

10

CONCLUSIONS

We opened this book with the POC21 eco-hackers at their innovation camp on the outskirts of Paris in August 2015. POC21 was a practical counter-initiative to the high-level climate talks at COP21 (21st Conference of the Parties to the UN Framework Convention on Climate Change). As COP21 finally reached an agreement affirming social constraint in anthropogenic climate change, this deal will have profound implications for social, economic and technological transformations. In this context, the ingenuity and empowerment of civil society activities such as POC21 become even more relevant (Stirling, 2015); especially since government and business commitments to emissions reductions, while welcome and significant, appear insufficient in themselves. POC21 activists recognize this and speak of building a movement for open source, low-carbon, zero-waste living.

As we finish this book in January 2016, the open source designs prototyped at POC21 and posted to the Instructables website have attracted over 500,000 visitors – far more people than are likely to read this book. This amazing amount of interest and excitement achieved in such a short time highlights the potential of grassroots innovation to become a force for sustainable development and social inclusion at a global scale. Not all the visitors will adapt and make the POC21 designs, although some will and all visitors will have been exposed to the underlying ideas and vision and may tell others, as we are doing now. Those that do work on the prototypes may do so collaboratively across hackerspaces, fablabs and makerspaces, and perhaps even at future innovations camps. Their experiences, adjustments and improvements will feed back to the design commons. Meanwhile, three of the POC21 prototyping teams have already joined forces and raised funds through a crowd-funding website in order to develop a portable, solar-powered water filtration device. The ambition is to develop this at various scales, including as a village-scale technology.

One thing we have done in this book is to take seriously initiatives such as POC21 in their aspiration for building a movement. Indeed, we argued that movements for grassroots innovation already exist, and have existed for a long time. It is important to consider initiatives such as POC21 alongside similar initiatives, and to appreciate the connections between the ideas and practices that each of them adapts and reinforces. By working through case studies of six movements from different places and times in this book, we can draw some conclusions for supporting and harnessing grassroots innovation movements. Our conclusions emphasize activity *beneath* and *beyond* the development of specific artefacts, whether technological or service oriented. It means noticing and valuing the alternative forms of innovation activity (including but not limited to new organizational forms and novel social relations) beneath the generation of specific artefacts. And it means looking beyond the insertion of these artefacts into conventional innovation processes and taking seriously the social visions that motivate grassroots innovators.

Making the most of grassroots innovation requires concerted political pressure on those with power over conventional innovation agendas. All the case studies have wanted to contribute to an opening up of alternative pathways for sustainable developments and a transformation of the social structures shaping innovation activity. Transformative innovation has been the aim: simultaneously restructuring the conditions, supports and forms of innovation in societies, and in doing so enabling alternative, more socially just and environmentally sustainable development pathways to open up. However, we have seen repeatedly over the case studies just how challenging it is to realize these broader, longer-term and more transformative aspirations. Overcoming those challenges requires grassroots innovation initiatives to build upon their movement qualities and to make greater demands for social structures that support transformational innovation in society. Consequently, in this concluding chapter we argue the importance of grassroots innovation movements for:

- opening up alternative forms of innovation;
- resisting narrow interpretations and institutional insertion;
- mobilizing for alternative pathways.

We discuss each conclusion in turn below. They are interlinked: each implies the others. Overall, they suggest that a systemic programme perspective is required for supporting grassroots innovation – whether from policymakers, multilateral agencies or NGOs. Until such programmes are won, we hope that these conclusions will prove useful for people busy working in grassroots innovation.

Opening up alternative forms of innovation

Grassroots innovation is an alternative *form* of innovation. It is not simply another source of innovation. It is important to acknowledge the work needed to open up

spaces for doing (grassroots) innovation differently, to understand and appreciate the wide variety of activities involved in the generation of grassroots innovations and to support the aims and purposes in grassroots innovation.

The case studies in chapters 3 to 8 demonstrate how grassroots innovation is underpinned by motivations, sets of practices, working relations and networks that constitute novel forms for doing innovation. These alternative forms seek to incorporate new or overlooked actors, issues, sites, networks, processes and purposes. Table 9.5 in Chapter 9 summarized constituent features in alternative forms of innovation. Those features included different combinations of knowledge and relationships, such as abstract engineering knowledge with situated community knowledge. Methodologies have been developed for helping people to articulate their ideas and experiences and participate in a collective innovation process. Open infrastructures were created, such as workshops that give people access to tools, prototypes, networks and platforms for sharing designs and lessons, and arenas for debating development challenges and responses. New actors were created and alliances forged. Different concepts and ideas were advanced and put to work. And, crucially, capabilities were developed and shared.

The cultivation of knowledge, skills, capabilities, working practices and community development was found to be simultaneously a requirement for grassroots innovation and a measure of successful outcomes. Finance, materials, tools, prototyping facilities, even markets, are an important part of the story, but so too are participants' imaginaries, values, skills and social relations, which animate these materials and motivate other people to join in and put their ingenuity into grassroots innovation for sustainable developments. Even where the focal technologies did not work out, more often than not the efforts nevertheless cultivated capabilities and lessons that had a more enduring value.

It is important not to let the more visible artefacts eclipse what else goes on. For all its hard-won success in crowd-funding the development of promising prototypes, POC21 was also emblematic of the (more) democratizing form in which it sought to demonstrate technological ideas. POC21 signalled a desire for alternative forms of innovation and development. In doing so, it drew upon novel organizational forms and working processes for open source, commons-based peer production that other groups and networks have been developing and working with over many years (Kostakis and Bauwens, 2015). Originating in the free software movement, and now developing in the open hardware movement, this is an alternative form of innovation that is being developed, and not simply novel artefacts.

Similarly, aspirations for collaboration in these open, commons-based organizational forms find relevant methodologies in participatory design that have also developed over many years. The incorporation of different ideas, with negotiations between different viewpoints, and always acknowledging diverse contributions in participatory design, was originally intended to help to democratize design and innovation and cultivate a form of technological citizenship (Ehn, 1988). However, the alternative form has also been selectively co-opted for corporate purposes and specific methodologies have been adapted into user-centred product designs for

assuring sales and customer loyalty (Asaro, 2000). Under appropriate conditions, participatory practices are still capable of assisting the grassroots with transformative innovation (Ehn et al., 2014). The point is that it is the overall form, with all its underlying social relations, political-economic implications and motivations that needs to be recognized and supported, otherwise methodologies are at risk of being co-opted for tapping into the grassroots (or ‘users’) as a source and input into otherwise unchanged innovation processes and development pathways.

Over the course of this book, we have seen how important is the overall robustness of the alternative organizational form as a whole, in the face of pressure to conform. That robustness derives from the social framings motivating people and guiding activity, the material and social spaces for experimentation, the strategies for occupying spaces and securing resources and the ability to build momentum capable of transforming political and economic relations such that truly participatory, collaborative and democratic forms of innovation can flourish.

Resisting narrow interpretations and institutional insertion

Throughout the book, we have noted periods of policy and business interest in grassroots innovation. We have seen with our case studies how institutional engagement with the grassroots tends towards a narrow framing. It is important to resist such narrowing, since it overlooks the social basis of innovations and denies the broader transformative aims of grassroots innovation movements.

Most recently, policy and business interest in grassroots initiatives has arisen through international discussion about inclusive innovation. Among the troubling features of an increasingly inequitable world is the exclusion of more and more people from the benefits of innovation and development. An inclusive innovation agenda, linked to ideas about inclusive economic growth, is intended as a response (OECD, 2015; UNDP, 2010; World Bank, 2012). Grassroots innovation activity has attracted interest as both a source of potentially inclusive ideas and practices and a relevant field of experience from which programmes for inclusive innovation might learn. As researchers studying grassroots innovation, we were invited into some inclusive innovation discussions, for example, by speaking at policy events and commenting on draft reports (Smith, 2014a). A recurring theme to the invitations, as in the related field of social innovation, has been an emphasis on scaling up promising initiatives and rolling them out widely.

Typically, scaling up is framed as proceeding through measures to formalize and commercialize the grassroots innovation. The facilities and tools of conventional innovation systems are brought to the service of promising grassroots innovators and their innovations through the provision of research, development and demonstration; assistance with standards procedures; and help in securing intellectual property. Investment and marketing assistance is also offered. The grassroots furnish prototypes for entrepreneurs and investors; and these are then turned into goods and services for scaling up, principally by expanding markets, but also through more conventional development programmes. It is a framing that presumes an obvious

risk-taking innovator (analogous to a firm or inventor) to support and reward, and an innovation that can be turned into a proprietary object for marketing.

There is nothing inherently wrong with such a move. Indeed, it can help considerably to improve those innovations that can more readily be marketed. And, given the way that policy and business interest in grassroots innovation is organized towards this end, it is a dynamic that we can expect to have considerable momentum. But while doing that well, it performs badly at supporting the more transformative possibilities in grassroots innovation. As we have seen across the cases in this book, altering a grassroots innovation so that it might 'find' markets neglects the social basis of that innovation. It fails to acknowledge the less-entrepreneurial subjectivities and relationships that originally cultivated the grassroots innovation. And it discounts the socially transformative framings that motivated the grassroots activity. Entrepreneurship alone cannot create and maintain the conditions of grassroots mobilization upon which it relies. The recent fashion for innovation prizes, with the winners taking all, has a similarly myopic notion of grassroots innovation subjects and the social basis of grassroots innovation capabilities. Grassroots innovation movements build additional social relationships, organizational forms and purposes that operate beyond and beneath entrepreneurship, markets and insertion. These relationships build the capacities for people to organize at grassroots level and to contribute and direct innovation along development pathways particular to their contexts. Grassroots innovators tend to want to be involved in the breadth of the relevant decisions, from prioritizing and framing the development issue, to making design choices and decisions about evaluative criteria, as well as evaluating 'success' and undertaking further development and production. This includes deciding how investments are made, having a stake in the way value is realized, captured and distributed into wider community developments and livelihoods.

This is why insertion risks being insufficient, at best, and counterproductive, at worse. It is in this sense that insertion alone needs to be resisted; not necessarily to stop a narrower scaling up of innovations but, rather, to continually point out what is being overlooked and neglected. If people as inventive and empowered as grassroots innovators are unnecessarily straightjacketed by inflexible support structures, then they are likely to ignore or even resist the invitations to insertion anyway.

However, for all the evident potential for grassroots innovation movements to promote plurality and reflexivity in the politics of innovation, it is vitally important not to romanticize it. Questions of inclusion, exclusion, conviviality and injustice are just as pertinent in grassroots innovation spaces as they are in conventional innovation institutions. Grassroots spaces are also prone to exclusions arising through expertise, knowing how and knowing what, skills, tacit knowledge, practices and cultures that variously constrain and enable different social groups to become involved. Initiatives have to be designed and cultivated carefully, through ongoing community development processes that address structural inequalities and exclusions in terms of education, gender, class, ethnicity, age, disability and so forth. People have to be supported in gaining confidence with and within alternative forms of innovation. Nor does everyone want to be involved actively, which raises questions of representation.

In sum, grassroots innovation movements need to be continually in tune with the dynamic contexts in which people live. As such, grassroots spaces are a key locus for confronting and experimenting with some practical challenges in the democratization of innovation. Some of the critical lessons learnt will no doubt point beyond the cultivation of the grassroots spaces themselves and towards changes required in society, over which grassroots innovation movements have only limited agency.

Challenging dominant and unsustainable pathways

Ultimately, making the most of grassroots innovation is a question of challenging power. Through their successions of initiatives, grassroots innovation movements cultivate ideas and practices that contribute important reflexivity, debate and plurality to discussions of innovation in society. They open questions about the social, economic and political causes and consequences of technological change. We see in the movements for socially useful production and for hackerspaces, fablabs and makerspaces, for example, two periods of critical exploration of the rise of computing and digital technologies. These movements have been imagining and anticipating different configurations for the development of digital technologies. Such activity reminds us that, in this case, nothing is automatic about automation. Social choices are involved. Plural possibilities exist between human-centred and human-excluding applications, as tools for liberation or instruments of control. Usually in diverse, emergent and unruly ways, grassroots innovation movements open up important spaces, demonstrations, prototypes, ideas and methods for exploring open-ended, contingent futures.

Yet it would be naïve to claim that those futures are wide open. There are relations of political and economic power that give advantages to the cultivation of some pathways over others. Grassroots innovation is motivated by commitments that imply changes to social and economic relations and that are ambitious in their breadth and depth. However, while incumbent structures of asymmetric agency constitute considerable privileges, the privileged are never fully in control (Stirling, 2015). Vested interests are susceptible to the inventive richness of people and their associational power. We have seen how spaces for grassroots innovation can open up an unruly inventiveness. However, we have also seen that if such spaces are to have greater influence, they have to overcome restrictive political economies, locked-in institutions and overbearing cultures that often characterize dominant pathways.

All the case studies succeeded in creating grassroots power at the grassroots to do innovation. Few, however, were able to build power over wider support structures in society, such as power over the institutions promoting innovation. Here, it is the power of social movements that becomes important. It is through social movement pressure that these institutions can be changed, by contributing momentum and significance to more specific agendas such as scaling down innovation systems, opening up design processes, distributing prototyping capabilities and making a material contribution to the development of more sustainable pathways.

Social movements are one means to challenging power, opening up possibilities and building momentum for alternative pathways. Whether drawing upon support among workers, peasants, environmentalists, pacifists, hackers, community activists or others, we have seen in the case studies how wider social movements have been vital for grassroots innovation initiatives. That support has been both discursive and material, mobilizing around relevant framings as well as providing resources. Support has manifested through direct links and through looser associations. It has arisen when grassroots initiatives were seen as trying to infuse social movement ideals into innovation practice, whether for social justice or environmental sustainability. Indeed, in our case studies it was difficult to understand some of their framings of grassroots innovation in the absence of an appreciation of wider social movements. It is important to recognize how the movement in grassroots innovation links to these wider social movements and their claims for rights, recognition and justice. Social movements provide solidarity, energy, people, skills, strategies, resources and facilities for initiatives, but they also serve as bridges between grassroots innovation movements in different places and across different times.

However, movement pressure works most visibly when it translates into favourable response from business and government. The kinds of institutional changes envisaged in a transformational framing of grassroots innovation require committed partnership. The point is, however, that unless business and government realistically understand grassroots innovation as social movement, with all the social relations and motivations implied, then any partnership will remain fraught with misunderstanding. It is in deeper social movement demands, for socially just and environmentally sustainable development pathways, that grassroots innovation draws its strength and it is these demands that partnerships with business and government need to recognize and understand if they are to engage successfully.

Final remarks

In this book, looking across experiences at different times and places, we have identified recurring features in grassroots innovation movements (e.g. Table 9.4 in Chapter 9). By recognizing these experiences, we hope to have highlighted the real relevance of grassroots innovation movements for the creation of alternative pathways of development. The framing of grassroots innovation variously emphasizes its potential in ingenuity, empowerment or transformation. We have seen how important it is for grassroots innovators to open up and occupy different spaces – physical, institutional and discursive. Here, alternative forms of innovation attract resources but also become subject to reciprocal requirements that affect what can be practised and what is achieved in those spaces. Moving beyond those spaces, and seeking wider roles in development pathways, we identified strategies of insertion and transformation with respect to conventional institutions for innovation. We then discussed the dilemmas that these strategies present to grassroots innovation movements in terms of becoming co-opted, mainstreaming or remaining marginal.

It is important to remember that these insights were abstracted from cases whose messy realities involved hybrid arrangements, compromised positions, contradictory outcomes and some influential achievements. Grassroots innovation will continue to be messy. We intended our analysis to provide some clarity that, while simplified, nevertheless provides some helpful bearings for working through those messy realities. If there is one direction we would particularly emphasize in closing this book, however, it is that the full compass of possibilities will not be realized without a struggle for transformational possibilities.

The stories, struggles, successes, ideas and technologies that we traced in this book are just a glimpse of some of the undercurrents of grassroots innovation. We expect that this book will contribute to extend the understanding of grassroots innovation around the world and, we hope, inspire further research and experimentation. We hope that a new and renewed focus on grassroots innovation will help us to recognize the dormant power of these initiatives to create alternative pathways.

Grassroots innovation movements do not have the map for more sustainable futures. But they are exploring critical points of departure.