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Civic ecosystems and social innovation: From collaboration to complementarity

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Abstract
This article introduces civic ecosystems as a concept and set of practical approaches to social innovation. It draws on several examples of civic ecosystems in action to highlight their main characteristics and to provide insights and lessons for applying ecosystem approaches to social innovation in practice. The discussion of civic ecosystems is placed in the broader context of the rise of ecosystem thinking among social change practitioners, researchers, technologists and funders. The article argues for a paradigm shift in social innovation from networks as vehicles for collaboration to ecosystems as catalysts for complementarity.

1 | SELF-ORGANIZING, INFORMAL, ORGANIC: A DISTINCTIVE LOGIC OF SOCIAL INNOVATION

As soon as news of the Taliban takeover of Kabul in August 2021 reached the neighbourhood of Dasht-e-Barchi, women activists in the area prepared to flee. An outspoken activist and organizer from the Hazara community—we can call her Hamida—reached out to other Afghan women and international connections through WhatsApp while her husband and daughter quickly packed the family's documents and valuables.

A woman based in the United States, whom Hamida did not know, contacted her with instructions. She was in touch with NATO personnel and U.S. marines and had managed to put Hamida's family on the list at the East gate of Kabul airport: 'When you get to the gate, wave your scarf and shout your name'. It took the family several hours to get to the airport, but the crowds prevented them from reaching the gate and they returned home.

The next day, they were told to go to the Serena Hotel. Someone had managed to put them on a list for buses to take people directly into Kabul airport. To manifest them on the plane, someone else contacted Hamida on WhatsApp asking for pictures of their passports and about why they were at risk. After getting biometric scans and having their documents verified, the family boarded a private charter plane organized by a non-profit for Tirana, Albania.

Once there, the family waited several weeks to see if they could get a P2 visa, a new part of the U.S. Refugee Admissions Program established for Afghans. However, that system proved to be dysfunctional and eventually, Hamida secured a university fellowship and J1 visa through another contact in the US. Several months after leaving Kabul, the family arrived safely in Pittsburgh and started to rebuild their lives.

In just 2 weeks that summer, more than 100,000 Afghans were evacuated from Kabul airport alone. Thousands more were airlifted with charter flights from other airports or used land routes to get to Iran and Pakistan. President Biden said that the United States had carried out the largest and most successful airlift in history. As Hamida's example demonstrates, however, countless civic-minded people around the world mobilized; and it was their collective and largely uncoordinated efforts that made the evacuations possible.

Hamida's evacuation alone required people working around the clock in the United States as well as Albania, Britain, Pakistan, the United Arab Emirates and beyond. Some liaised between the evacuees and the U.S. forces on the ground. Others worked with foundations, philanthropists and the Afghan diaspora to secure the funds and documentation required for

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travel, accommodation and legal assistance. Still, others leveraged their contacts in governments and organizations to create legal pathways for resettlement and employment opportunities like Hamida's fellowship. U.S. marines and NATO soldiers played a key role in the Kabul airlift; however, they were only one component of a larger system that self-organized and carried out the overall effort.

This is an example of what we call 'civic ecosystems': self-organizing systems of diverse and interdependent social actors held together by shared civic values. In the case of the Afghanistan evacuations, a civic ecosystem emerged from the efforts of women and men in different parts of the world trying to get to safety Afghan women like Hamida; academics and athletes helping to evacuate Afghan researchers at-risk and girls' sports teams; U.S. veterans scrambling to secure a safe exit for interpreters and colleagues in the Afghan armed forces and to assist the efforts of others, to name just a few.

Hamida's story draws attention to a distinctive logic of social innovation that emerges organically in response to pressing social problems but can be easily missed. Telling the story of the evacuations by focusing on the role of civil society, governments and militaries or the private sector misses the extent to which the overall effort depended on people, capabilities and resources across all three sectors. Telling the story through the lens of networks brings into focus the connectivity and collaboration between key nodes such as U.S. forces and veterans, for example. However, that lens misses how specific networks operated in a broader system that lacked overall coordination; individual actors coordinated directly with other actors, at particular points and on particular issues as the need arose. In other words, the story is less about collaboration and coordination and more about complementarity.

Historians of social change and innovation have drawn attention to these often missing parts of the innovation story. In his book *Extra Life: A Short History of Living Longer*, Steven Johnson provides a corrective to our understanding of scientific innovations such as vaccines or antibiotics that helped to double life expectancy over the last century. He shows that the success of major medical breakthroughs that changed the course of history depended on a wider system of actors and approaches that amplified and advocated for, circulated and funded the original breakthrough and drove implementation: 'For an idea to transform a society, the institutions and agents who transmit the idea are in many ways as critical as the original minds that conceived the idea' (Johnson, 2021, p. 47). These forces of change in society are often overlooked in accounts of human progress. Yet without the efforts of 'activists and reformers and evangelists, many life-saving ideas would have languished in research labs or been resisted by the general public' (ibid, p. 51).

An ecosystems lens brings out these often invisible but indispensable complementarities and offers new approaches and strategies to catalyse social innovation. This is why more and more nonprofits, governments and businesses are embracing ecosystem thinking.

2 | THE RISE OF ECOSYSTEM THINKING

If networks were the buzzword of the early 21st century, we are now at the tipping point of another paradigm of social innovation that builds on metaphors and insights from ecology. Centred on the notion of ecosystems, this new way of thinking is rapidly penetrating the private, public and non-profit sectors. It seeks to foster social change by unlocking the potential of different types of social actors, different logics of action and crucially, different theories of change that complement and reinforce each other largely organically. As Paul Bloom and Gregory Dees point out, creating far-reaching social change depends on social actors understanding and altering the system that sustains the problems they are tackling in the first place: 'This social system includes all of the actors—the friends, foes, competitors, and even the innocent bystanders—party to the problem, as well as the larger environment—the laws, policies, social norms, demographic trends, and cultural institutions—within which actors play' (Bloom & Dees, 2008, p. 47).

This kind of thinking is well-established in technology and innovation management, where researchers and practitioners are working with concepts such as knowledge ecosystems, innovation ecosystems and entrepreneurial and business ecosystems. The technology sector, for example, has focused on innovation in digital platform-based ecosystems (Helfat & Raubitschek, 2018). Funders in the technology space are also increasingly turning to ecosystem thinking to fill critical gaps in Public Interest Technology (PIT) and create more equitable innovation ecosystems that cut across physical, social and digital assets (Knight & Maher, 2022).

The work of Carlos Saavedra and Paul Engler at the Ayni Institute on Social Movement Ecology (SME) has been influential in civil society. The popular Momentum Planning program, which coaches activists on movement-building, uses the concept to show why an individual organization does not have 'to do it all', highlighting how each approach to social change fits in the ecosystem of movement groups. Funders are also using SME to develop ecosystem approaches to philanthropy that defuse conflict, fill critical gaps and sequence investments in ways that prepare different parts of the ecosystem to engage in the broader movement at the right time (Cockburn, 2018).

In the public sector, ecosystem thinking is influencing the planning and design of Open Government Data (OGD) programs. Traditionally viewed as 'one-way streets' for information clearing, OGD programs are increasingly seen as ecosystems with cycles of feedback between data users and suppliers (Dawes et al., 2016). In the public policy arena, an ecosystem approach is implicit in the work of some of the mega-funders. For example, the Charles Koch Foundation provides small targeted investments to hundreds of grantees across universities, the business world, community-based organizations, local state institutions, media, policy institutes and think tanks. Their strategy involves sustained investment in the infrastructure of ideas, supporting a diverse set of groups across the political spectrum. Research has shown that by going well-beyond traditional political and lobbying structures, that strategy has been able to reshape agendas, practices and ideas in American politics (Hertel-Fernandez et al., 2018).

The concept of civic ecosystems reflects this shift in thinking about pathways to innovation in the new ecology of social change. Like network approaches, ecosystem approaches draw attention to the role of self-organization and informality in fostering social innovation. In some respects, ecosystems are similar to networks. Both social networks and natural ecosystems, for example, are complex adaptive systems that self-organize and emerge organically (Lansing, 2003). They are 'complex' in that the interactions between the components of the system, and between the system and its environment, are dynamic. They are 'adaptive' in that they have the capacity to change and learn from experience. How complex adaptive systems behave cannot be predicted simply from the behaviour of their components. Small changes can have dramatic effects. This is illustrated with the 'butterfly effect', the idea that a butterfly flapping its wings may end up triggering a hurricane.

In other ways, however, ecosystems are quite different from networks. As patterns of social relations and vehicles for social change, they have distinctive logics. The network logic is connection and communication. Networks are measured by the density of 'ties' between the actors or 'nodes' and the flows of information and communication; these flows create the network. The ecosystem logic is diversity and interdependence. Ecosystems are defined by the range of different types of actors and the pathways through which they affect, enable or constrain each other; the pathways constitute the ecosystem. Or to put it another way, networks are about relationships and ecosystems are about dependencies.

These distinctive logics have practical implications, making networks and ecosystems different kinds of vehicles for innovation and change. Network forms of communication and exchange have been described as a third mode of coordinating collective action alongside hierarchies and markets (Powell, 1990). Networks are good at diffusing information and fostering collaboration, which has prompted calls to address a host of global problems by creating and designing networks (Slaughter, 2017). Ecosystems, on the other hand, are good at fostering complementarity. They encourage specialization and division of labour, whereby different actors perform different functions important for the well-being and impact of the entire system. Complementarity can emerge from accommodation and symbiosis but also competition. Individual actors in the ecosystem may be driven by competing logics of action or theories of change—principle vs pragmatism, top-down vs bottom-up, institutional change vs personal transformation—but collectively, they may be complementary. At the ecosystem level, they may be competing for resources but their approaches may be mutually reinforcing.

Civic networks have been described as webs of collaborative ties between participatory associations acting on behalf of public and collective interests (Baldassari & Diani, 2007). They are one component of civic ecosystems, which can be described as pathways of complementarity between diverse social actors driven by shared concerns for the public interest.

3 | FROM COLLABORATION TO COMPLEMENTARITY: CIVIC ECOSYSTEMS IN ACTION

Our interest in ecosystem thinking emerged from engaging and working with civic actors in some of the world's most difficult places over the past two decades. The big takeaway that crystallized over time was that the success of civic actors in tackling complex and seemingly intractable problems often hinged on their ability to understand and harness the broader systems they were part of, and dependent upon.

After the end of the wars in the Balkans, we started working with civil society groups there who found themselves in a new situation. Whereas in the previous decade, their efforts had focused on documenting and reporting human rights abuses committed in Bosnia, Croatia and Kosovo, the question now was how to use the documentation and evidence already gathered to bring justice to victims. Several challenges emerged.

One was about the documentation itself. Mapping the landscape revealed that the records were scattered across a wide range of actors inside and outside the region. Most of the documentation was available in hard copy and had been collected for reporting and publicizing violations. That meant that it could not be easily accessed and used to support criminal prosecutions and reparations cases.

The answer emerging from the mapping was a combination of aggregation and digitization of the records. However, no individual actor or network had the capacity to carry out this enormous task on their own. That led to rethinking the role of key actors with access to documentation with a focus on their complementarities, especially local civil society groups and technologists, and the International Criminal Tribunal for the Former Yugoslavia (ICTY), the largest repository of records and video testimony.

Several innovations emerged as a result. One was the development of new methodologies for documenting human rights violations and digital archiving that made the records easier to use in justice processes. Particularly important were digital databases that coded, analysed and integrated different kinds of records to make them easily accessible and searchable. These innovations helped to make documentation an instrument of justice in the Balkans. Since then, some of them have been scaled up and replicated in other parts of the world. The pioneering work of activists and technologists in the Balkans is the backbone of knowledge-transfer and capacity-building efforts in conflict-affected countries including Colombia, Iraq and Sudan and plays an important role in platforms such as the Global Initiative for Justice, Truth and Reconciliation (GITR).

The other challenge was how to use the documentation effectively. State institutions in the Balkans were fragile and often uncooperative, but they were not monolithic. Activists undertook a sustained effort to identify civic-minded judges and prosecutors and sympathetic officials in the public administration, embassies and international organizations. Strategic litigation was used to identify openings in the judiciary and an innovative approach to justice was developed to harness these openings, whereby NGOs secured witness testimony and represented victims in civil and criminal cases.

What emerged in the Balkans was a civic ecosystem of judicial and non-judicial actors that pioneered a set of important innovations, including the creation of special War Crime Chambers and Prosecutor's Offices that became a focal point in the region and provided a model for other post-conflict societies.

Finally, there was also the challenge of resources. Intellectual resources, ideas as well as financial resources and technical support that were not available locally were often available elsewhere. In the Americas, for example, researchers and practitioners were drawing lessons from the post-junta trials and truth commissions in the region. Elsewhere, technologists and activists were creating new tools and initiatives such as the Human Rights Data Analysis Group. The UN was distilling global best practice in transitional justice, and funders started investing more systematically in documentation as a catalyst for justice.

In other words, the resources, ideas and practices that were critical for social innovation in the Balkans were available across wider ecosystems that spanned multiple sectors and geographies. What we learned in the Balkans about the importance of making civic ecosystems visible, understanding their logic and leveraging their power, we have seen again and again in other parts of the world. In the volatile borderlands of Afghanistan and Pakistan, for example, a grassroots initiative using technology to keep young people engaged and safe started from identifying civic-minded business owners, community leaders and officials at the local level, while reaching out to international NGOs and technologists for support.

The initiative involved setting up hubs for young women and men to learn computer skills, connect and share information. It created safe spaces by becoming a focal point for local communities and civic actors, while also reducing the ability of local militias and criminal groups to recruit. It was an experiment in catalysing a civic ecosystem at the local level. Subsequent shifts in the broader environment in Afghanistan, however, weakened these kinds of fragile civic ecosystems and made them unsustainable. Once again, what we saw in Afghanistan was similar to our experience in the Balkans. The success or failure of civic actors was shaped in important ways by the strength and resilience of the ecosystems they were embedded in and dependent upon, and their interaction with the broader environment.

Experiences like these have prompted us to set up the Civic Ecosystems Initiative to create space for researchers, activists and practitioners to engage and produce new kinds of knowledge and to experiment with practical applications. The initiative draws on research, engagement and resourcing strategies and uses methods such as ecosystem mapping and analysis. The goal is to uncover and catalyse emerging and established civic ecosystems in different domains and to ensure they are getting the attention and resources they need to thrive.

These efforts are deepening our understanding of the range of social actors driving innovation in civic ecosystems. They reveal specific patterns of interdependence and pathways through which ideas, practices and resources flow and circulate in the ecosystem. And they highlight the significance of shared civic values and purposes that hold it together. Thereby surfacing the core dimensions of civic ecosystems: diversity, interdependence and civicness.

4 | DIVERSITY

Solving complex social problems depends on the efforts of diverse social actors driven by distinctive logics of action and theories of change, who tackle the issue with different approaches and from different angles to address its various drivers and dimensions.

Steven Johnson emphasizes this point in his account of the most significant advancements in human health over the last century. He highlights the tendency to credit major innovations to a single individual or 'genius', such as Alexander Fleming's discovery of penicillin while neglecting the diverse range of actors and approaches that helped to translate such innovations into lasting social change.[1] He shows how the extraordinary success of vaccination was 'the product of medical science, to be sure, but also activists and public intellectuals and legal reformers. In many ways, mass vaccination was closer to modern breakthroughs like organized labor and universal suffrage; an idea that required social movements and acts of persuasion and new kinds of public institutions to take root' (Johnson, 2021, p. 57).

The key point is about the coming together of the different logic of actions and theories of change that drive the actors within the ecosystem, such as changing dominant institutions, experimenting with new ideas and practices or enabling personal transformation. Individually, they may be seen as alternative or competing approaches. But collectively, they are often mutually supportive and reinforcing. The ecosystem lens helps us understand what these roles and contributions are, and why they are complementary in nature. This is why diversity has intrinsic value in civic ecosystems.

5 | INTERDEPENDENCE

When Hamida tried to find and thank the people involved in getting her family to safety, she realized it was virtually impossible. Her contacts could not tell her who had put her family on the list for evacuation flights, who had secured their seats on the bus from the Serena Hotel, who had liaised with Albanian government officials and private donors for clearance and accommodation in Tirana, or even who had nominated her for the fellowship that secured her U.S. visa. What is striking about the evacuation ecosystem is not so much the number of people involved, but the range of different actors carrying out specific functions, often working beyond their remit and volunteering their time.

In any social system—whether an organization or an entire sector or industry—unlocking positive interdependence is tied to the diversity that obtains in the system. In natural systems, ecologists call this phenomenon 'niche complementarity'—the idea that the differences between species allow them to use resources in complementary ways, thereby enhancing the functioning of the entire ecosystem and increasing the total amount of resources available within the community. Similarly in civic ecosystems, productive forms of complementarity emerge from the diversity of actors, approaches and theories of change that are brought to bear on a specific problem.

As a dimension of civic ecosystems, interdependence draws attention to a distinctive logic of social innovation. Partnerships and coalitions are based on the logic of coordination and collaboration between a set of social actors and require more sustained infrastructure or orchestration; for example, the 'collective impact' model proposed by John Kania and Mark Kramer (2011). By contrast, the ecosystem logic is about organic forms of interdependence, and its value is in fostering complementarity.

6 | CIVICNESS

The third dimension of civic ecosystems is 'civicness' (Kaldor, 2019; Kaldor & Radice, 2022). It implies a shared commitment to norms and values that emphasize the public interest. Civicness ensures that diverse actors, ideas and practices in the ecosystem are pulling in the same direction, holding the ecosystem together. It is also what allows us to determine the boundaries of civic ecosystems.

The boundary question became critical in the Afghan evacuations. Just as the civic ecosystem that helped Hamida was taking shape, an *uncivic* ecosystem was also emerging. Illicit networks took advantage of the desperation of Afghans and preyed on those who wanted to help in good faith. In a highly volatile environment and a very short period of time, documents had to be issued, transportation organized, convoys put together and border crossings facilitated. The challenge was how to tell legitimate security and logistics providers from trafficking networks? How to ensure that the money was reaching the right people and not feeding criminality? The ability to set the boundaries of civic ecosystems depends on making these kinds of distinctions, however difficult they may be in practice.

Civic ecosystems emerge organically in all societies because civicness can be found everywhere. Mary Kaldor distinguishes civicness from civil society and points out that it is a mode of behaviour. It is about the everyday practices of civic-minded doctors, teachers, journalists, activists, public officials or entrepreneurs who go above and beyond to advance the public interest, even at great personal risk. Without civicness, Kaldor emphasizes, people living in difficult places like Syria or the DRC would not be able to survive (Rangelov & Theros, 2022).

Like civicness, civic ecosystems can be found in all kinds of societies but they differ depending on the specific problem they tackle and the constraints and opportunities for civic action in a particular context. In our experience, the fluidity and fragmentation in conflict-affected environments allow for greater civic action than might be expected. Authoritarian and hybrid regimes often rely on and support civic action focused on socioeconomic issues and service delivery, even as they crack down on advocacy for human rights and democracy (Toepler et al., 2020). When the space for civic action at the national level is restricted, the local and transnational dimensions of civic ecosystems may become more important—the role of civic-minded people in local communities, municipalities and businesses or in the diaspora, international institutions and NGOs.

7 | SEE, STRENGTHEN, STEER

Adopting ecosystem thinking requires a cognitive shift. The proliferation of digital technologies has embedded hyperconnectivity in work cultures, shaping how we think about and 'do' social change. The instinct to approach social problems by building networks or setting up partnerships and collaborations for solving them is deeply conditioned. The cognitive shift is about recognizing that our individual and collective efforts to tackle a particular social problem are part of larger ecosystems that shape our chances for success in important ways, and recognizing that, in some respects, our dependencies may be more important than our connections.

Civic ecosystems provide opportunities to develop and apply this kind of thinking in practice. Putting on 'ecosystem glasses' brings into focus the many components of an ecosystem and makes visible the ways in which they interact with each other and the broader environment. Ecosystem mapping is the first step in operationalizing this approach but it is not the same as stakeholder mapping. What we learned in the Balkans early on is that civic ecosystems are problem-specific rather than sectorally or geographically bounded. The entry point for mapping them has to be the issue they tackle.

In the Balkans, mapping the range of actors, approaches and theories of change in the ecosystem revealed the importance of civic-minded judges and prosecutors in national and international courts; highlighted the potential of new types of documentation practices such as digital archiving and databases; and showed how raising awareness in society was as important as affecting change at the institutional level. The mapping clarified the positionality of individual actors in relation to other actors and approaches in the ecosystem and the broader environment. It made visible their ecosystem-level roles and functions and highlighted their interdependencies.

Another lesson from our experience is that mapping can be an ecosystem intervention in its own right. In the Afghanistan evacuations, mapping the ecosystem was an inflection point. It involved creating databases that brought out different segments of the ecosystem by identifying the interests and characteristics of particular actors and the potential paths for different groups at risk. For example, France was more open to people from the arts and creative industries while Canada was more interested in media and women. It revealed that the paths for grassroots activists and civil servants at risk were very limited, effectively identifying gaps that had to be filled. In other words, mapping the pathways of complementarity opened up new pathways.

Civic ecosystems are self-organizing, informal patterns of social relations that emerge organically to address specific social problems. They are difficult to create and control; however, they can be strengthened and steered. Strengthening civic ecosystems is about strengthening one or more of their core dimensions. The goal is to enhance diversity, leverage interdependence and reinforce civicness. What that might involve in practice will depend on the specific ecosystem. Nevertheless, there are several takeaways from our experience.

Resourcing strategies are important but their impact depends on what kinds of resources are mobilized and how they are deployed. Ecosystem resourcing is not just about funding. In many cases, other types of resources may be more important even if some funding may be needed to mobilize them. We have been supporting efforts in the Balkans to create a digital and physical Research and Documentation Center (RDC) about war crimes. The civic ecosystems we first engaged with 20 years ago have evolved and their environment has changed. War crimes trials in the region and the ICTY have generated extensive records with judicially-established facts and a large video archive of witness testimony, which can be used by activists, researchers, artists and others to challenge revisionist narratives, create a memory for the future and ensure non-repetition. The archives and records from the trials are a key resource for all of these actors; making them easily accessible and usable in digital and physical form is a strategy for resourcing the entire ecosystem.

Another lesson is that resourcing, especially funding, can weaken civic ecosystems when it diminishes diversity and civicness. An example is the impact of civil society development after the end of the Cold War, which became a core strategy for peacebuilding and international development. Promoting civic action in conflict-affected and developing countries focused on strengthening civil society while often neglecting the importance of strengthening civicness in the public and private sectors. In fact, civic-minded people in those sectors flocked to civil society because that was the space for 'doing' social innovation and driving change. That altered the nature of civic ecosystems by anchoring them in civil society at the expense of the state and the market. Something similar happened in many post-communist countries, where civicness was concentrated in civil society while the state and the market were captured by an array of *uncivic* actors, ideas and practices.

Moreover, civil society development became synonymous with creating and funding NGOs. The distinctive functions and contributions of social movements, trade unions, community organizations, independent media and other parts of civil society were marginalized. With hindsight, we can see how the 'NGO-ization' of civil society backfired. Authoritarian and hybrid regimes around the world have been very effective in suppressing civil society and closing civic space using a template of restrictive NGO laws and policies (Hayes & Joshi, 2020). One lesson for funders and policymakers is that prioritizing one sector or investing in one type of actor can weaken civic ecosystems and limit their ability to innovate. Another lesson is that investing in civicness and diversity can be a strategy for building ecosystem resilience.

Steering the ecosystem involves catalysing the complementarities between the actors, approaches and theories of change that seek to address a specific social problem. This may require designing ecosystem-level interventions or making small, but targeted changes in the ecosystem that have 'butterfly effects'. The nature of the catalytic intervention will depend on the type of civic ecosystem. Emerging ecosystems may require activation strategies while more established ecosystems may need strategies for consolidation. For example, two decades ago, activating the Balkan ecosystem involved using the mapping to raise awareness among the actors about their specific roles in the ecosystem and how its components interacted with each other and the larger environment. That triggered strategic thinking about enhancing their complementarities and harnessing them in productive, practical ways. Today, the creation of an RDC is a strategy for consolidation.

Civic ecosystems can be steered by catalysing 'niche complementarity' that increases the resources, ideas and practices available within the community. That may involve enabling diverse actors to play their distinctive ecosystem roles better and encouraging specialization; however, it may also require identifying and filling gaps where specific roles or functions are missing within the ecosystem. This kind of steering work was critical for accessing, pooling together and disbursing resources in the Afghan evacuations. The whole effort was largely carried out by private citizens, informal groups and networks that wanted to assist particular individuals and families. What was missing in the ecosystem was the infrastructure to receive private donations, combine these funds and make them available for larger tasks such as hiring charter flights and safe houses, and to do it in transparent, legal ways. The creation of legal entities like Uplift Afghanistan, for example, helped to fill that gap.

Civic ecosystems can also be steered by catalysing 'scale complementarity' that expands the ecosystem by attracting new actors and leveraging new capabilities and resources to address the problem at stake. Catalysing scale complementarity is about changing the opportunity structures within the ecosystem and its broader environment. In *Extra Life*, Johnson describes how the World Health Organization (WHO) was able to catalyse the civic ecosystem for the global eradication of smallpox (Johnson, 2021, pp. 67–73).[2] The final push in the 1960s and 1970s created opportunities for scientists, public authorities and health workers in more than 70 countries to engage and contribute to the campaign, including the Soviet Union and the United States. There are lessons here about where and under what conditions civic ecosystems can thrive. The eradication of smallpox was carried out at the height of the Cold War when the confrontation between the superpowers intensified and most people lived in authoritarian and totalitarian states. Because civicness exists in all societies and civic ecosystems are adaptive and problem-specific, they can create and exploit openings and opportunities where other vehicles for social change may encounter blockages and constraints.

In our experience, an ecosystem approach to social innovation is premised on respect and humility. It calls for respect and appreciation of the many different ways of thinking about and 'doing' social innovation, even when they may seem to compete with our own approaches and theories of change. It also calls for humility and recognition that our efforts to address complex social problems are dependent upon those of others and embedded in a larger ecology of change.

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CONFLICT OF INTEREST STATEMENT

We have no conflicts of interest to disclose.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

ENDNOTES

[1] Joseph Schumpeter's emphasis on the role of the entrepreneur as the driver of economic change rests on a similar distinction between invention (an original idea or technological development) and innovation (the commercialization of ideas into marketable products). See e.g. Ziemnowicz (2020).

[2] The pathways of complementarity between international and local, top-down and bottom-up actors and approaches in the worldwide eradication of smallpox are highlighted in Bhattacharya (2010).

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