

Pluriversal Technologies: Innovation Inspired by Indigenous Worldviews

Written by Martin Calisto Friant, Paola Velasco-Herrejón and Thomas Bauwens

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<https://www.e-ir.info/2023/12/12/pluriversal-technologies-innovation-inspired-by-indigenous-worldviews/>

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Modern and Western approaches to science, technology, and innovation have often seen Indigenous forms of production as inefficient, unsustainable, and ultimately inferior (Power 2018). Under the paradigm of modernity, Indigenous cultures are pressured to move away from their traditional practices for enjoying the benefits of a society of mass production and consumption (Fisher and Freudenburg 2001). A single form of understanding progress and sustainability is thus imposed and is framed by consumerism, materialism, individualism, and the liberal ethos of free markets, private property, and capitalist labour relations (Querejazu 2016). This modernist worldview sees rational scientific knowledge as the ultimate avenue to bring about sustainability through new technologies and innovations, such as renewable energy production, electric mobility, and modern recycling techniques (Redclift 2005). This is also reflected in the routes to solve current global problems. The current climate breakdown and biodiversity collapse are herein remediated by innovations, including circular economy, eco-design, biotechnology, automation, artificial intelligence, nanotechnology, geoengineering, robotics, and digitalisation – all of which would result in a new era of “green growth”; even bringing about a “third” or “fourth” industrial revolution (Rifkin 2013; Sachs et al. 2019).

This vision of progress has received many criticisms for being colonial, socially unjust, ethnocentric, and anthropocentric, and could thus ultimately bring about more socio-ecological harms than benefits (Escobar 2018; Latouche 2009; Kothari et al. 2019; D'Alisa, Demaria, and Kallis 2014). Indeed, this single, monolithic vision is based on (1) the ethnocentric idea that modern Western culture is superior to all other cultures, (2) the anthropocentric idea that humans are superior to nature, and (3) the productivist idea that technological innovation and economic growth can address the present socio-ecological crisis. This ideology has justified the exploitation of human and more-than-human ecosystems and communities throughout the world for the benefit of a handful of people and corporations (Marín-Beltrán et al. 2022). Also, it has perpetuated the illusion that we might be able to decouple economic growth from environmental degradation, despite more than 50 years of evidence indicating the impossibility of adequately addressing the ongoing crises of climate breakdown and biodiversity collapse while expanding global economic growth (Haberl et al. 2020; Wiedenhofer et al. 2020; Hickel and Kallis 2019).

This article will first unpack and explore the limitations of the aforementioned modernist approach to sustainability and technology. It will then propose the idea of pluriversal technologies as an alternative inspired by indigenous worldviews and explore their implementation in a case study. Pluriversal Technologies are defined as “technologies that embrace ontological and epistemological diversity by being co-designed, co-produced and co-owned by the inhabitants of the socio-cultural territory in which they are embedded” (Velasco-Herrejón, Bauwens, and Calisto Friant 2022, p11). Through pluriversal technologies, we can think about innovations and technologies in a completely different manner, enabling us to co-create a much-needed socio-ecological transition with technologies that actually improve socio-ecological well-being. This article thus helps us reconcile our need for certain technologies for addressing the present socio-ecological crisis with a different worldview on how to design, produce, and use these technologies so they may meet the needs of all humanity within the biophysical boundaries of the Earth.

Modernity and Coloniality

For over five centuries, the idea of modernity spread throughout the world, imposing Western culture and technology

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as the ultimate pinnacle of humankind (Escobar 2014). This has resulted in the historical destruction and continued devaluation of different Indigenous cultures and pluriversal forms of seeing and understanding the world (Brand et al. 2021). It has translated into outright oppression and exploitation, especially when the worldviews, ideas, and practices of Indigenous peoples were at odds with the interests and objectives of modernity (Fressoz and Bonneuil 2016). Extractive projects such as mines and monocultures have hence expanded into the Global South, devastating human and natural ecosystems to provide natural resources for colonial and neocolonial powers (Marín-Beltrán et al. 2022; Wiedmann et al. 2020). Parts of the world have thus become resource extraction and waste disposal frontiers – “sacrifice zones” – that provide raw materials for the Global North, as well as waste disposal sites away from wealthy consumption centres (Martinez-Alier 2021a). Such a system, often termed the “imperial mode of living,” has remained from times of colonisation until today, exemplified by the fact that minerals needed for the “energy transition” are still displacing communities and ecosystems in the Global South (Brand 2022).

The same is true for many so-called “sustainable development” projects, with apparent good intentions. For instance, modernist conservation efforts in the Global South have expropriated traditional lands from Indigenous peoples, whose practices were seen as unsustainable. Yet, Indigenous people are vital symbiotic components of these ecosystems and play a crucial role in protecting biodiversity and regenerating natural cycles (Watson 2019).

Similarly, renewable energy production infrastructures, such as hydroelectric dams, wind farms, and photovoltaic power stations, have often been imposed on natural ecosystems without regard for their human and more-than-human inhabitants (Fressoz and Bonneuil 2016). Because of this, they devastated natural habitats, displaced Indigenous people from their traditional lands, and destroyed their livelihoods and means of subsistence. The construction of dams, for example, has often led to the privatisation of communal territories and the flooding, or destruction, of large forest areas. Additionally, they lead to the interruption of vital water cycles that connect ecosystems and bring essential nutrients to riverine communities (Fletcher 2012; Sullivan 2017). The potential climate benefits of hydroelectric energy production are thus obtained at the costs of incalculable impacts on biodiversity and local livelihoods, while also releasing significant amounts of greenhouse gases due to forest flooding, deforestation, and infrastructural construction.

Moreover, these projects often fail to bring meaningful economic opportunities as they typically neglect local people or only include them as temporary unskilled workers during the construction phase (Velasco-Herrejón and Bauwens 2020). These top-down processes, therefore, renew historical processes of colonialism by disregarding traditional communal land-tenure and relationships to the ecosystem as well as the local skills and work relations. For instance, the arrival of wind energy dependents in Southern Mexico led to the privatisation and commodification of Indigenous territories, as well as the disregard for traditional forms of governance. This led to rising inequalities and a breakdown of social bonds and relations. The wind energy developments in Southern Mexico also reproduced colonial distributions of labour, in which permanent employees of Spanish descent arrived in the territory to supervise the work. The most difficult tasks were left to Indigenous people with precarious temporary contracts. Naturally, this further increased the inequalities, enhancing social upheaval brought about by the commodification of Indigenous lands, and exacerbating social conflicts and tensions within and between Indigenous communities and wind energy developers (Velasco-Herrejón, Bauwens, and Calisto Friant 2022). This process has also been labelled “energy colonialism”, as Indigenous territories have become a preferred location for energy mega-projects; putting Indigenous communities at greater risk of land expropriation, cultural assimilation, and labour exploitation (Batel and Devine-Wright 2017).

The Need for Pluriversal Technologies

The above examples are but a fraction of the countless stories of neocolonial dispossession that result from the exploitation of human and more-than-human nature resulting from the Western modernist perspective (Martinez-Alier 2021b; Hickel 2021). Additionally, we also face a monumental socio-ecological crisis due to the ongoing climate breakdown and biodiversity collapse, emphasised through the overshoot of six out of nine essential planetary boundaries (e.g. freshwater use, nitrogen and phosphorus cycles, chemical pollutants, and land-system change) (Richardson et al. 2023). All this happens while around 40% of humanity remains in poverty and cannot meet basic needs such as access to water, sanitation, housing, education, and healthcare (World Bank 2022; O'Neill et al.

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2018).

Considering the scale and gravity of the present socio-ecological crisis and the many negative socio-ecological impacts of “green technologies”, it is imperative to find an alternative approach to technology that addresses our ecological overshoot while meeting the needs and aspirations of the most vulnerable. We propose the idea of pluriversal technologies as an alternative approach, which might reconcile these imperatives by bringing together Indigenous worldviews and modern technologies in a transformative dialogue.

The concept of pluriversal technologies, as defined in the introduction, combines two main concepts from fundamentally different worldviews: the Indigenous notion of the pluriverse and the modern idea of technology. The concept of the pluriverse is best described by this quote from Kothari et al. (2019):

A ‘pluriverse’: a world where many worlds fit, as the Zapatistas of Chiapas put it. All people’s worlds should co-exist with dignity and peace without being subjected to diminishment, exploitation and misery. A pluriversal world overcomes patriarchal attitudes, racism, casteism, and other forms of discrimination. Here, people re-learn what it means to be a humble part of ‘nature’, leaving behind narrow anthropocentric notions of progress based on economic growth.

Technology is defined by the Oxford Reference dictionary as:

The application of knowledge to facilitate the obtaining and transformation of natural materials. Technology involves the creation of material instruments (such as machines) used in human interactions with nature

The core idea behind Pluriversal Technologies is thus to take inspiration from Indigenous worldviews and apply these principles to modern technology, especially the type of tools and infrastructures needed to provide for the needs of humanity within the biophysical boundaries of the Earth.

The concept of pluriversal technologies draws inspiration from the idea of convivial tools by Ivan Illich (1973), the notion of appropriate or intermediate technologies by Schumacher (1973), the concept of pluriversal design by Escobar (2018) as well as the call for pluriversalizing technology recently made by Escobar, Osterweil, and Sharma (2023). Moreover, the idea of pluriversal technologies builds on previous research on grassroots innovations (Maldonado-Villalpando and Paneque-Gálvez 2022), decolonial innovation (Jimenez et al. 2022), and responsible research and innovation (Pansera et al. 2020; Pandey et al. 2020).

We still need electricity, sanitation, hospitals, schools, universities, water provision, internet access, decent housing, and many other basic needs that entail the use of modern technologies. However, we must learn how to provide these needs to all humanity in a completely different manner. A manner that is fair, sustainable, and resilient, and that safeguards and maintains the Earth’s vital cycles while respecting its boundaries. Indigenous worldviews can help us address this challenge by allowing us to transform how we understand, use, share, design, and create vital technologies and infrastructures.

The Components of Pluriversal Technologies

The concept of pluriversal technologies has three core components: co-design, co-production, and co-ownership. Firstly, co-design entails design practices where all human and more-than-human forms of knowledge are considered equal and are democratically combined for the purpose of improving socio-ecological well-being and harmony. Knowledge from plants, animals, mountains, rivers, spirits, dreams, psychedelic hallucinations, and Western forms of rationality are thus equally and openly included in the design process. Moreover, co-design entails focusing on the needs and interests of the entire community, especially the most vulnerable people (such as women, children, elderly, disabled etc.) while respecting the natural cycles and boundaries of the Earth. Finally, co-design emphasises using low-tech innovations and modular, repairable, upgradeable, and durable goods and infrastructures made with locally sourced resources. All in all, it is about designing in deep relationships and respect for ecosystems, local communities, and their members.

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Secondly, co-production is about decentralised production processes that preserve and enhance local sociocultural practices and ecosystems. It entails ensuring that technologies can be built, operated, and maintained locally and autonomously by local people who should have the necessary skills, tools, and knowledge to do so. Moreover, it entails that spare parts and other essential components are produced locally as much as possible. To achieve these objectives, co-production requires a focus on producing low-tech goods and infrastructures that are easy to repair, refurbish, repurpose, remanufacture, and recycle. Moreover, co-production focuses on collaborative production practices that include humans and more-than-humans in a collective effort. Creation thus becomes a harmonious process of working together for a shared socio-ecological purpose. In addition, co-production prioritises self-sufficiency in the provision of basic needs such as housing, energy, water, shelter, and food. In doing so, it also focuses on providing for the unmet needs of the most vulnerable people. Co-production includes, for example, community festivals to repair communal irrigation networks of forest gardens. This way, their role in feeding humans is revitalised while providing habitats for more-than-human life.

Thirdly, co-ownership refers to the reconceptualization of the property of technologies, allowing for communal control and collective governance. It is about making inclusive democratic decision-making structures that integrate the voices of all affected human and more-than-human actors, especially the most vulnerable and discriminated groups. Such inclusiveness and democracy fosters a fair distribution of costs and benefits, as well as a care for the well-being of humans and more-than-humans in creating, using, and managing technologies. Mother Nature is thereby recognised as a direct holder of rights who must be respected and protected in the same way that vulnerable people and discriminated populations must be respected and protected. A form of governance that includes the above principles is the democratic decision-making process of the Iroquois nation, which requires that any action results in a sustainable world seven generations into the future.

Co-ownership also entails that all knowledge and technologies are open-source and open-access and that no one can privately own land, infrastructures, natural resources, tools, and other means of production. Innovations, technologies, and natural and human infrastructures can thus not be privatised, patented, or commodified. Pluriversal technologies are thus based on social and solidarity economies where the means of production are communally owned and democratically controlled to serve socio-ecological purposes, rather than economic growth and private profit.

An Example of Pluriversal Technologies

To exemplify what pluriversal technologies entail, we will showcase a case study from the Ashuar people of the Ecuadorian Amazon. East of the Ecuadorian Andes flows the Pastaza River, carrying waters from snow-capped mountaintops to the lush, colourful, and plentiful Amazon rainforest. There live the Achuar people, who have called this ecosystem home for millennia and developed a unique culture in harmony with the natural cycles of life. One of the major problems encountered by the Ashuar people is the encroachment on their traditional ecosystems and the destruction of their habitats through modernist projects. This destruction often begins with the construction of roads, which open the door for agricultural expansion and mining exploitation. Ashuar people much prefer using canoes for transport as they do not require the destruction of biodiversity and, while slower, it is a mode of transportation much better adapted to the web of rivers that crisscross their territory (Vila-Viñas, Crespo, and Martens 2020).

Nevertheless, they face a problematic dependence on fossil fuels for the engines of their motor canoes. They also lack access to electricity as they often live way beyond the access of the Ecuadorian energy grid. To remediate both problems, Ashuar people worked with international NGOs and engineers to create a solar-powered canoe along with a network of solar centres, providing energy to local communities while serving as charging stations for solar canoes (Vila-Viñas, Crespo, and Martens 2020).

There are now three solar boats, providing a sustainable transport system for nine communities along 67km of river, benefiting about 1200 people. The boats have six to eight hours of autonomy and can carry 20 people at speeds up to 14 km/h. The boats were co-designed by Ashuar people in collaboration with engineers from the Global North. They combine modern technologies, such as solar panels and electric engines, with traditional Ashuar designs for the structure of the canoe. In fact, computer modelling showed that the Ashuar boat design had greater speed and

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manoeuvrability compared to modern counterparts. The local community co-produced the boats, building all structural components locally. While some parts, like the solar panels and the electric engine, had to be imported, the community wrote repair and maintenance manuals to ensure their durability. The boats and solar centres are all co-owned by the local communities, which share the benefits and democratically decide how to use and share the resources based on bottom-up participatory processes. Moreover, all patents and designs are entirely open-source, so this technology can be freely shared with other Indigenous communities worldwide (Vila-Viñas, Crespo, and Martens 2020).

Solar canoes of the Kara Solar project provide an alternative to roads and their high impact on Amazon ecosystems. They ultimately seek to ensure energy, transport, and economic sovereignty for the Ashuar people. By combining Indigenous worldviews and modern technology, they are a great example of pluriversal technologies, evidently co-designed, co-produced, and co-owned by the inhabitants of the socio-cultural territory in which they are embedded. Nevertheless, there are still many challenges for this project to reach all the aspirations of pluriversal technologies, especially due to the fact that some components – like solar panels and electric engines – are produced by modernist corporations far from their communities, leading to unmitigated socio-ecological impacts and a lack of full sovereignty on their innovation. Pluriversal technologies can best be seen as an ideal that should be sought as much as possible in each context while always keeping sight of its core transformative principles.

Conclusion

This article presented the incalculable socio-ecological impacts caused by modernist approaches to technological innovation and sustainable development (including persistent poverty, discrimination, inequality, and the overshoot of planetary boundaries). It then proposed the concept of pluriversal technologies as an alternative approach to technological change, which draws on sustainable approaches from Indigenous worldviews to help overcome the major socio-ecological challenges brought by modernisation. Paraphrasing the famous words of Albert Einstein might be applicable here: we may not solve the problems modernity caused with the same form of thinking we used when we created them.

Pluriversal technologies could be key in ensuring that the technologies needed to address the multiple crises of the 21st century are designed and implemented from a worldview that allows for the flourishing of all forms of life. As Escobar, Osterweil, and Sharma (2023) rightly emphasise: “returning technology to being part of Life by placing it at the service of multiple ways of worlding, rather than leaving it in its dominating instance, is a clearer imperative today than ever before”.

The concept of pluriversal technologies does not reject all aspects of modernity, but rather places it as another worldview amongst many others. As such, it rejects modernity’s homogenising force and ethnocentric and anthropocentric features. Pluriversal technologies are about putting modernity in equal dialogue with a plurality of other human and non-human cultures and forms of life. This dialogue allows us to use modern tools and technologies in entirely different ways and share them in harmonious manners. Yet, some modern technologies might be fundamentally incompatible with a pluriverse, such as genetically modified organisms, geoengineering, and artificial pesticides. We need further discussion about these technologies from a pluriversal perspective to better understand their potential impact on the web of life. We highly encourage future thinking on the topic, especially future research and application of pluriversal technologies to help us rethink our approach to science, technologies, and infrastructures; and re-examine the transformations we may create for the much-needed socio-ecological transition. This article is therefore best seen as an initial call to embrace Indigenous worldviews in helping us transform our relationship to technology, society, sustainability, and life altogether. It is an urgent call, now more than ever.

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