A “Knowledge Commons’ Framework for the Governance of Bioprospecting Relationships

Aman Gebru

Benjamin N. Cardozo Law School

In the process of drug discovery biotechnology and pharmaceutical (biopharmaceutical) firms collect thousands of samples of genetic resource and screen them with the help of high efficiency technologies. Despite advancements in the biopharmaceutical industry, in most circumstances, only a few of the samples will have a potentially valuable active ingredient which can further be studied for commercial development. This process of developing drugs involves high risks and requires considerable financial resources. To reduce the risks involved in drug discovery, some firms use traditional medicinal knowledge (TMK) which is the know-how, skills, innovations and practices of indigenous peoples and local communities. TMK has become increasingly important in bioprospecting processes - attempts to develop drugs from genetic resources found in nature. Empirical evidence has revealed that the use of TMK and genetic resources from nature reduces the time and cost of producing modern drugs.

Despite its value, TMK and the biodiversity resources are disappearing at a dramatic rate. This rate of loss is caused by multiple socio-economic, environmental and political factors. This trend threatens the sustainability of the bioprospecting industry and ultimately affects drug discovery. TMK and biodiversity resources that firms can use to develop drugs will continue to diminish. Scholars have reacted in different ways to this trend and the relevant scholarship has examined the issues from various angles including indigenous rights, environmental protection, and knowledge governance. Within the knowledge governance literature, the reaction from intellectual property (IP) scholars have been to examine the issue through the usual binary governance frameworks for knowledge goods – government (public) subsidy or the recognition of some form of private right to encourage private investment. This binary view of options for the governance of knowledge goods is dominant in the governance of “modern” knowledge. Investments in the production of knowledge goods are thought to be supported either through government (public) support as in the case of libraries and research institutions, or through private rights as in the case of IP rights. Following the binary view of IP scholarship, scholars working on TMK and biodiversity have also focused on a public-private approach to solving the problem of loss of TMK and biodiversity.

However, this binary approach is limited and it does not account for a considerable portion of innovative activities both in modern or traditional societies. The binary approach ignores the

1 An alternative way of producing drugs involves the use of synthetic chemicals that mimic natural compounds. This is a relatively recent process made possible through advances in the biopharmaceutical industry.
3 In a previous work I have analysed what a private rights approach could look like in this context. Aman Gebru, International Intellectual Property Law and the Protection of Traditional Knowledge: From Cultural Conservation to Knowledge Codification, 15 ASPER REV. INT. BUS. TRADE L. (2015).
roles that a third (emerging) framework – the “knowledge commons” framework – could play in governing knowledge goods in general and bioprospecting relationships in particular. Knowledge commons refers to formal or informal community management or governance of “the sharing, and in some cases, creation, of information, science, knowledge, data, and other types of intellectual and cultural resource.” This paper will analyze the potential and limitation of a knowledge commons framework for the governance of relationships in bioprospecting projects.

The knowledge commons framework is the extension of Nobel Prize winner Elenor Ostrom’s theory of the commons originally developed in the context of natural resources. Ostrom’s work challenged the traditional assumption of the “tragedy of the commons” which claimed that common resources will face over consumption because self-interested consumer will over consume a common resource and disregard the negative effect of over consumption on others. The “tragedy of the commons” fits the theory of externalities in economics. Ostrom’s work challenged this assumption and based on detailed empirical case studies revealed that the “tragedy of the commons” is a narrow view that fails to describe cases in which common resources are produced and used through community action.

The scholarship on the governance of knowledge goods parallels the “tragedy of the commons” literature and current IP laws are heavily based on externalities literature and free-rider problem. The argument is that the non-excludable nature of knowledge goods creates a free-rider problem in which a producer is unable to exclude users and therefore under-invests in the production of knowledge goods in fear of her inability to recoup the investments. The policy prescription proposed to address this problem is usually binary. One prescription is government (public) subsidy of the production of knowledge goods, while the other is the recognition IP rights - rights that would artificially make knowledge goods excludable and thereby address the free-rider problem. There are some variations of this proposal including proposals for the granting of tax incentives or prizes for innovative output. This view is increasingly criticized for being too narrow and for misrepresenting reality. The criticisms come from different angles and include examples in which knowledge goods are produced despite free-riders and situations in which the risk of free-riding is reduced or absent as a result of factors other than IP law. For instance, individuals produce knowledge goods because of curiosity, altruistic aspirations or because their primary goals is to solve a personal problem; and firms do the same because, for example, because they can keep the knowledge secret or the head-start they will get in the market is a sufficient incentive.

Scholars who are critical of the binary proposals to knowledge governance – government subsidy or IP rights – have recently started to look at alternative frameworks. The knowledge commons scholarship arises from these attempts to describe innovative activities that cannot be fully described through the traditional IP framework. This does not mean that knowledge commons are unrelated to IP rights. In fact, some knowledge common systems rely on some form of IP rights or are supported through government subsidy or public investments. Knowledge commons come in varied forms and are used in the governance of the production, use and dissemination of know-

4 Governing Knowledge Commons, (Brett M. Frischmann, Michael M. Madison, & Katherine J. Strandburg eds., 2014).
how and expressive content. Examples of knowledge commons include specific entities such as Wikipedia and the Associated Press, or new orientations in existing practices as exemplified by Open Source Software and Citizen Science. Knowledge commons, be they formal or informal, involve rules created by the members that would govern issues such as who is a member; whether the commons is open to outsiders or not; what rights and obligations members have towards each other etc. While many knowledge commons tend to share knowledge goods for free within the commons, some commons may involve compensation for contributions made into the commons.

Ostrom and her colleagues developed what they call the institutional Analysis and Development (IAD) framework as a tool to help scholars examine the commons (reproduced below). The IAD framework is “a diagnostic tool that can be used to investigate any broad subject where humans repeatedly interact within rules and norms that guide their choice of strategies and behaviours.” The IAD framework involves a structure to study interactions between members of the commons and a set of questions under each structure that scholars can use to investigates the commons. The framework involves flexibilities useful for the study of different arrangements of knowledge commons, while the structures allow for generalization out of multiple case studies. This flexibility may prove to be useful for the study of relationships in TMK commons. The flexibilities within the knowledge commons approach have the advantage of encompassing a wider range of interests than a private right (IP like) system focused on financial remedies would provide. The diverse interests of source communities range from an interest in getting attribution for being the source of the TMK or genetic resource, sharing profits arising from the use of TMK and genetic resources, benefiting from advances made on their TMK. While the recognition of private rights over TMK or genetic resources (as suggested by some) could address some of these interests such as benefit sharing, it may not address other interests adequately.

The paper will examine the role that a knowledge commons framework could play in the governance of bioprospecting relationship between source communities, biopharmaceutical firms, non-profit research institutions, and governments. Part I will describe the problem - the limitations of the binary alternative to the governance of knowledge goods in general and TMK in particular. It will also outline the key factors that result in inefficiencies and transaction costs in bioprospecting projects. Part II will provide a brief discussion of the commons approach to natural resources followed by an examination of knowledge commons frameworks in selected case studies. Part III will apply the knowledge commons governance framework to the context of TMK and bioprospecting relationships. Part IV will attempt to extract some factors that could potentially impact the success of a TMK commons. Understanding of these factors could help those interested in establishing TMK commons between different stakeholders (source communities, executives, researchers and government agents) avoid potential pitfalls.

The key research questions within this project include: 1) What are the factors that determine the success or failure of a ‘traditional knowledge commons’? 2) To what extent do the unique features of a ‘traditional knowledge commons’ require custom-made frameworks? 3) How does the difference in power, background, and interest among the source communities, firms, non-profit entities and governments create challenges or provide opportunities for strengthening the ‘commons’?

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The structures and questions of the IAD framework for knowledge commons are reproduced below with preliminary responses (in italics) on how TMK and bioprospecting relate to the framework.8

Knowledge Commons Framework and Representative Research Questions:

Background Environment

- What is the background context (legal, cultural, etc.) of this particular commons?
- What is the “default” status of the resources involved in the commons (patented, copyrighted, open, or other)?

Many TMK is considered to be in the ‘public domain’, while inventions that build on TMK may be eligible for patent protection. Some jurisdictions recognize IP-like rights in TMK such as an access and benefit sharing (ABS) frameworks. Some source communities keep their TMK secret or put conditions on outsiders accessing their TMK. There are many reports of communities that practice a culture of open-sharing as well.

Attributes

Resources

- What resources are pooled and how are they created or obtained?
- What are the characteristics of the resources? Are they rival or nonrival, tangible or intangible? Is there shared infrastructure?
- What technologies and skills are needed to create, obtain, maintain, and use the resources?

The resources that could be pooled in a TMK commons include TMK, genetic resources and samples, a mix of intangible (TMK) and tangible (biodiversity resources), know-how and technology from modern medicine. In many indigenous peoples and local communities TMK is predominantly developed over many generations and passed from one to another through kinship and apprenticeship relationships between traditional healers and elders to the younger generation. While TMK (defined as know-how) is non-rival and intangible, resources on which it depends may be rival and tangible. This includes, for instance, genetic and biodiversity resources on which TMK relies. Given how TMK is created and obtain, a mix of tacit and expressed knowledge maybe involved in creating, obtaining, maintaining and using TMK and associated resources. In bioprospecting processes and in modern drug discovery, biopharmaceutical technologies and skills are necessary.

Community Members

- Who are the community members and what are their roles?
- What are the degree and nature of openness with respect to each type of community member and the general public?

8 The structure and questions of the IAD framework is an excerpt from Frischmann et. al., supra note 3. The uniform use of the IAD structure and questions is encouraged among scholars working in the area in order to allow for a generalizable set of findings about the workings of knowledge commons.
Members of TMK commons could include traditional healers, community leaders, biopharmaceutical executives, government leaders, researchers, patients among others. Depending on the interests, goals and objectives of the commons, stakeholders could create commons made up of these members. The literature on TMK points to a very diverse set of interests among indigenous peoples and local communities ranging from a philosophy of openness, secrecy and some form of exclusive ownership.

Goals and Objectives

- What are the goals and objectives of the commons and its members, including obstacles or dilemmas to be overcome?
- What are the history and narrative of the commons?

Based on the make up of a commons, some of the goals and objectives would include the saving TMK and associated biodiversity from loss, ensuring the sustainability and increasing the effectiveness of bio-prospecting projects, reducing transaction costs, empowering source communities, regulating access to sacred knowledge, preserving traditional lifestyles, equity and distributive justice

Governance

- What are the relevant action arenas and how do they relate to the goals and objective of the commons and the relationships among various types of participants and with the general public?
- What are the governance mechanisms (e.g., membership rules, resource contribution or extraction standards and requirements, conflict resolution mechanisms, sanctions for rule violation)?
- Who are the decision makers and how are they selected?
- What are the institutions and technological infrastructures that structure and govern decision making?
- What informal norms govern the commons?
- How do non-members interact with the commons? What institutions govern those interactions?
- What legal structures (e.g., intellectual property, subsidies, contract, licensing, tax, antitrust) apply?

TMK commons could be formed locally, nationally or internationally. The world’s biodiversity is concentrated in the Global South while the resources required to use TMK in bioprospecting projects are concentrated in the Global North. As a result, the most effective bioprospecting projects may be undertaken under international TMK commons. Some relationships that could be describe as TMK commons have been formed among source communities themselves, between source communities, governments and private companies. There are also some reports of purely private agreements between biopharmaceutical firms and source communities. These reports offer a glimpse into the wide variety of arrangements that a TMK commons could take and institutional setup regarding membership, resource contributions etc. Source communities, governments, and firms would have internal mechanisms to decide who the leaders of these groups are while other informally arranged stakeholders may have to pick representatives for the particular TMK
commons. The tools that could be used to create and sustain a TMK commons include contracts, IP and IP-like frameworks, informal rules and practices.

Patterns and Outcomes

- What benefits are delivered to members and to others (e.g., innovations and creative output, production, sharing, and dissemination to a broader audience, and social interactions that emerge from the commons)?
- What costs and risks are associated with the commons, including any negative externalities?

The benefits of a TMK commons may include increased innovation in modern drug discovery and the reduction of transaction costs, the conservation of TMK and associated genetic resources including through databases and on the ground conservation work. TMK commons could also have a welfare enhancing outcome for source communities who share profits from modern drug development. On the negative aspect of TMK commons, one can imagine potential anti-competitive effects that some commons may create. If membership in a TMK commons is restricted, such restrictions may amount to violations of anti-trust rules. Knowledge commons in other settings have created similar concerns that should be addressed. Furthermore, the recognition of some form of interest in TMK may limit the ability of outsiders to access the resources thereby affecting innovation in the area. Thus, the static and dynamic efficiency concerns of TMK commons should be a carefully studied.