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## Universities

### Universities as Open Knowledge Institutions

The modern research university, dating from the German technical education and research system of the nineteenth century, was built to be open to the world, pulling knowledge in and pushing knowledge out. It was a product of the liberal Enlightenment and “invisible college” (Mokyr 2017) that spanned Europe and gave us the modern conception of an “open society” of knowledge (Popper 1945).

An ideology of openness was pervasive in these early institutions. At the founding of Johns Hopkins University Press (2019) in 1878, for example, Daniel Colt Gilman, the first president of Johns Hopkins University, stated, “It is one of the noblest duties of a university to advance knowledge, and to diffuse it not merely among those who can attend daily lectures—but far and wide.”

In the simplest terms, this provides the ideal of the modern research university as being dedicated to the production and dissemination of knowledge to the public. These values are echoed in mission statements and strategic plans across the world: the university envisions itself as a space in which knowledge is produced, often in collaboration with other partners, and its results should

have significance for the broader community. The University of Cambridge (2020), for instance, states as a core value the relationship with society, making it clear that the university should have the widest possible access by members of the public and engage innovative partnerships with other knowledge institutions.

Several historical processes have endowed modern universities with a privileged space in the knowledge economy. Academic scholars have been ascribed certain virtues that are frequently not attached to knowledge makers in other industries (Shapin 2008). Their peculiar system of self-government, including peer review and disciplinization has oftentimes been used as a protection against outside influence. Furthermore, universities in the aggregate engage with a large proportion of the population, more than has participated in any single industry. This provides a sense of loyalty to and defense of the academy that may not be observed for other industries.

The monopoly that universities may once have enjoyed as sites of privileged access to knowledge resources is, however, being lost as digital developments make it possible for ordinary citizens to find, make, and share knowledge in open and networked systems, mediated by technology platforms and companies (Google, Facebook, YouTube, Baidu, and Tencent) rather than by experts. The growth of knowledge has been coupled with faster rates of change in all aspects of life, including accelerating technological change.

In response to these pressures as well as increased scrutiny and accountability measures, the modern university is driven to become an increasingly closed institution, which allows it to operate more efficiently to meet short-term goals set by funders, regulators, and the market. Yet this makes universities poorly suited to the realities of accelerating change and poorly positioned to engage with new opportunities. Most important, this shift means that universities are failing in their basic mission: to serve as open institutions capable of providing the knowledge and innovations needed by a world in which change and uncertainty are inescapable realities.

Closed systems are a dominant equilibrium. But to cope with change, all systems, including societies and economies, need to be open in order to benefit from experimentation. Open systems work because they are resilient as well as capable of coping with uncertainty and accelerated change. If universities are to survive and prosper, they need to shift away from operating as closed centers of knowledge production and become open knowledge institutions. In an uncertain world, systems must accept a share of “inefficiency” (variability) in order to maximize robustness. An OKI can more productively respond to technological disruption, rapid global change, and dynamic competitive pressures. Given these attributes, an OKI is not only an optimal strategy but a contemporary necessity too.

Openness is a strategy for prospering in the context of uncertainty and change, and also a principled ethical position—a humanistic liberal quality, emphasizing social inclusiveness while minimizing tendencies toward the centralization of power and unfair distribution of knowledge resources. In a world in which moral leadership and trust in institutions are in short supply, openness provides an ethical position from which universities can speak as honest brokers, interested in the power of knowledge to create positive change in the lives of the many, not the few. Openness recognizes the connection that exists between universities and the local, national, and global communities that these institutions depend on, and in turn affect. Open stances position universities as hubs within larger networks of knowledge creation, sharing, use, and growth.

Supporting and encouraging diverse strategies for sharing the knowledge being created within universities is a powerful strategy for ensuring that universities engage with changes happening beyond the institution. Feedback mechanisms, which allow universities to understand how and where they can add value to networked knowledge environments, at both global and local levels, and in both commercial and community contexts, are vital if universities are successfully to navigate the complex changes now occurring in the landscapes

in which they must operate. As incumbent and emergent institutions with a great deal of public trust, universities can act as innovative partners and sometimes leaders in an open knowledge society. Adhering to open knowledge practices would allow universities to build on the infrastructure that they already have in the service of their communities of influence and the broader public.

At their core, OKIs act as networks of knowledge, spanning common disciplinary boundaries and campus barriers in order to serve as agents for societal change. These institutions operate via a set of protocols, and are governed by commonly understood rules and procedures. These rules and procedures are neither fixed nor hierarchical; they are expected to morph and change over time; they do not serve to regulate knowledge in a market-driven way. They are oriented toward the coproduction of knowledge with and for broader communities. In an open system, evaluation criteria must expand from isolated notions of excellence to metrics that include ideas of innovation, utility, and engagement under uncertainty. OKIs of higher learning foreground and prioritize the constituent communities that their students, alumni, faculty, staff, administrators, partners, and collaborators both comprise and promote.

In this environment, the concept of excellence no longer relies on particular publication brands (e.g., high-ranking journals or presses). Instead, the value of scholarship is tied to the difference it is able to make in a life, community, nation, or the world. Advancement occurs as a reward for connectedness and usefulness, not for elite recognition. Furthermore, OKIs do not operate in isolation from or competition with other institutions but rather cooperatively to create a robust common pool resource and shared infrastructure.

It is perhaps useful to distinguish the notion of an OKI from the contemporary parlance of “open universities”—namely institutions that do not impose limitations on entry (examples of which can be seen in the United Kingdom’s The Open University and Open Universities Australia). Such institutions developed around principles

of open access to enrollment. Most are not experimental offshoots of existing higher education establishments but rather philosophically driven newcomers created and designed to provide educational opportunities and degrees to anyone who can afford to participate. Though they share some characteristics with OKIs, particularly in their support of a diverse student population, open universities do not typically encompass the full spectrum of criteria that are imagined in the case of an OKI because they confine openness to the student demographic, and not to systemic knowledge making and sharing.

## Maintaining Open Knowledge Institutions

OKIs, such as universities, create new values for the society at large through coordinating networks and platforms for knowledge-making activities, where the network itself is a common pool resource. Universities provide individuals and groups with access to a broader network as well as the reputational resources and honest broker status of the larger institution. Whereas different communities interact within the university to create their common pool resources, this interaction, in turn, needs to be coordinated and sustained to share the common good (e.g., departments compete against each other for funding and influence, which may create harmful externalities). Hence the network of interaction emerges as a higher-level common pool resource.

If we look at the history of the university system globally, the emergence of the university as a broker and governance structure is a hallmark of the US model (Marginson 2019). In comparison, power within the traditional German university has been distributed differently, with relatively weak faculty structures organized as collectives of autonomous chairs. Recent reforms, particularly the German Excellence Initiative that established Clusters and Universities of Excellence, have strengthened the role of the university as a coordinating, mediating, and enabling institution. Yet critics of the US model point to

the negative, knowledge-closing impacts of a focus on rankings, the market-oriented design of programs, and the growing dependence on nontenure-track and part-time faculty (Wallis 2018). In the US model, principles of closure and openness stay in tension.

Understood in this way, open knowledge as an organizing framework is a strategy and alignment that protects the common knowledge pool resources of the university in the context of change and uncertainty. The successful management of common pool resources depends on coordination and governance mechanisms, such as

### **Case Study 6**

#### The German Excellence Initiative

Germany's universities are supported and governed via the states that make up Germany's federal system. Traditionally there has been relatively little hierarchy within the German universities and significant autonomy for individual universities within the system. In 2006, the German government created a €4.6 billion program that aimed to help a small group of universities to challenge US and British universities for top positions in international rankings.

As with most such initiatives, the strategy has been hailed a success by its originators (Schiermeier and Van Noorden 2015). It has also generated significant controversy, however, in relation to how that success is to be judged (Krieger 2016), whether the program is sustainable, and what it has done to the character of German institutions and the German system (Brembs 2016).

It can certainly be argued that while the initiative has changed the German system and prompted greater competition among its members, not all the effects have been positive. Critics worry that the initiative has resulted in the loss of some of the German system's unique characteristics as well as the introduction of many of the less positive aspects of the British and US systems, including the casualization of staff and focus on externally provided evaluation measures. There is also a mismatch between the aspirations of the intervention and its resourcing. While the additional €148 million made available to each of the eleven institutions selected to participate in the Excellence Initiative (DFG, German Research Foundation 2020) is a substantial sum, it is insignificant in comparison to the endowments of the universities described as the inspiration for the program. Stanford and Harvard have endowments of US\$27 billion and US\$40 billion, respectively (Stanford University 2020; Harvard University Endowment 2020).

community norms, protocols of acceptable behavior, and a shared purpose and vision. In this sense, the university is the institutional embodiment of the public interest in creating and sustaining common knowledge pools.

OKIs nevertheless face challenges to their economic and social sustainability. The unique capability of OKIs in creating knowledge for public interests needs to be recognized and supported at policy levels, and then translated into public funding (as well as other sources) for long-term sustainability. Thus advocating for policy changes should be a permanent mission for OKIs, not a one-off distraction.

Meanwhile, as knowledge is an economic good, the knowledge object yields positive outcomes (as determined among producers and users) that are measurable or demonstrable. Open business models are therefore possible—and needed—for OKIs to increase their economic sustainability. This is not just about generating revenues from open-licensed content but also, more important, about integrating open knowledge practices with broader digital culture, economics, and innovation, thereby creating new value propositions.

As OKIs, universities must build trust and incentive-reward mechanisms for participants from academia, industry, and wider publics. This includes the development of innovative quality control methods, ranging from open peer review to altmetrics, building public trust in knowledge that is created in an open paradigm. It is also necessary to motivate both individual academics and citizens to participate in open knowledge practices and develop practical rewards for them, particularly in institutional contexts, and based on connected communities with shared interests.

Further, OKIs have both the capability and responsibility to advocate in favor of profound policy changes through analysis of good practices and evidence-based research. These policy changes include funding and evaluation issues that have been widely discussed. They will free academics from the restrictions of “publish or perish,” but also avoid creating new open maxims such as “be visible or vanish.”

**Case Study 7**

## The Athena SWAN Charter

Recent twenty-first-century initiatives focus on equity, diversity, and inclusion in higher education and research to balance gender distribution among staff, especially in the STEM disciplines, where the percentages of women are generally lower than men. In 2005, the Equality Challenge Unit in the United Kingdom established the Athena SWAN Charter with the aim of encouraging more participation by women in STEM fields. In 2015, Athena SWAN expanded to include all disciplines, including the arts, humanities, social sciences, business and law, professional and support staff, trans staff, and students (Advance HE, n.d.).

The charter highlights the need to acknowledge and foster the talents of all persons in academic institutions, addressing issues such as the gender pay gap, short-term contracts, and discrimination based on gender and sexual preferences. Ireland adopted the Athena SWAN Charter in 2015. The Australian Academy of Science and Academy of Technological Sciences and Engineering partnered in 2015 to introduce the Athena SWAN Charter to Australia under the Science in Australia Gender Equity initiative. Currently the focus is on STEM disciplines. Athena SWAN is an optional program, with 184 university and research institutional members in the United Kingdom, 11 institutions with awards in Ireland, and 45 member university and research organizations in Australia.

Athena SWAN has raised the profile and visibility of women among the academic community as well as awareness of gender inequality within institutions, but evidence of workplace impact and cultural change within wider staff groupings is less clear. An independent review of the UK Athena SWAN Charter in 2019 found positive effects but some concerns about superficial box ticking at an institutional level (Bhopal and Henderson 2019). An independent review commissioned by Advance HE (2020) found the charter provides effective mechanisms for addressing gender equality, yet it also identified a large administrative burden on staff in developing submissions and complying with the application requirements, and a lack of confidence in the assessment process. Both reports indicate variations in cultural change across institutions, highlighting the progress as well as challenges in addressing and achieving such change on the path to institutional openness.



Rather than building tech utopian open knowledge initiatives, though, universities are uniquely positioned to lead open transformations in a practical and sustainable way, using symbolic (branding/reputation), economic (public and/or private funding), and human (experts/students/communities) resources. In summary, open knowledge policy innovations should endeavor to build a more diverse, inclusive, experimental, and failure-tolerant system and culture.

### Opting for Openness?

Universities have many opportunities for future development. Many will build incrementally on past successes, and the development of well-trying values and priorities. For an increasing number, however, path dependence is not enough. Discontinuities or U-turns may be necessary for survival; new roles or community positionings may be essential. Many universities have, in fact, already moved toward a more open knowledge function within their communities—as “part of the world” rather than a more monastic or intramural role, “apart from the world.”

Clearly a university cannot, by itself, become a successful OKI. A new institutional openness in resource availability, tying in with a greater openness in the way it runs its education or research business, depends on how a university’s communities, networks, and affiliations also embrace the open knowledge opportunity—that is, how these partners seek to be involved in an OKI’s new role and new knowledge emphasis. The activities of others, such as local government, religious bodies, dominant philanthropic families, and so on, can effectively usurp many of the services that an open knowledge university might seek to provide. The closed character of certain professions or disciplines, or a prevailing “key holder” approach to knowledge access, can equally thwart an institution trying to forge a new knowledge compact with its communities. On the other hand,

as a trusted thought leader, a university has an obligation to foster change and confront any defensively restricted approach.

The theme of this book is that universities are well placed to take a central role as OKIs because of their liberal values, core knowledge mission, and importance in their communities. But this does not mean that all universities can or will prioritize an open knowledge role; a defense-related or religious university may have fundamental difficulties with such a role. Nor does it mean that all universities must prioritize strong community relations. Some will indeed thrive on being apart from the world, or will look for their community far from their physical location. For most comprehensive, not-for-profit universities, however, the development of an open knowledge agenda needs serious consideration. Like free trade, open knowledge is good for the system in total even when it may not always be good for any one player.

Figure 3.1 summarizes the functions that different elements of an OKI have, building on the conceptual framework developed in this chapter. The key point is that the university interacts with various and diverse external actors in creating common knowledge pools. In this interaction, the university plays the essential role of creating and sustaining a number of common pool resources that enable the actors involved. Common pool resources are created by members of the university, such as its reputation, and their sustainability builds

#### **Case Study 8**

##### Software as an Academic Output

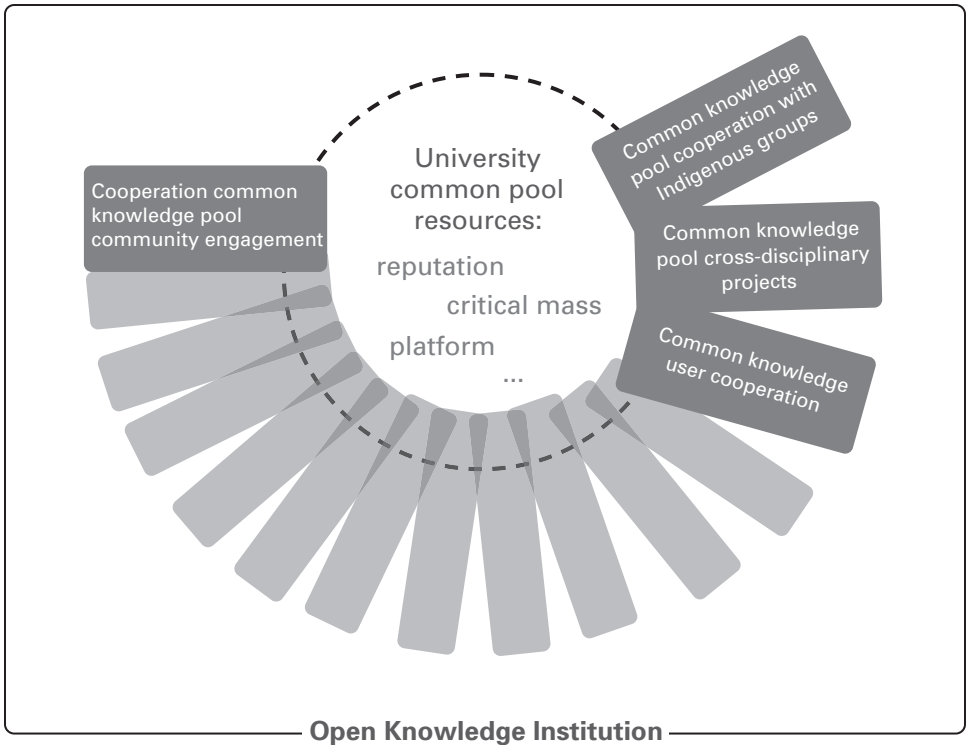
The free and open-source software movements were significant contributors to ideas of open scholarship, and many of the disciplines with the greatest commitment to the sharing of research outputs generate software as a core activity. Nevertheless, while disciplinary communities have increasingly recognized the value of software as an output, and good software practices as good research practices, universities have been slower to adapt to the idea that software should be recognized as a product of research and scholarship on a similar level to journal articles or books.

As with the sharing and publication of data, this has led to efforts that seek to co-opt existing modes of communication and evaluation that are recognized by universities to cover software. Efforts such as BioMedCentral's Open Research Communication (Neylon 2010; Neylon et al. 2012) sought explicitly to exploit the characteristics of the journal system to make software appear valuable within journal-focused evaluation systems. In seeking to create a highly cited journal, though, the bar for entry was set too high to achieve a critical mass of submissions that met this standard. The more recent and much more successful *Journal of Open Source Software* (n.d.) takes a more "developer-friendly" approach, intended to make it as easy as possible for academic developers of software to receive a form of credit that is recognizable by their more traditional peers.

A similar motivation can be seen with efforts to encourage the citation of software. Because citations are viewed as the central metric of success for modern research, there have been attempts to co-opt this existing set of evaluation institutions to valorize the sharing of research outputs beyond text, including data as well as software. A workshop on software credit held in 2015 commenced with a session on "best practices in citation/evidence" (Software Sustainability Institute 2015), and a FORCE11 Working Group, taking inspiration from work on principles for data citation, published a similar set of principles for software citation (Smith, Katz, and Niemeyer 2016).

Criticism of this focus on citations as a means of credit has grown in parallel. This criticism comes from a theoretical perspective (Wouters 2016; Neylon 2016) as well as more fundamental concerns as to the prominence of citation as a measure for evaluation or "credit" over its original role as a means of linking related research outputs and providing the evidence underpinning claims (Bilder 2016). As one of the strongest voices arguing for the recognition of software as a scholarly output and an author of the FORCE11 software citation principles, Daniel Katz has recently explored different approaches to software citation. His reflection looked at the tension between co-opting citation approaches developed for text documents because they are coupled to existing evaluation systems and applying new systems that are more suited to software as a mode of communication (Katz 2019).

More broadly, these tensions play out across scholarly communications. If our institutions are to be open to new forms of communication, as they must be in a changing world, how can there also be coordination and agreement on what is valued? How can resources be fairly distributed among diverse activities generating a diversity of outputs, without creating incentives that will tend to reduce that diversity? How can evaluation systems be built that are appropriate to innovative forms and types of scholarly communication?



**Figure 3.1**

The university as an OKI.

on protocols, values, and norms that are constitutive for the university as an organization. Common knowledge pools are various but may overlap, such as including users in research cooperation with other universities as well. The entire pattern of interaction, as outlined in the figure above, is the result of the institutionalization of an open knowledge system: the OKI.

### Universities as OKIs

This chapter has focused on the tensions between the aspiration of universities to be open and the default tendency toward closure for all institutions. In the following three chapters we will examine

areas of activity that universities need to deliver if they are to thrive as OKIs. Drawing on the idea of knowledge production as a social activity, driven and used by communities, we frame these according to three key themes: diversity, coordination, and communication.

If knowledge is produced and used through the interaction of diverse groups, then *diversity* is a first-order principle. OKIs will need to support, interconnect, and work with communities, groups, and organizations with a diversity of experiences, knowledge, culture, and perspective. This might be viewed through the lens of the demographic diversity of the staff and students directly engaged in the work of the university, but this is only an initial step. A deep and intersectional commitment to epistemic diversity in all its forms is required.

To support the work of such diverse communities requires *coordination*. It is not productive or even ethical to simply place communities into contact. The work of finding commonalities, language, and—in the face of historical inequity and injustice—a sufficient level of trust that the benefits will be shared is crucial. In a broader sense, the core purpose of an institution is coordination. Its role is to supply common systems and platforms to reduce the costs of activity, and allow specialists to concentrate on their core skill sets and goals. The challenge in coordination is finding ways to support a diverse range of activities and actors, without restricting their flexibility. What is common is necessarily less flexible, and finding that balance is a core part of the challenge of iterating toward that point of poise between closed control and chaos.

The third critical area is *communication*. Knowledge, in all its forms, must travel beyond its point of origin if it is to support the different kinds of value creation we have described. Traditional communication of the knowledge produced in universities involves a sophisticated set of existing institutions. Some universities and some of their members are highly effective at communicating in less formally recognized ways to broader communities and publics. Supporting effective communication, writ large, is therefore a central part of what a university as an OKI needs to provide.

