive goods, rivalry is said to separate out *common goods*, such as timber and fish stocks, because their supply is so large relative to demand that they are considered to be effectively free. However, are there many common goods left? Real wilderness areas (not public parks that people pay fees to visit), for example, remain a dwindling luxury in most developed countries, and increasingly so in developing ones. Even clean water and air are increasingly scarce in many cities around the world. Unlike the diminishing physical commons, the knowledge commons is growing rapidly, with growing populations and communications adding to stocks rather than diminishing them. Nonrivalry—one user not diminishing availability to others—is in fact a powerful basis of much of the explosion of the open provision of goods and freedoms.

Given the revisions just indicated, we propose a revised matrix of exclusiveness and openness in goods provision, shown in table 7.10.

In this schema, open goods are found in five categories: open publicly (state) provided goods and services, open private services that are free to users, common goods, knowledge commons, and other largely open goods, including open-source software and OER provided often by the nonprofit or voluntary sector.[10]

Many publicly provided services are starting to incorporate open practices in their provision. Indeed, this even means that sometimes the benefits of some government

Table 7.10
Exclusively and nonexclusively provided goods: Proposed revised list.

	More exclusively provided goods (individual/household benefit)	More inclusively provided goods (collective benefit)

Nonopen goods	Privately (market) provided goods and services
	    Food and medicines (private, perishable goods)
	    Clothing and electronics (private, semidurable goods)
	    Cars and housing (private, durable goods)
	    Insurance, travel, and entertainment
	    (private, business services)
	    Education and health (private, social services)	

	Publicly (state) provided exclusive goods and services
	    Fish, timber, minerals, oil, and gas (public, licensed resources)
	    Toll roads, electricity, and water (public utilities)
		Publicly (state) provided nonexclusive goods and services (public goods)
		    Education, health, and social security (public social services)
		    Defense, police, and justice (public security services)
		    Telecom and finance regulation (public regulatory services)
		    Public roads and airports (public, infrastructure)

	Privately provided club goods (cinemas, private parks, and airline/bus trips, Netflix, e-books, software such as Microsoft Word)	

Openly provided (shared) goods		Open public-sector goods
		    Open government data, accountability, and consultation/referenda services
		Open private services
		    TripAdvisor reviews, iFixIt repair manuals, Google search results
		Common goods (goods from common-pool resources)
		    Clean water and air, inhabitable climate
		Knowledge commons goods
		    In public domain or released under an IP license that permits free use and repurposing by others (e.g., OER, open-source software, Wikipedia, open access to scholarly publishing)

activities, such as funding open textbooks as part of their education provision, can spread beyond the borders of that government's particular jurisdiction. Further, within the public sector, there are highly open goods and freedoms based on the provision of open informational resources (e.g., open data initiatives and referendums).

How much insight does one gain by categorizing goods in these ways? In normative welfare economics, the defining of *public goods* was intended to specify which goods are not provided (either efficiently or at all) by markets, yet are demanded by people, so their provision needs to be organized by government. The emergence of open goods adds complications and a more nuanced view of government roles.

More specifically, open provision models arguably offer alternatives where both markets and the public sector fall short of supplying goods and freedoms that are in demand. To market provision, they add new goods (such as free applications and content) and services (such as user reviews) that help to reduce information asymmetries between sellers and buyers. To public provision, they add new ways (such as referendums) to identify demand for public goods and freedoms, greater reach and quality of public services (e.g., through OER or by offering open government data to make public expenditures and activities more transparent), and new goods and freedoms (such as crowdmapping and crisis management) that need voluntary input to succeed.

Although public policy has many purposes in addressing public goods, key questions in both normative welfare economics and the HDCA frameworks is about what public goods to provide and how to organize the provision. With the explosion of new open goods and freedoms now occurring, reformulating the theory of public goods is needed to guide public provision decisions and policy and improve informed public discourse, social choice, and social justice.

In this context, an important feature of open provision in the personal and non-profit sectors is simply the possibility that people can organize the provision of collective benefit goods and freedoms without the process requirements and constraints of public organization, consensus requirements, and funding. On the whole, this should add greatly to the overall efficiency of providing valued goods and freedoms and, hence, to the flourishing of humanity. However, as chapters 1 and 6 illustrate, open provision can lead to the increased efficiency of provision of social *bads* as well as goods. This concept will be discussed briefly in the following section.

Policy and Research Implications

Phenomena as large as open provision might be expected to have a wide range of major implications for public policy and action. Here, we have picked out some main areas

from the analysis—namely, public provision of digital goods and freedoms, IP, employment and social protections, privacy and security, and a cluster that includes agency, social choice, and political freedoms.

Public Provision

To what extent should governments be active in the provision of open goods and freedoms? While the particulars of each national government will be highly influential, we provide next just a quick review of a few areas where governments are engaged or could benefit from engaging in open provision. This brief discussion is indicative rather than comprehensive, focusing on goods provision; public curtailment of the provision of bads is addressed separately in the "Privacy and Security" section later in this chapter.

Education   Given the public goods nature of an educated population, it is not surprising that most governments attempt to provide public education for all. However, there is variation in the abilities and commitments of governments to cover the cost of educational resources. Some governments are adopting open practices in the provision of educational resources, such as making all educational resources that are funded by the government openly licensed, and thus reusable for free by students. There are some emerging models that seem to be working. For example, in British Columbia, Canada, the Ministry of Advanced Education launched the BC Open Textbooks project to provide open textbooks in the subject areas with the highest enrollment levels. With this model, the government pays comparatively less than the original outlay to have the books updated annually. This means that not only are the books free to teachers and students, but they are also more up to date than previously published alternatives. Such an approach may be doubly beneficial for developing countries if there is a focus on working with in-country authors, considering that foreign publishers are often highly active in developing-country markets (Toledo et al. 2014).

Governance   As discussed previously, open data initiatives by governments have expanded rapidly, with the potential to improve governance across a wide range of areas. The availability of open government data is also argued to enable much value creation by the private sector—estimated by some to be in the trillions worldwide (Manyika et al. 2013). Furthermore, there are also many examples of government use of crowdsourcing to improve service delivery in education, health, water, waste management, and other areas, as well as a means to foster broader public participation (Bott and Young 2012; Gigler and Bailur 2014; Peixoto and Fox 2016). In many countries, both less and more developed, improving the public, private (e.g., social media), and nonprofit mechanisms furthering political engagement and consensus building is a key public policy challenge.

Intellectual Property Protection   While IP has a long history, its relative significance for economic and human development is arguably only increasing given our shift toward increasingly knowledge-based societies. IP protection has been supported mainly on the ideas of fairness to inventors and incentive for research and development, and, on the other hand, it has been challenged throughout its history on the grounds that it stifles innovation. The current copyright regime hampers one of the core affordances of the Internet (easily sharing digital goods) and thus limits the sharing of ideas, knowledge, and resources that are fundamental to key social functions such as education (Wiley 2017). The emergence of open provision provides a fundamental challenge to the current dominant IP regime and competition policy. Drawing on examples of the major innovations in the Internet, Yochai Benkler (2011, 318–320) argues that the freedoms extended by more flexible IP policy ("freedom to operate") are more important than strong IP protection in driving this innovation.

There is also an emerging body of knowledge on practical ways in which knowledge is appropriated and used for innovation in informal sectors of developing countries. In a synthesis of five case studies of informal sector innovation in sub-Saharan Africa, de Beer and Armstrong (2015) found that informal sector innovators adopted open practices (particularly sharing), although they were not necessarily digital. The key point is that the protection of IP rights did *not* play a significant role in spurring innovation.

Similarly, Mizukami and Lemos (2008) describe a business model for local Technobrega musicians in Brazil that is also predicated on giving away their music to street vendors, who then sell it. The goal for the musicians is to share their music broadly to gain popularity. Then they host street concerts for which they can charge admission. It mirrors online freemium models, which give away some basic services or content, but then charge for extras. These perspectives are particularly significant, given that in many developing countries, the informal economy constitutes the majority of the economic activity.

Much more could be said about IP policy and the law. Open innovation analysis, for example, describes the relationship between open innovation and IP and recommends appropriate IP and other marketplace framework policy measures (de Beer 2016). For example, there is an argument for policy neutrality between the proprietary firm-based system developed throughout the Industrial Revolution and the rapidly emerging open and collaborative needs of open innovation and provision.

Nonneutrality of infrastructure poses another large set of diverse interests facing IP and competition policy (Fuster Morell 2014). Monopolization occurs in many ways through a demand-side discoverability dynamic where, for example, despite the wide diversity of a particular type of content, those elements that are easily found on Google

will dominate greatly, while the rest exist in the long shadow of dwindling use (see also chapter 6).

Employment and Social Protection   It is difficult to measure the current extent of open provision and how far and fast it will expand. Available studies suggest that open provision—in the sense of industries that depend on and benefit from limitations to copyright, rather than its extension—comprise about one-sixth of the US GDP (Benkler 2011). In the case of open provision, trends or limits might be easier to approach than current levels. One interesting perspective on the potential is the aggregate amount of time that individuals spend on the consumption of open-activity goods and freedoms. According to Shirky (2010, 10), "Americans watch roughly two hundred billion hours of TV every year.…Even tiny subsets of this time are enormous: we spend roughly a hundred million hours every weekend just watching commercials."

Open provision looks likely to expand greatly on the basis of so-called big data and data exhaust, as well as sheer innovation, rather than the amounts of human and capital resources used in provision. The impact of artificial intelligence (AI), for example, is already substantial and growing fast. One large area includes the studying of user and market behavior and the tailoring of provision and marketing to individual preferences. Where AI may lead is hard to guess. Its possible applications were suggested by Sebastian Thrun, founder of Google X (Thrun 2017):

> My students and I recently did work on artificial intelligence for detecting skin cancer, and we found that if we train an artificial intelligence with about 130,000 images, we can find skin cancer basically using an iPhone as accurately as the best board-certified dermatologist.…Every time I talk through my phone—and it's probably about an hour a day—it could analyze my speech and thereby find things like Alzheimer's much, much, much earlier than we find it today.

Open provision in many cases displaces jobs and employment (e.g., appliance repair people and real estate agents). AI and robotization extend this potential in both lower- and higher-skilled employment. This is one part of a picture of uncertain employment prospects associated with technology, automation, digitalization, and globalization, among other areas. Employment and social security implications require public policy responses.

It is noted that open provision models, including intelligent job search and matching, counter the "fatalism that we are powerless to harness what we create to improve our lives—and indeed our jobs" (Spence and Manyika 2015, 1). Nevertheless, open provision contributes to the possibility of widespread prosperity without widespread employment and the need for political action and social protection (e.g., guaranteed income) to resolve who gets what. In many developing countries, where social and economic security mechanisms are not very developed and where full-time employment is

rarer and temporary or freelance work more common, current and coming challenges are substantial.

Privacy and Security   It is clear that open provision can provide bads and restraints, as well as goods and freedoms. One example is the use of online platforms where the ease of sharing can support the recruitment and radicalization of individuals, who in turn may participate in terrorist activities. Similarly, one can use these platforms for bullying, hate campaigns, and political manipulation where provision reduces rather than expands freedoms. Another set of privacy and security concerns surrounds major open platforms and the theft and misuse of personal data from user repositories (cybercrime). These and other concerns (e.g., cyberwarfare) apply to proprietary (corporate, military) provision processes, as well as open ones and, while important, are well beyond the scope of this chapter. One thing that seems clear is that the Internet and the high-volume provision that it enables—both open and proprietary—are facing much higher security and privacy costs than in the past, as both security and privacy are essential to sustain openness and broad public participation. They are also facing major substantive challenges for public policy and participation, reflecting greater difficulty than expected in identifying and managing or countering highly negative behavior.

Agency, Social Choice, and Political Freedoms   Open provision can promote agency, social choice, and political freedoms, which are three major concerns of the HDCA. The idea that open provision activities tend to promote agency does not seem far-fetched when one looks at people's personal contributions in terms of commitment, time, effort, skills, knowledge, experience, management, and finance. In many cases, connectivity and platforms allow people to be engaged in the provision of goods and freedoms that they value and have reason to value. Open activities certainly can serve the provision of informed public discourse, social choice, social justice, and political freedoms, which are not small matters. For instance, public consultation processes are examples from the public sector, and many of the Ushahidi-based initiatives are examples on the nonprofit side.

On the other hand, open activities can also pollute public discourse and thus effectively reduce political freedoms and social choice. One prominent example is the emergence of deliberate misinformation as legitimate news stories (i.e., what has become known as *fake news*) as a genuine threat to democratic governance. The prevalence of misinformation has become significant enough that some social media platforms, such as Twitter, have proposed measures to counter its spread. Security dimensions of fake news have also been highlighted by Russia's activities before and after the 2016 election in the United States. Given the effectiveness of these techniques, such

interference in political processes is increasing—with organized disinformation campaigns found in 48 countries in 2018 (Bradshaw and Howard 2018.)

Furthermore, the tailoring of free content based on an individual's past actions by social media platforms serves only to further fragment society, creating separate realities and alternative facts, dramatically undermining the possibility for meaningful dialogue. Indeed, it is an open question as to whether democracies will survive in such a context.[11]

Afterword

The reality and rapid expansion of open provision necessitate a change in the nature of economic theory and analysis. A simple example from this chapter is that it is no longer adequate to address economic efficiency, equity, and stability in terms of private and public goods. Rather, one must include open provision across the public, private, nonprofit, and personal sectors. Digital provision—both open and proprietary—is transforming economies in terms of goods and freedoms provided, work, IP, competition, and security. Because proprietary provision has been the dominant mode of market economies, the large open portion of digital provision is, in our view, the most transformative part. Like the future of open provision, its ultimate impact on economic thinking is in the early stages and very hard to predict. Nevertheless, the discussion should prove both valuable and interesting.

Notes

1. See Open Government Partnership (n.d.).

2. See Ushahidi (n.d.).

3. As freely shared goods have no price and often have voluntary labor and inputs, data on their extent come only from infrequent studies.

4. See W3Techs (n.d.).

5. See Ushahidi (n.d.). Its Twitter account is at https://twitter.com/ushahidi.

6. See HarassMap (n.d.).

7. See TripAdvisor (2018).

8. Benkler's (2015) view of TripAdvisor and Yelp as examples of firm-based peer production is also a reasonable way of viewing their provision models.

9. See MIT (2018). Over 200 other universities around the world have subsequently made courseware openly available online. For more information, consult http://www.oeconsortium.org/members/.

10. Some of these services aim to make governments more open or responsive, but these are organized outside government and so are distinguished from open public activities, where governments themselves are the providers.

11. See Helbing et al. (2017).

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