

Policy Analogs and Creating Lunar Futures

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The Usefulness of Policy Analog

Policy analogs enable the application of insights from familiar domains to new contexts. They reference specific physical, legal, procedural, or economic properties that are shared between the source and target domains. Policy analogs deeply influence our thinking about international collaboration, regulation, and governance, and allow us to learn by appealing to case studies of what has already been done.

Analog has been a particularly valuable tool in thinking about governance of new domains such as space. However, an over-reliance on specific analogs, such as the high seas or the commons, can “over fit” the domain, and create intellectual blinders that prevent new ideas from being explored.

The benefits of policy analogs depend as much on identifying their limitations as on similarities. Utilizing a diversity of analogs can mitigate shortcomings while helping to make space for sorely needed innovation and new approaches to uncharted domains.

Space-Specific Policy Analog

Analogized features may be physical or otherwise inherent; while other times they are a function of legislative or governance decisions. In the Outer Space Treaty, access and non-appropriation are both governance decisions, not physical features, but they inform what analogies apply. Governance itself is by design, but analogizing the implications of governance choices design can be helpful.

In addition to fit, it is important to think about scope. “Space” is not one place, and treating it as such doesn’t do justice to the myriad resources it contains and the different legal, political, or economic mechanisms those specific resources may suggest. Clearly Earth orbit has different properties to the surfaces of celestial bodies. At another level of detail, the presence of scarce resources on these celestial bodies, such as minerals, water, illuminated areas, or radio quiet zones, as well as different types of public and private goods, each warrant different treatment, with their own institutional, risk, and financing strategies.

Rather than think of analogs as objective comparisons, we can highlight the choices being made regarding what to compare and what to prioritize in each comparison. For example, when we analogize with Antarctica, we are making certain assumptions that space will operate according to a model that does not involve commercial activity or traditional notions of sovereignty. Whether those things are true or not, is a choice.

Limitations and Challenges of Analogs

Poor Fit

When the similarities between a source and target domain are minor compared to the differences, the ability to infer expected dynamics in the target domain may be limited. Poor analogies may be misleading during problem formulation and identification of stakeholder interests.

Continuation of past mistakes

Analogs are not necessarily prescriptions. They may also be indicators of what not to do, lest we repeat the mistakes of the past. Not only is the similarity between two domains important for positive lessons, but it might highlight the kinds of problems we expect to arise.

Sociopolitical overfitting

The interests of stakeholders with specific goals or values can outweigh evidence for what is or isn't working. Shifts in power among actors can bring with them shifts in what analogs are relied on. This can be controlled for with mechanisms such as academic-style review mechanisms, or by making explicit the goals of any given choice of analog along with its use.

Obfuscation of unique features

Features that cannot be captured by any known analog may cause important factors to go overlooked, under-represented, or misunderstood. Focusing on differences from the analogy may help; for example, in space, an object does not come to a stop after halting acceleration. Analogies to ocean rules should be careful not to hinge on such expected behaviour.

Diversity as an Important Functional Value

“All models are wrong, but some are useful.” With each new analog, our possibilities for understanding and reacting to the world are expanded, like blind people able to touch the different parts of an elephant to understand its many aspects.

Where a narrow understanding becomes robust is in the diversity of models that are used. Boating fails to analogize space’s three-dimensional structure, but may be relevant in developing rover regulations. If the three-dimensional nature of space needed specific analysis, one could choose to focus solely on submersible vehicles. Given their history, these may hold lessons on military uses of space vehicles, but are unlikely to hold lessons on resource extraction in the way that fishing analogies might.

This is similar to the value that is added to an organization by enlisting workers from a diverse pool of backgrounds. Each brings a unique history, set of lessons and niches. Through analysis of difference, one can experimentally or experientially come to a better understanding of how and why aspects from one domain transfer to the other.

Analog Examples

Examples of Analogous Domains, Treatments or Metaphors for Lunar Policy Inspiration

<u>Policy Analog</u>	<u>Similarities to Outer Space</u>	<u>Potential implications</u>	<u>Differences & Challenges</u>
Antarctica	Non-appropriation . Remote. Harsh conditions.	Territorial jurisdiction without sovereignty. State management. No resource extraction. Emphasis on science.	Private access. Resource extraction.
High Seas	Non appropriation. res communis.	Obligations of ships and crews, craft registration, and flag-state jurisdictional rules.	Land vs water. Non-coastal seabed has been declared “common heritage of mankind,” while outer space “province of mankind.”

Examples of Analogous Domains, Treatments or Metaphors for Lunar Policy Inspiration (Cont.)

<u>Policy Analog</u>	<u>Similarities to Outer Space</u>	<u>Potential implications</u>	<u>Differences & Challenges</u>
National Parks	Unsettled territory. Shared access. Public value.	Governance regime. Public access. Preservation.	Cost of access. In situ resource utilization.
The Commons	Shared resource of value.	Collective management. One party one vote. Even distribution of access rights.	Space is not a single resource. Not all resources are subtractable, and some are excludable..
International Airspace	3D travel of vessels. Liftoff and landing similarities	Air/Space ports and traffic control.	Orbital dynamics
The Frontier	The Unknown. Exploration.	Heroism, romance.	Private property. Agriculture. Prior inhabitants.
Transcontinental Railroad Development	Importance of Infrastructure	Government incentives for private investment.	Risk profile, uncertainty, relative maturity of services.
Alaska Purchase & Dividend Model	Uncertain resource value. High upfront cost of exploration.	Property rights independent of fee-simple ownership.	Defining beneficiaries and ratios.
US Mining Law	Opening up of resources/land for development	Dropped barriers can make a "gold rush" stampede	"Asteroid rush" won't be trampling native peoples/lands

Drawing New Policy Analog

Let us say that we are considering a land use zoning program for the Moon. We know that people on Earth often categorize land into zones which designate different usage patterns. To guide the selection and analysis of analogs, we can be explicit about what qualities we're looking to generate with this analysis, such as access or plurality.

There are many factors that do not translate between land-use on Earth and the Moon, so it is worth keeping in mind properties such as the lack of prior peoples or habitats, the lunar environment being lethal, and that the nature of land use or industrial machinery may be different on the Moon. Importing lessons learned from terrestrial zoning should not assume the ability for residents to do things like walk outside at any time. Multiple axes of comparison yield more results, and may even be rooted in named values.

Of course, if our concern wasn't about land utility but morale and local culture impact, or if our goals were financial instead of, say, scientific, an analysis even of the same analogies around zoning and land management would have wildly different results.

Conclusion

Analog is a valuable resource, but they are never perfect. Users of analogs can be principled in their use by drawing from a diverse pool, and being explicit about the axes along which the domains are being compared, as well as relevant differences and limitations. Not only can this help with accuracy, but it can make space for new approaches to governance and coordination where no known analogs exist.

Reading List

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