

# Shared technology making in neoliberal ruins: Rationalities, practices and possibilities of hackathons

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Published as an open access pre-print on OSFPreprint: <https://osf.io/k793w>

## Abstract

Shared technology making refers to the practices, spaces and events that bear the hope and belief that collaborative and open ways of designing, making and modifying technology can improve our ways of living. Shared technology making in the context of the smart city reinvigorates explorations of the possibility of free, open and collaborative ways of engineering urban spaces, infrastructures and public life. Open innovation events and civic hacking initiatives often encourage members of local communities, residents, or city administrations to participate so that the problems they face and the knowledge they possess can be leveraged to develop innovations from the working (and failure) of urban everyday life and (non-)expert knowledges. However, the incorporation of shared technology making into urban contexts engender concerns around the right to participate in shared technology- and city-making. This paper addresses this issue by suggesting ways to consider both the neoliberal patterning of shared technology making and the patches and gaps that show the future possibility of shared city making. It explores the ways in which shared technology making are organised using hackathons and other hacking initiatives as an example. By providing a hackathon typology and detailed accounts of the experiences of organisers and participants of related events, the paper reconsiders the neoliberalisation of shared technology making. It attends to the multiple, entangled and conflictual relationships that do not follow corporate logic for considering the possibilities of more open and collaborative ways of technology- and city-making.

## Keywords

Neoliberal ruins, hackathon, civic hacking, citizen, smart urbanism

## Introduction

Shared technology making refers to the practices, spaces and events that foreground collaborative and open ways of designing, making and modifying technology for improving ways of living. While practices of sharing tools and knowledge for technology making have their own histories, their significance has grown considerably in recent years. A wide range of spaces and events organised in cities worldwide attracts ‘thousands of engineers, programmers, designers, and artists’ to congregate in ‘local community spaces such as hackerspaces, makerlabs, fablabs, hacklabs, hardware incubators, fixer collectives, coworking spaces, and so on, to collaboratively produce, maintain and refigure technologies’ (Rosner et al., 2014: 113–4). Further, the members of these ‘spaces’ and ‘communities’ promote the ideal that better worlds can be created through the design and modification of technology by its users.

Shared technology making in the context of cities is instrumental for digital commons or civics (Cardullo, 2017; Shelton, forthcoming) in their translation of free, open and collaborative ways of technology making into new possibilities of engineering urban spaces, infrastructures and public life. Local communities or city administrations are encouraged by organisers to participate in these initiatives so that innovations are developed from the working (and failure) of urban everyday life and (non-)expert knowledges. Furthermore, in the recent revision of smart urbanism, ‘citizen-centric’ approaches are preferred in setting up urban living labs, civic hacking initiatives or innovation districts to engineer socially and environmentally sustainable ways of urban living (Cardullo and Kitchin, 2018; Cowley et al., 2017; Evans, 2016; Vanolo, 2016).

The growing popularity and significance of shared technology making in the city then raise several critical questions. How has shared technology making been incorporated into the city? How has it been changed and influenced in this process? How has the possibility of free, open and collaborative engineering of the city been exploited or sustained? How are the rights to shared technology been challenged or improved? How do we know, think about and notice future possibilities?

Addressing these questions, this paper delineates how urban processes and structures shape the historical and social transformations of shared technology making and suggests a need to consider

shared technology making through the lens of neoliberal 'ruins' (Tsing, 2016). This contributes to an exploration of its future possibilities when neoliberal operations are seemingly in full swing. By providing a hackathon typology and detailed accounts of the experiences of organisers and participants, I pay attention not only to the neoliberalisation of shared technology making, but more importantly the multiple, entangled and conflictual relationships that produce irregular patches and gaps in the ruins for us to consider the possibilities of open and collaborative ways of technology- and city-making.

## **Urbanisation of shared technology making**

Large infrastructural projects that engineer 'smart', 'data-driven' and 'experimental' cities are often black-boxed due to the expert knowledge, specialist equipment, and the political and financial investments of the state required for such projects, despite the celebratory claims and visions of the co-production of the cities with citizens (Evans et al., 2016; Marvin et al., 2016). Meanwhile, there have been ongoing attempts of developing practices, spaces and practitioners to transform urban governance into one that is transparent, informed by diverse knowledges and perspective and led by citizens. The encounters between these citizen-focused attempts of city making and existing social, economic and governmental structures, however, have led to complex processes and outcomes. Here, I suggest six processes through which shared technology making is incorporated into the city and is faced with global political economy and neoliberal operations.

First, there have been social, cultural and philosophical transformations throughout the history of free and open source software (F/OSS) and hardware that motivate wider participation in and support for shared technology making. Hacking for the purposes of building Internet technology has long been a shared practice comprising globally distributed tasks and labour for establishing alternative economy and governance (Powell, 2016; Söderberg, 2008). In Kelty's account (2008) of the cultural significance of F/OSS, writing code for ensuring free and open access to knowledge is a making of a recursive public that provides new social and legal means to challenge and enact a different political economy through coordinating people and technology. As Coleman (2013) observes, the making of F/OSS comprises ingenious technology tinkering and also contested senses of politics when code writing for F/OSS is implicated in the licensing of intellectual property for ensuring the freedom of exchanging ideas, artefacts and knowledge. Similarly, the central concern

for open source hardware in the context of city addresses the question: 'What would a city look like if its infrastructures were designed, built, certified, and managed by its residents?' (Corsín Jiménez, 2014: 386). Lindtner (2015) also contends that maker practices both oppose passive consumer culture and offer opportunities of engaged citizenship. Maker practices can be active participation in technology building that also intervenes in societal issues and market economy.

Second, there is increasing commodification of F/OSS beliefs, practices and practitioners that leads to 'neoliberal co-optation' in developing smart cities (Zandbergen, 2017: 542). Corporate innovation has increasingly looked beyond companies' research and development (R&D) units and embrace the idea of 'open innovation' that incorporate the innovation capacities outside their own organisations (Chesbrough, 2006). The 'political antagonism' in F/OSS has facilitated the 'corporate espousal that translates F/OSS principles into neoliberal language, market agility, consumer choice, and an improved bottom line' (Coleman, 2013: 192). Also, for corporations, the re-development, support and integration of F/OSS into essential IT infrastructure are an effective strategy of cost reduction and capital accumulation (Ettlinger, 2017), which sustains the neoliberal co-optation of the ethical values of F/OSS. Increasingly adopted as a smart city strategy, open innovation practices and events have expanded in scopes and scales, ranging from informal 'meetups' to large innovation competitions. At these competitions, companies target the knowledge, innovation and creative labour abundant in global cities where a new iteration of exploiting crowdsourcing activities occurs. Evident in hackathons, skilled participants provide free labour with little promise of employment and small chances of winning competition prizes, while the volunteerism that motivates the participation only results in 'myopic engagement' with civic or political issues (Gregg, 2015).

Third, the emphasis on technological innovations and private interests has led to neoliberal co-optation of open data (Barns, 2016; Bates, 2012). The ethical value of technological and legal innovations to ensure open access to knowledge, as seen in early F/OSS, motivates 'open data' and other related movements, including open knowledge and open government (Barns, 2016). 'Open data', the release of public and private data in machine-readable format and the licensing allowing (non-)commercial reuse, are considered a valuable tool for ensuring government transparency and accountability, cultivating informed government decision-making, and encouraging citizen engagement in urban issues. Open data also generate economic values through data reuse for

developing innovations that improve urban services and governance (see also Bates, 2013). Despite these potentials, critical studies have also warned of the 'widgetization' of urban problems where only issues that interest the citizens with technical and data analytical competences are raised and only technical fixes are sought (Mattern, 2014). At a city level, the building of data portals and application programming interfaces (APIs) has been frequently prioritised by local governments to facilitate commercial reuse of open data. These transitions inevitably lead to the deregulation of open data through which corporate interests acquire greater control over data standards, publication and maintenance, as well as favouring proprietary software and algorithms that impede the reuse of data for civic and societal purposes (Johnson et al., 2017; Leszczynski, 2012). The emphasis on the commercial reuse of open, public data further strengthens entrepreneurial and algorithmic governance that lacks the articulation of the public value of data. The scope and imaginary of citizen engagement are thus reduced to what is demonstrable by available datasets, quantifiable measurements and algorithmic processing (Barns, 2016; Leszczynski, 2016).

Fourth, these technology- and data-making initiatives have engendered entrepreneurial citizens and civic paternalism. State and corporate initiatives have started to prioritise 'people' and consider how the sense of being citizens can be improved after smart city developments are criticised for their lack of awareness and efforts in providing opportunities of citizen participation (Cardullo and Kitchin, 2018; Cowley et al., 2017). However, these studies also suggest that, despite a citizen-centric approach, what is engineered tends to be neoliberal citizenship where citizens can actively generate data, provide feedback and submit problem proposals but under the control of the privatisation of urban infrastructures, services, places and issues. Further, in the few instances where technological innovations from the perspectives of and by citizens are encouraged, they engender entrepreneurial citizenship that forecloses the possibility of technology tinkering for societal purposes and deepen the ambiguity and precarity of work, life and prototype in the development of smart urbanism (Irani, 2015; Perng et al., 2017).

Fifth, there have been continued efforts in pursuing and reflecting the working and meaning of civic hacking. For the socially-minded participants of civic hacking, the one-off, short-lived and often exclusionary practices of hackathons are questioned (Maalsen and Perng, 2016), which echoes the concerns that these hacking events fall short of establishing and maintaining 'recursive

publics' (Lodato and DiSalvo, 2016). Some reconfigurations of hacking events are under way, by developing sustained engagement with communities, governments and otherwise invisible urban issues, as well as facilitating and leveraging greater governmental and societal support for the issues at hand (Schrock, 2016).

Sixth, and critically, even with the emphasis on opening access for making technology, data and knowledge, the sexist behaviours and prejudice against female coders' competences are still prevalent in 'open' initiatives and spaces and thus deter wider and more sustained female participation (Ford and Wajcman, 2017; Nafus, 2012; Terrell et al., 2017). Against the sexist practices and more broadly the masculine narratives of innovation, technology and hacking, an increasing range of female-focused or -friendly initiatives across many global cities have been organised to hack the culture and ontology of hacking (Rosner and Fox, 2016). These initiatives aim to develop female coding subjectivities and spaces with a wider diversity remit (Maalsen and Perng, 2017; Toupin, 2014), with some further addressing the gender imbalance in rural areas (Corneliussen and Prøitz, 2016).

## **Considering the possibilities of shared technology making in neoliberal ruins**

As demonstrated above, neoliberal logic and operations have increasingly played roles in the translation of the social and ethical values of F/OSS and open movements for capital accumulation. Also, the participation from those who are not white, male and with technical knowledge and expertise continues to be excluded in events for shared technology making. Confronted with these concerns, the question regarding the extent to which emancipatory and empowering shared technology making is still possible becomes a challenging one that requires an analytical tool for discovering hopeful practices without losing critical insights.

Tsing's (2016) concept of 'ruins' provides such an opportunity. Capitalist ruins for Tsing are where '[i]ndustrial transformation turned out to be a bubble of promise followed by lost livelihoods and damaged landscapes' (2016: 18). For her, capitalist ruins are results of 'salvage accumulation' where the values of the livelihoods outside capitalism are translated into commodities through creative and generative practices to extend capitalism's reach and perpetuate its logic and control.

Similarly, the ruination of shared technology making proceeds, as demonstrated above, where salvage accumulation is at work: where generative and creative translations of societal and ethical values of shared technology making are devised by the global political economy to amass capital in places where control has not been established. But following Tsing, the delineations of ruination and salvage accumulation are only a start because ‘such documents are not enough. If we end the story with decay, we abandon all hope’ (Tsing, 2016: 18).

An equally important question for Tsing concerns ‘What emerges in damaged landscapes, beyond the call of industrial promise and ruin?’ (Tsing, 2016: 18). This question shares similar concerns with those conducting critical examination of global capitalism, but with a focus on its edge. She is concerned with the damages inflicted by global capitalism on human and non-human lives; but her theoretical focus on ‘edge’ aims to produce an understanding of livelihoods that are heterogeneous, survive at the edge of capitalist operation and tell something about both the possibilities of living in capitalist ruins without giving in to their underlying logic. This is a continuation of the exploration for alternatives but looks for such alternatives in more uncomfortable places. That is, instead of looking for alternatives that seek to entirely transcend market logic and entering postcapitalist economic regimes, Tsing instead explores hopeful livelihoods and practices that are at the edge, simultaneously inside and outside, of capitalism.

Tsing’s proposition does not sit squarely with others that focus on the eradication of homogenising, capitalist operations and control for reclaiming the rights to and ownership of informational, digital or smart cities. de Lange and de Waal (2013) argue that, to reclaim the ‘ownership’ of technology- and city-making, citizens should be equipped with the ‘rights’ and scope to ‘organize themselves and take ownership of particular issues’ vis-a-vis juridical control and authority. Also, in the formulation of the informational right to the city, Shaw and Graham (2017) lay out their concerns over the urbanisation of data and information and propose to ‘get rid of’ the techno-political monopolisation, as exercised by Google, and its control over how cities are known, experienced and governed. Accordingly, the rights of inhabitants in informational cities as Purcell (2017: 30–2) proposes have two important components: overcoming the struggles ‘to gain access to existing information that is being withheld from them, by a power outside of or above them’; and ‘*autogestion généralisée*’, the carrying out of the information and city production by the inhabitants ‘instead of giving that work over to specialized experts in State agencies, public

utilities, development corporations, and the like'. Concerned with possible ways of reclaiming rights to the city and the production of urbanisation, Swyngedouw (2011) proposes to urban inhabitants and intellectuals several possibilities for ending the expansion of capitalist fantasies, desires and acts: by transgressing the fantasy of the elite, enunciating dissent and refusing to act as preferred, as ways to '*think ... the design of a democratic, polemic, equitable, free common urbanity* (p. 50; original emphasis).

However, the theoretical re-orientation towards looking for possibilities at the edge of global political economy is necessary, even though the refusal to act as the elite prefers is shared. First, while considering rights to and ownership of the city is important, the politics and future possibilities of shared technology making emerge from how multiple ideals and operations come to focus on specific issues. Whether pursuing transparency or extending market logic, shared technology making becomes where '*entanglements of issues and actors come to specified*' because of the multiple ideals, actors and institutions involved and also where the relevance to these issues constitutes 'a political ontology that ... conceives of issue specification as a wider material, technical, political and social process' (Marres, 2012: 54–5; original emphasis). Critically, these entanglements in shared technology making are similar to what Mouffe (2013) terms 'agonistic attachments' in other political spheres which foregrounds conflictual relationships inherent and shaping a world consisting of multiple rationalities and their corresponding political and economic ordering. Considering the possibility of shared technology making then should take into account the conflictual interplay between pluralised hegemonies. This would produce careful understandings regarding how the multitude of the beliefs and practices can generate different practices of technology making, without assuming an illusory unification of political worlds. In other words, as well as identifying individual persons or corporations that enforce a hegemonic order, considerations for the future of shared technology making has to attend to the material, technical, political and social entanglements that might align and contest one another.

Second, shared technology making in the city is both variegated, liminal and emergent and thus can embody multiple existing and resisting. The rationalities and practices that configure shared technology making are both variegated and 'liminal' (Zandbergen, 2017) in the sense that each holds onto its own ideal while being susceptible to change when in contact with others. In these encounters, such as tech meetups for civic purposes (Perng and Kitchin, 2018; Zandbergen, 2017),



the co-optation attempts by the prevailing neoliberal, technocratic ideology are continuously reconfigured when confronted with contextual specificities and contingencies where multiple interests, practices and rationalities seek to exercise greater influence over others. These interplays following Gabrys (2016) can be considered as multiple existing and resisting. She further suggests that the idea of identifying the hegemony to be eradicated for erecting a substitute or opposing one is already a defeat. It is a failing of not recognising, experimenting and extending the agential efforts that are distributed across diverse time-space configurations and emerge in multiple and unexpected ways. Accordingly, the politics in shared technology making runs through all possible ways of making and therefore it is necessary to programme power relations, rerouting or rearranging them through thorough and creative explorations of other forms of engagements and experiments for extending participatory agency. It is important then to consider possibilities of shared technology making by directing our analytical focus towards practices of participatory agency that 'delimit and enable in particular ways but that also unfold, materialize, or fail in unexpected ways' (Gabrys, 2016: 204).

Finally, examining the neoliberal ruins of shared technology making has an equal emphasis on continued, critical examination of the global economy and also on expanding the imaginary for such making's future. That is, 'ruins' can be a challenging place to survive, but are not depleted of any form of life or possibility. Instead, gaps and patches can grow in neoliberal ruins that demonstrate how multiple resistance and participatory agency might be possible for the future of shared technology making. It is important to maintain the efforts of 'railing at those who put us here' and the changing forms and processes of neoliberal technology- and city-making, however without assuming that the search for possibilities in the ruins should lead to 'harmony or conquest' as a result (Tsing, 2016: 3–5). By examining the ruins' edge, it becomes possible to explore the rationalities and practices that produce irregular patches and gaps, intentional or not, under the homogenising attempts of global political economy. Ruins thus are a messier but nonetheless provocative and productive concept for considering the possibilities of reclaiming social, economic and technological livelihoods entangled in shared technology and city making.

## Reassembling shared technology making: Hackathons as neoliberal ruins

Hackathons are examined here because they embody neoliberal ruination of shared technology making in its way of translating the societal and ethical values of hacking into the production of corporate innovations (Van Waart et al, 2015), entrepreneurial citizenship (Irani, 2015) and precarious smart urbanism (Perng et al., 2017).<sup>1</sup> Whether hackathons epitomise ‘ruins’ and if the livelihoods of people (hackathon participants) are as heavily reliant upon and enmeshed into the ruins (hackathons) as originally formulated in Tsing’s work, are open to debate. But the focus on hackathons offers a critical view of the neoliberal ruination in action. It makes explicit the neoliberal co-optation of shared technology making, for further discerning if multiple, emergent and conflictual relations for extending participatory agency are possible.

Current understandings of hackathons can be summarised in the typologies in Table 1. Meyer and Ermoshina (2013) and Briscoe and Mulligan (2014) suggest to categorise hackathons according to their focuses on technical developments, specific topics and demographics, and data reuse, where Van Waart et al (2015) also note the business orientation of hackathons where stakeholders, participants and local authorities are engaged for future business concept and product development. However, existing typologies do not explore the organisation of hackathons where multiple actors and practices could produce different effects on shared technology making.

*Table 1: Existing hackathon typology*

Hackathon main type	Sub-type	Definitions and examples
Tech-centric	Single-application	Focus on particular applications, e.g. a O/FSS project
	Application type	Specific platforms, e.g. mobile applications, games
	Technology-specific	Develop specific software languages or frameworks
Focus-centric	Socially-oriented	Address social concerns, e.g. public services
	Demographic-specific	Intended for, e.g. women or teenagers
	Company-internal	For company’s engineering staff, e.g. Facebook
Data-centric		Focus on using the data provided by organisers
Business-centric		Focus on developing future products and business concepts

<sup>1</sup> There is also a parallel stream of literature, e.g. DeSilvey & Edensor (2013), that examines urban ruins to reflect market and state power and also the romantic and dark sides of situating ruins in alternative times and spatialities.

To address this aspect, I curate an Eventbrite dataset, comprised of 374 hackathons that are mostly organised for April to June 2017 and use the Eventbrite platform for event promotion and ticketing. The dataset complements over 50 in-depth interviews and ethnography of 8 hackathons and other hacking initiatives conducted in Dublin (2014-5) and Boston (April, 2016).<sup>2</sup> The interviews and ethnography of hackathons provide detailed discussion and observation concerning the rationale, strategies, experiences and reflections of hackathon participation and organisation.

The Eventbrite dataset provides web links to relevant event pages containing details of organisers, sponsors, proposed challenges for participants to work on, intended participants (and also desirable knowledge, skills, experiences), and rewards for participation. The details are captured and categorised manually to generate a sense of ‘hackathon parts’, demonstrated in Figure 1(a), where the parts in each category (e.g. organisers) are assembled according to specific hackathon rationales and preparations. Further, Figure 1(b) shows that while predominantly in North America and West Europe, the reach of hackathons has expanded into East Europe, Asia and the global South, including South America and Africa. In terms of the participating organisations (be they private companies, civic organisations or any other kinds of organisations), they can be of international or national scales, associated with different industries and sectors, or targeting diverse societal or technological issues. In the case of corporations, they can be multinational companies in the IT industry, such as Microsoft and Google, or in other industries heavily dependent upon IT infrastructure, such as Banking (BNP Paribas), telecommunication (AT&T), fashion (Gucci) or ticketing (Ticketmaster), as well as other national or local ones. Further, there are several ways problems can be identified and potentially solved, ranging from broad ‘challenges’ set by event organisers, to specific issues that collaborating organisations face. In some events, there can be no overarching theme and participants can propose their own problems or projects.

Similarly, civic organisations differing in focuses and scales also participate in hackathons as organisers or stakeholders. Many of these organisations have an emphasis on diversity issues in tech culture and the sector. Hackathons are adapted as a strategy for broadening access to technology and education for socially disadvantaged groups, most notably women, children and teens, and ethnic minorities, instead of as a place for invention. There are other civic or activist groups that re-appropriate hackathons as a strategy to respond to emergent, critical issue or to

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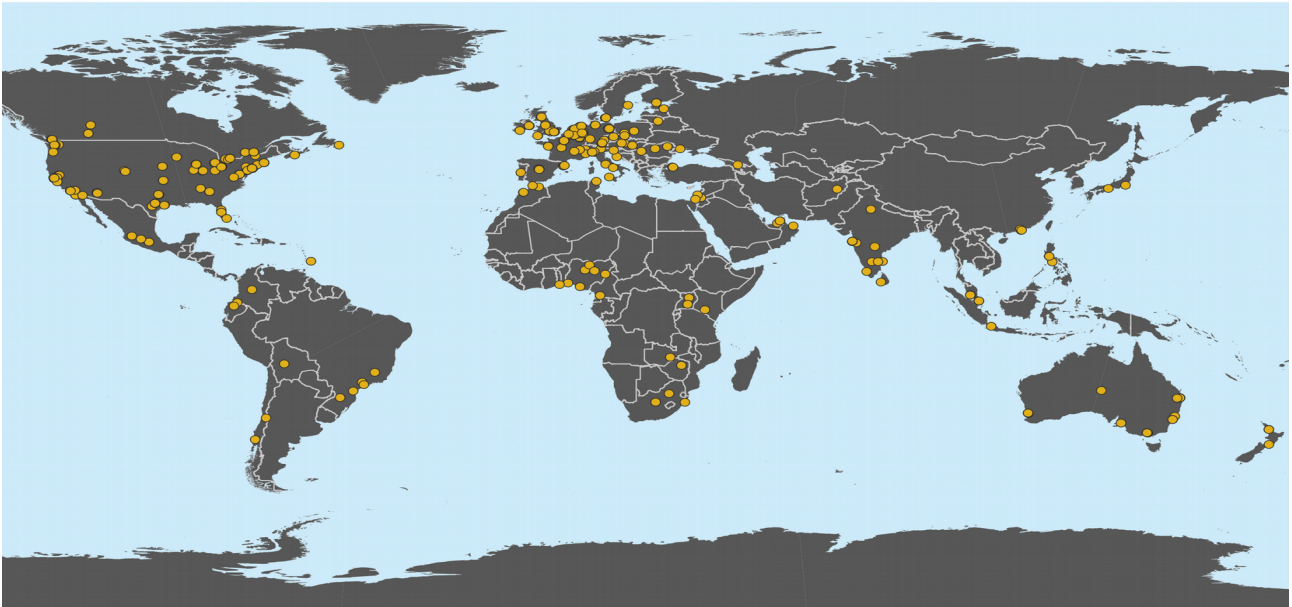
<sup>2</sup> Methodological considerations for such an approach are discussed elsewhere.

pursue their long-term goals. For example, open knowledge and open data initiatives can use these events as part of long-term strategy for creating transparency in governance; meanwhile, emergent societal issues such as refugees or the travel ban in the US can lead to the organisation of hackathons by civic or activist groups targeting at these issues specifically.

By observing the Eventbrite dataset, six different ways of assembling hackathons can be identified, which I introduce below focusing on actors (organisations and participants), rationalities (framing of motivations and achievements) and practices involved (the recruiting and rewarding of organisations and participants).

Figure 1: (a) hackathon parts (top) and (b) geographic distribution of hackathons between April and June 2017 in Eventbrite dataset (down) (created by author)

Organisers	Wider Stakeholders	Skills, Expertise and Knowledges	Project Proposition	Rewards
Corporation	Corporations	Professional Dev	To Set Challenges	Cash
Industry	Industries	Other Tech Prof.	To Broad Issues	Placement
University	Governments	Domain Experts	Propose Problems	Visibility
Civic	Societies	Communities	Set Problems	Entrepreneurship
Tech Enthusiasts	Sciences	Civic		Recruitment
Government	Technologies	Individuals		Societal
		Tech Mentors		
		Non-tech Mentors		

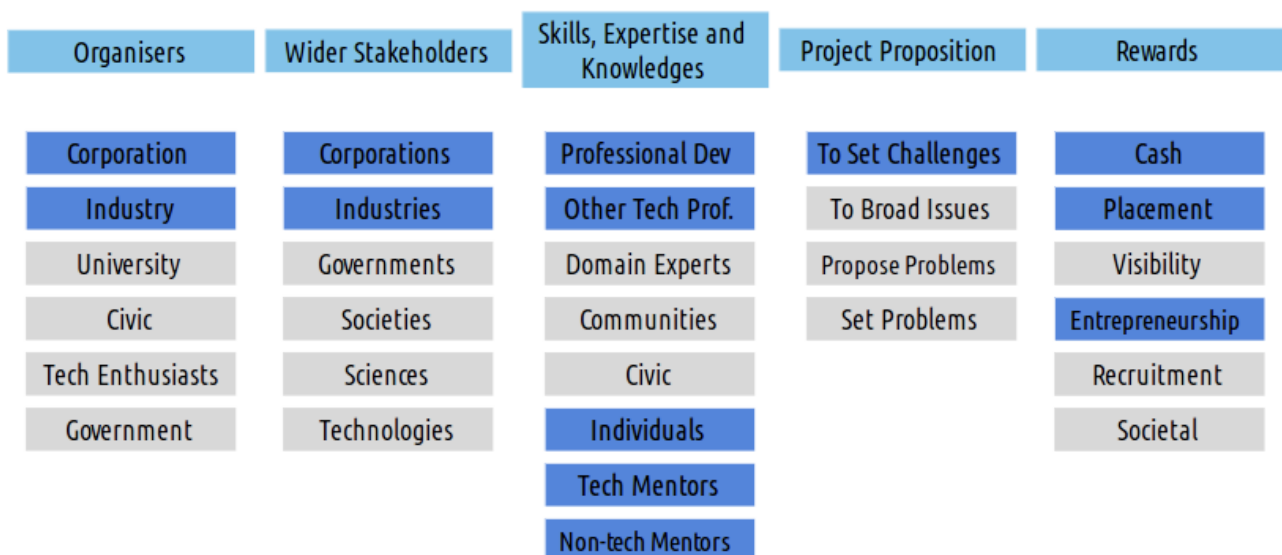


**Entrepreneurship machines** are facilitated by a ‘hackathon industry’ that focuses on helping companies and organisations in their planning of the events, including the selection of ideas and teams that have the potential to further attract seed funds and launch as a startup company when the events conclude (see Figure 2). These hackathon consultancy companies, e.g. AngelHack, are involved in preparing multinational or local companies in setting up hackathons and, in many cases, organise them as a themed series to extend their effects. Apart from advising on the overall event theme, structure and challenges, hackathon consultancy companies also provide guidelines for local organisers to follow, particularly in terms of securing local sponsorships, venues and partnerships with other companies.

**State economic machines** have similar emphases on entrepreneurship and innovation as entrepreneurship machines do. However, economic state machines deploy strong discourses on national or regional economic growth through startup economy and innovation of smaller scales, which in turn attract public and private funding to support them. Accordingly, sharing similar organisational characteristics with entrepreneurship machines, state economic machines have direct and indirect involvement of governmental agencies of various levels. National and regional economic development strategies and funds can also provide financial support for using hackathons as a means to grow a startup economy (see Figure 3). Hackathon series in Estonia and the Balkans are an example where the European Regional Development Fund aids the innovation

and economic development of the region.<sup>3</sup> State economic machines in ‘postcolonial’ countries, in both geopolitical and sociotechnical terms, are not incidental. For countries and regions such as Eastern Europe and Africa, economy and nation building largely models on the developed, formerly colonising, countries and their innovation and technological advancement as signs of growth and progress (also including Central and South America and India in Figure 1(b)).<sup>4</sup>

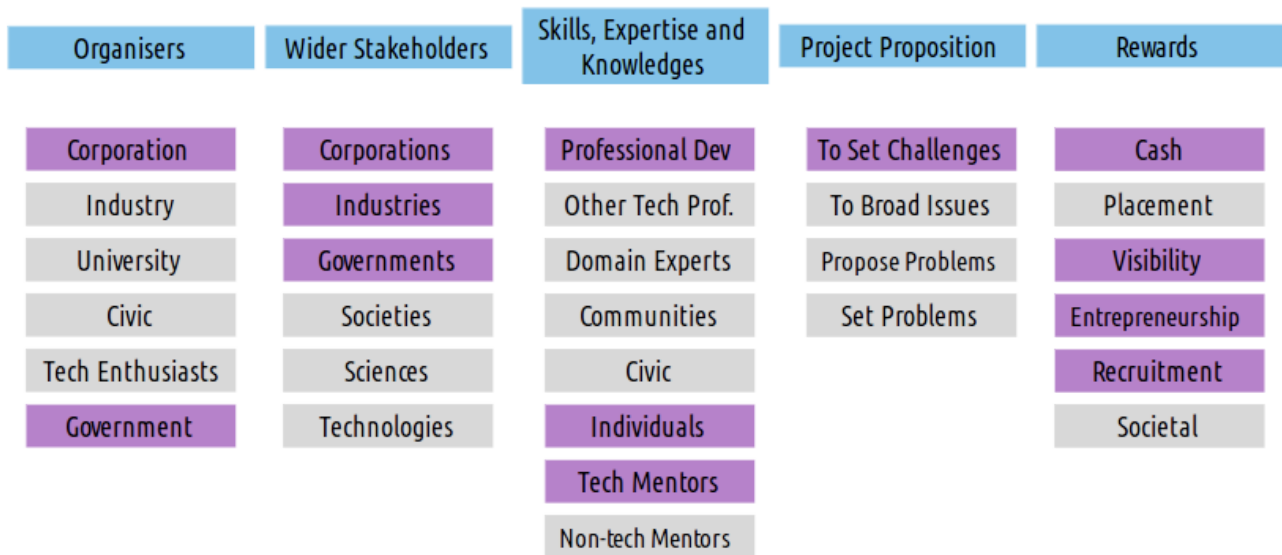
Figure 2: Organising entrepreneurial machines



3 Hackathon series organiser, Garage48, and one of their collaborative projects funded by EU, see <http://garage48.ee/blog/erdf-is-supporting-garage48-hardware-and-arts-in-tartu-for-the-next-three-times>.

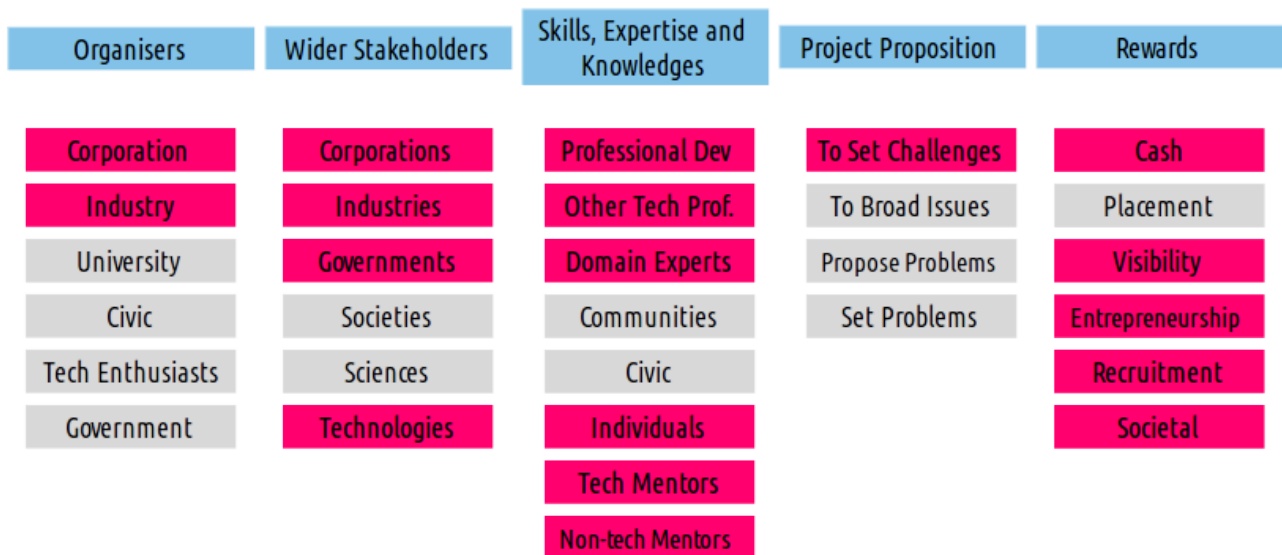
4 For hackathon details, see Prague (<http://hackprague.com/>), Africa (<http://www.hacks4africa.com/>) (Africa Rising is a non-profit organisation founded by Ndaba & Kweku Mandela at the end of 2009 in order to contribute to the development of the African continent), or French speaking countries, or Francophonie (<http://ffin.francophonie.org/index.php/2015/01/14/55h/>)

Figure 3: Organising state economic machines



**Open innovation instruments** are events where hackathons are thought of and implemented as an instrument to generate knowledge, ideas and prototypes by leveraging the expertise outside the organising companies or organisations for pursuing innovations (see Figure 4). These hackathons often involve companies of all sizes and multiple stakeholders, as well as calling for participation from those who have tech, design or business interests and skills. Hackathons for open innovation can be organised by multinational companies, which usually are not in the IT industry, but are highly reliant on either IT infrastructure to operate or IT innovations to provide new services. They can also have digital engagement plans or strategies in place for exploring and attracting new ideas outside of the companies. Similarly, open innovation instruments can be organised as industry specific events. Health and medicine are among some of the most popular industries that are featured by hackathons with MIT Hacking Medicine (<http://hackingmedicine.mit.edu/>) and Hacking Health (<http://hackinghealth.ca/>) as most prominent examples.

Figure 4: Organising open innovation instruments



**Specialist dives** are less frequent than other hackathons, largely due to the focus and organisation of these events (see Figure 5). They are led primarily by companies and only occasionally partnered with other types of organisations, such as technology enthusiast groups or startup accelerator programmes. Also, these hackathons have narrower focuses which are often a result of the size and resources of the organising companies and also the specific technological focus of the organising companies. While these events employ similar rhetoric of welcoming any interested participants, there is still an implied expectation that participants would have certain levels of technical competences and relevant industry knowledge.

**Research and innovation appropriations** are practices of showcasing the research and innovation capacity of universities or academic communities through hosting hackathons (see Figure 6). Such appropriations can be organised in several ways. Universities can become part of an organisation team where they can inform, if not lead, the preparation of hackathon themes and challenges. This way, hackathons effect as a stakeholder engagement strategy for research.<sup>5</sup> In addition, hackathons can be incorporated as part of university digital engagement or commercialisation strategies. Some of these hackathons focus on developing technical tools or social events that address social, cultural and urban issues, e.g. biodiversity, gender, programming education or missing map data. In

5 Hacking, Eating, Tracking (HET; <http://www.hackingeatingtracking.org/hackathon/>) and IMED Hackathon (<http://www.hackathon.isid.org/>) are examples of such appropriations.



addition, university accelerator programmes or innovation centres can include hackathons as part of university's innovation and commercialisation programmes.<sup>6</sup> At these events, the creativity and technology development capability of students are featured in university-based hackathons, most notably in North America but also in Europe and Australia, as another way of showcasing university's other streams of talents and innovation capacity.

Figure 5: Organising specialist dives

Organisers	Wider Stakeholders	Skills, Expertise and Knowledges	Project Proposition	Rewards
Corporation	Corporations	Professional Dev	To Set Challenges	Cash
Industry	Industries	Other Tech Prof.	To Broad Issues	Placement
University	Governments	Domain Experts	Propose Problems	Visibility
Civic	Societies	Communities	Set Problems	Entrepreneurship
Tech Enthusiasts	Sciences	Civic		Recruitment
Government	Technologies	Individuals		Societal
		Tech Mentors		
		Non-tech Mentors		

Figure 6: Organising research and innovation appropriations

Organisers	Wider Stakeholders	Skills, Expertise and Knowledges	Project Proposition	Rewards
Corporation	Corporations	Professional Dev	To Set Challenges	Cash
Industry	Industries	Other Tech Prof.	To Broad Issues	Placement
University	Governments	Domain Experts	Propose Problems	Visibility
Civic	Societies	Communities	Set Problems	Entrepreneurship
Tech Enthusiasts	Sciences	Civic		Recruitment
Government	Technologies	Individuals		Societal
		Tech Mentors		
		Non-tech Mentors		

6 For example, the Center for Innovation and Business Creation at Technical University of Munich in innovate.healthcare hackathon (<http://munich.innovate.healthcare/>).

**Societal appropriations** are events that repurpose hackathons to respond to social and political issues that have long been developing or currently ongoing (see Figure 7). The repurposing has been carried out in various ways, by diverse combinations of organisations, and taking place locally or globally. Organisationally, societal appropriations involve diverse social entities as lead or contributing partners to shape the issues, challenges or problems to be focused on. This wide range of participating organisations can include multinational or local companies, non-profit organisations or charities, or government agencies or technology enthusiast organisations. Societal appropriations of hackathons can take shape by civic and cultural organisations leading the events or being approached by tech companies for the proposition of specific problems that they face and would benefit from hackathon participants' skills to develop ideas or prototypes, if not full solutions. Hackathons in support of Techfugees (<https://techfugees.com/>), a global network of volunteers and local organisers in Jordan and Australia, for example, partnered with tech and startup companies, as well as other charity, non-profit or non-governmental organisations operating with the goals of improving the life of refugees and integrating them into hosting countries to explore the problems that obstructing the refugees from settling into the hosting countries and how technologies might mitigate these situations.<sup>7</sup> Also, Hack4FI (<http://hack4.fi/>) were co-organised by Open Knowledge Finland and AvoinGLAM, Finnish branch of a global network facilitating collaboration with participating countries' galleries, libraries, archives and museums (GLAM) institutions, which also propose various 'tracks' and 'themes' related to increasing engagement with cultural heritage.

Meanwhile, civic hacking organisations take a considerably different approach to hacking. These organisations, such as Code for America and Random Hacks of Kindness, share a similar belief with those involved in organising hackathons as open innovation instruments that technological innovations can facilitate better provision of care and services for local communities or members of the public affected by specific issues. However, civic hacking organisations also recognise that several organisational aspects of hacking have to be changed to realise their goal of improving the life of people through technological innovations. Such change revolves around 'conducting

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7 For an Australian example, see [https://techfugees-adelaide-4948.devpost.com/?ref\\_content=default&ref\\_feature=challenge&ref\\_medium=discover](https://techfugees-adelaide-4948.devpost.com/?ref_content=default&ref_feature=challenge&ref_medium=discover); <https://techfugees-au-young-people.devpost.com/submissions>; or <https://techfugees.com/news/melbourne-hackathon-continues-the-spirit-of-techfugees-australia/> [Accessed 01/August/17]

research with real people to understand who they are, what they need, and how they behave' before any design starts and also 'building the capacity of subject matter experts and local stakeholders to identify problems where technology can help, and to define and refine those problems so that volunteer technologists can tackle them'.<sup>8</sup> The combining factors of the time required for such change of practices to take effect and the discontent with limited time and engagement with communities at hackathons, civic hacking organisations take a longer-term approach to extend the scope of engaging with affected communities. These organisations also further develop methods of engagement so that innovations are grounded in the collaborative explorations of problems and suitable technologies between participants with professional expertise of technology development and with local knowledge and connections. In practice, Code for America (CfA) and Random Hacks of Kindness (RHOK), for example, both organise annual events that both organisations place emphasis on problem clarification and capacity building for the lead team of local brigades. Furthermore, CfA also provides sets of 'how-to' documents outlining instructions for a wide range of activities, from the initial set up of local brigades to engaging with communities. Also, both CfA and RhoK establish their accelerator programmers so as to sustain the development and further deployment of prototypes.

Finally, hackathons can be further repurposed as a means of engagement where technical solutions and prototypes are not the sole purpose of the events. Increasingly, there are hackathons that are appropriated for enhancing the diversity of participation, e.g. females, ethnic groups, or creating opportunities of exposure to programming for children.<sup>9</sup> Hackathons can be further appropriated and become a loose term for events of intense collaboration: lasting only for a short period of time but with specified problems and goals to achieve. This leads to more adaptation and some recent examples of data rescue and legal hacks responding to the purge of environmental data and controversial travel ban in the USA.

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8 Quoted from <https://www.codeforamerica.org/how/#practices> and <http://rhok.cc/about> respectively.

9 Examples: focusing on children and teens: <https://www.eventbrite.it/e/biglietti-scratch-hackathon-codemotion-kids-33304804567>; <https://www.eventbrite.com/e/coderdojo-indiana-hackathon-tickets-30491217051>; female: <https://www.eventbrite.com/e/womens-hackathon-csusm-april-22-2017-registration-32359304551>; Ethnic groups: <https://www.eventbrite.ca/e/black-boys-code-spring-2017-hackathon-tickets-32930167016>; [Accessed 01/August/17]

Figure 7: Organising societal appropriations

Organisers	Wider Stakeholders	Skills, Expertise and Knowledges	Project Proposition	Rewards
Corporation	Corporations	Professional Dev	To Set Challenges	Cash
Industry	Industries	Other Tech Prof.	To Broad Issues	Placement
University	Governments	Domain Experts	Propose Problems	Visibility
Civic	Societies	Communities	Set Problems	Entrepreneurship
Tech Enthusiasts	Sciences	Civic		Recruitment
Government	Technologies	Individuals		Societal
		Tech Mentors		
		Non-tech Mentors		

Throughout the discussion above, the heavy presence of local and multinational corporations and diverse industries can certainly lead to the argument that the business-led, entrepreneurial developments of cities and subjectivities extend their grip on hackathons as an instance of shared technology and city making processes (Datta, 2015; Hollands, 2008). However, they also reveal multiple forms of hackathons (see Figure 8). As detailed in the figure, the organisations and stakeholders form different alliances for hackathons of disparate economic or societal purposes, and many hackathon parts are assembled to strengthen the alliances, including knowledge, expertise, general issues (general ‘challenges’ or specific problems) and participation rewards. Project proposition is a key aspect in the process. It can be organised in a top-down manner for entrepreneurial machines or open innovation instruments in the form of ‘challenges’ - predetermined by participating companies or government agencies for participants to respond. Project proposition can also be bottom-up where participants, usually without technical competences, bring their own problems for technical developers and designers to create a prototype. Alternatively, a broad and well-established concern, such as climate change, can be adopted as a theme and event organisers then work with other organisations, ranging from governmental agencies to NGOs, to identify specific social or technical problems to attract participants to work on.

Figure 8: Typology of hackathon organisations

Organising hacks	Stakeholders (organisers & sponsors)	Knowledge and expertise	Project proposition	Rewards	Examples
Entrepreneurship machines	Corporations (local and multinational) and industries	Professionals in tech, individuals, and tech & non-tech mentors	Responding to pre-arranged challenges	Cash, visibility (product & personnel) and entrepreneurship	Angelhack hackathons; AI Hackathon Series
State economic machines	Corporations, industries and <b>government agencies</b>	Professional developers, individuals and tech mentors	Responding to pre-arranged challenges	Cash, visibility, entrepreneurship and recruitment	Ministry of Foreign Affairs and Foreign Trade of Barbados; Garage48
Open innovation instruments	Corporations, industries, <b>government agencies</b> and <b>tech enthusiasts</b>	Professionals in tech, domain experts, <b>individuals</b> and tech & <b>non-tech mentors</b>	Responding to pre-arranged challenges	Cash, visibility, entrepreneurship, recruitment and <b>societal</b>	Deutsche Bahn Hackathon; Hacking Health
Specialist dives	Corporations, industries and <b>tech enthusiasts</b>	Professional developers, domain experts and tech mentors	Responding to pre-arranged challenges or <b>problems</b>	Cash and recruitment	Viper (on digital payment)
Appropriating research and innovation	Corporations, industries, universities, <b>societies</b>	Professional in tech, domain experts, <b>communities</b> and <b>non-tech mentors</b>	Responding to broad issues or pre-arranged challenges	Visibility, entrepreneurship and <b>societal</b>	Open Geneva Hackathon; Unihack
Civic appropriations	Corporations and <b>civic organisations</b>	Professional in tech, domain experts, communities, civic organisations, <b>non-tech mentors</b>	Responding to broad issues, <b>proposed problems</b> or <b>specific problems</b>	Visibility, entrepreneurship and <b>societal</b>	Techfugees; Random Hacks of Kindness

The exploration of how hackathons are assembled also tracks the irregular patches and unanticipated gaps emerging in the neoliberal ruins of shared technology making. In Figure 8, the elements marked in red are the actors, project propositions and societal rewards (incentives apart from cash or entrepreneurship) that work together to repurpose hackathons as an event format for producing socially desirable outcomes. The assembling of hackathon parts in ways not invited by neoliberal logic and operation thus marks, registers and exercises the refusal to perpetuate established political economy of technology making. These irregularities thus deserve greater attention for discovering how heterogeneous rationalities and practices become entangled at the edge of neoliberal ruins.

## Entangled rationalities

In this and the next section, I draw on hackathon interviews and observations to discuss the motivations, practices and experiences of hackathon organisers and participants. These explorations are ways of noticing how the entanglements might reconfigure neoliberal logic,

fantasies and operation and produce meaningful patches and gaps for considering the possibilities of shared technology making.

*Passion for innovation and appreciation for appropriate technology*

Hackathons attract participants passionate about technological innovation, but their motivations and understandings of innovation do not always align with economic or entrepreneurial developments. For some participants, a hackathon is a place to indulge in new tools to create elaborate technological functions (e.g. new software frameworks or libraries for complex user interaction, data manipulation or visualisation). Accordingly, hackathon's neoliberal remit to develop prototypes for future city solutions or business ideas, or participants as entrepreneurs (e.g. expanding personal contacts at the event), are paradoxically circumscribed by the fascination with the technological sublime. Meanwhile, redefinitions of innovation have become crucial in civic hackathons to prioritise the development of appropriate technology that is fit for the context of use, rather than chasing the new. Such belief is critical for NGOs or ICT for Development projects that usually have operations and field workers based at sites that do not enjoy the infrastructural stability and reliability (particularly electricity and Internet) as Western countries do. However, the availability of such belief and appreciation is not guaranteed by the market. In the interviews with NGO representatives at hackathons, they express shared frustration with professional developers and consultancy companies in their failing to grasp the technical realities that the NGO's field workers struggle with on a daily basis. The failure is set in contrast with their surprise at the accurate understanding of the technical constraints in remote sites by some of the hackathon participants:

I assume none of those had worked on an NGO but they seemed very quick to understand the context and imagine it being used and realise that offline really means offline, it means no power, no mobile, no internet. ... we have worked before with corporations, software providers and development houses and they are like, oh yes offline, offline. But they think you have got 3G or something and just no Wi-Fi. But no, sometimes you have nothing and you still need to do your job (Interviewee H01)

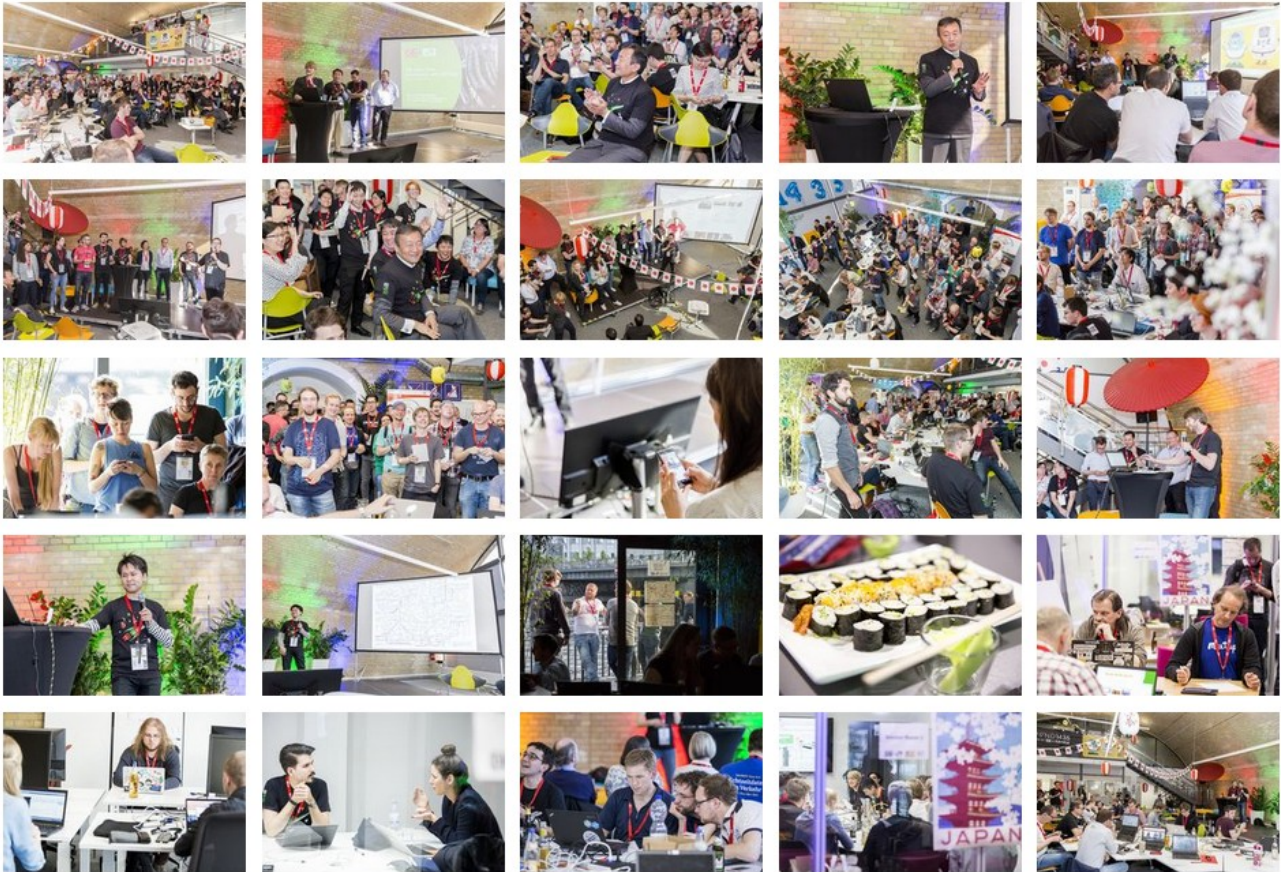
The appreciation for appropriate technology, however, requires a shared understanding and commitment to preparatory work before hackathons. Accordingly, techniques to negotiate between the technological sublime and the technical constraints in NGO field sites are developed by hackathon organisers for preparing problem statements (detailed in next section).

### *Staged conviviality and painful ignorance*

In open innovation hackathons, prototypes and business plans are developed in tandem and celebrated as successful 'co-creation' where different visions and knowledge are seamlessly integrated. Particularly for the events organised or heavily sponsored by multinational corporations, these 'success' stories are documented, most tellingly, in photo galleries that depict conviviality and collaboration (for an example, see Figure 9). However, such conviviality can be staged where the painful ignorance as a result of conflictual rationalities at hackathons are endured but erased.

A smart city hackathon, for example, invited participants and mentors from diverse professional backgrounds, both technical and non-technical. One of the teams proposed to develop a LED lighting system for city-wide deployment. While the intention to create interdisciplinary dialogues and co-creation opportunities was apparent, the differences between the rationalities entrapped in the same team were difficult to overcome. The promise of cost reduction from the new lighting system preoccupied the project leader, who also developed the business case for the project, while the hardware and software developers remained obsessed with the benefits of direct behavioural change as a result of technological innovation. However, the members with the background of industrial design felt frustrated after their proposal to consider the visions and versions of the prototypes from other perspectives are ignored. One of the hackathon mentors sensed the frictions and encouraged them to convince other team members to clarify the problems that they wanted to address. The disparate rationalities present in the team led to painful mutual ignorance, leaving the designers to finish the model lighting system, the developers to produce a barely functioning LED lighting prototype, and a project pitch that had little progress beyond some sketches about lighting in future cities.

Figure 9: Conviviality and collaboration in open innovation hackathon photo gallery



### *Engine of innovation and uncertain exploration*

Hackathons usually have high dosage of enthusiasm for the instrumental value of innovation in addressing social challenges. Following such passion, some research and academic institutions also explore if hackathons can be re-appropriated for scientific purposes. In these instances, curiosity and uncertainty better describe the rationale behind the pursuits, even though the usual celebratory discourses of innovation for problem-solving are still adopted. Instead of seeking commercial exploitations or building entrepreneurship, these events are motivated by the uncertain, open-ended explorations, a contrast to ensuring knowledge generation in current living labs and ‘experimental cities’. Instead, these hackathons are merely opportunities of mutual exploration between those who possess the technical know-hows to build prototypes and those exploring how these prototypes might benefit their own work, research or professions. These hackathons still retain instrumental rationality, but also recognise the irreducibility of uncertainty and wider ‘contextual’ and societal influences that shape research and innovation processes. This recognition can be further demonstrated in an interview with the hackathon organisers who work



at a world leading medical research institution in Boston and have organised a hackathon to explore how wearable technologies can contribute to improve eating behaviours and personal health:

So definitely there is a lot of contextual influence and environmental influence in what we eat. It is hard to study that, it is kind of in the spectrum of the most complex part in this scenario, from the individual more into the environment. So we got a glimpse of that with those talks and I think the artist also provided a more broader sort of, they brought out that component, but it is probably the hardest part to integrate.

(Interviewee H46)

### *Neoliberal and technocratic rationality critiqued*

More importantly, hackathons, hacking events and also maker spaces can be organised as critiques. Feminist critiques, practices and initiatives have used hackathons, and other events with similar formats, to promote the equality of genders, races or classes in the participation in technology making. Their central concern is the neglected viewpoints, experiences and assumed incapacibilities with regards to technology making at all levels, from schools and universities to professional (Fox et al., 2015; Maalsen and Perng, 2017; Rosner, 2014). Therefore, a key issue for them is whether programmer or maker subjectivities, but not new technologies, can be developed. These events and initiatives thus foreground the possibility of incorporating 'feminist standpoint theory to specifically engage with user perspectives that are left out of a design regime dominated by Western universalism, including perspectives from women, communities of color, children, low-resource contexts, and the Global South'. Furthermore, when it comes to hackathons, feminist critiques are incorporated to address the 'perspectives are marginal and often overlooked' where 'designers need learning experiences to appreciate the concerns, constraints, and opportunities afforded by them' (quotes from D'Ignazio et al., 2016: 2614).

## Entangled practices

### *Entrepreneurial hackathons as symptom of failure and limits of neoliberal fantasies*

Although 'neo-liberal co-optation of the commons' and shared technology making seems widespread (Zandbergen, 2017), the growing of entrepreneurial hackathons is a symptom of the failure of neoliberal fantasies about city and technology making. Setting aside those asking for high entry fees, hackathons provide food, entertainment, (some form of technical or business) training, (basic) accommodation and opportunities to network, with relative cheap to no costs for a weekend. These attract those who feel alienated at work, including dissatisfied with the day-to-day duties and not having ownership of the work they produce (often software code bound by intellectual property rights), as well as the unemployed looking for new contacts, vacancies and a cheap way to get by over the weekend. Furthermore, there is considerable 'inventiveness' and imitation that take place before, during and after hackathons. Even for hackathon novices, they quickly observe and learn techniques of participation, including quick prototype development, ad hoc project management and project presentation in an 'elevator pitch' style. They then replicate and improve the techniques in subsequent events to increase their competitiveness. Hackathon participation thus becomes work itself for the slim scope of securing prizes, places in incubator or accelerator programmes, and eventually venture capital. These all contribute to the precarity in social and economic livelihoods of the participants (Perng et al., 2017). Hackathon participation thus is a means of survival, not success.

Some participants would ignore neoliberal co-optation when organisers and sponsoring companies exercise too much control over prototype and project developments. Here, a classical sense of hacking and ownership of technology can be rehearsed. Professional programmers can use their own time to conduct desk or field research to identify real problems to work on. These practices become possible because hackathons are organised in series and become social events for 'like-minded' people to meet through repeat participation. The sense of belonging to a 'hackathon community' fosters collective resistance against neoliberal appropriation of collective intelligence.

### *Organisation practices shaping hacking processes*

Organisers and mentors play critical roles in intervening neoliberal co-optation by foregrounding collaboration rather than competition and also existing problems but not innovation, as event's goals. Organisations including CfA, RHoK and Geeks without Bounds produce and circulate 'how-to' and 'best practices' documents that suggest methods of community engagement and problem definition. These 'how-to' and 'best practices' are shared publicly but also within an 'epistemic community' (Haas, 1992) of civic hackers so that some possibilities of integrating societal values into technological innovation can be explored in civic hackathons. Some suggestions include discouraging technological developments for the enjoyment of participants and promising 'no big prizes' for a civic or humanitarian tech event. These measures change the dynamics within and between the teams, focusing less on competition but more on collaborative engagements among the teams, because 'when it's one big cash prize, no one talks to other[s]'.<sup>10</sup> In addition to event dynamics, technological developments would be directed towards practical problems rather than the technological new as an end goal. As a programmer reflected, her experiences and that of her team members at a civic hackathon were influenced by the organiser's introduction to the event that reminded the purpose of the weekend:

... when [the organiser] said that at the beginning how this weekend is not the weekend to learn how to programme in some new language or use some new framework that you have been dying to use. When he said that it was like, yes you are totally right, I need to get that out my head and we basically just moved for some technology that we knew already. (Interviewee H03)

### *Corporate practices and resources repurposed*

Time, money, venues and technical skills, such as design, project management or programming, are all necessary resources for organisers to programme civic hacking events and hackathons. While some initiatives have grown their scales and are able to provide resources by themselves, many others re-appropriate corporate resources and practices. From multinational corporations to co-working space startups, civic hacking events and initiatives benefit from partnerships with them

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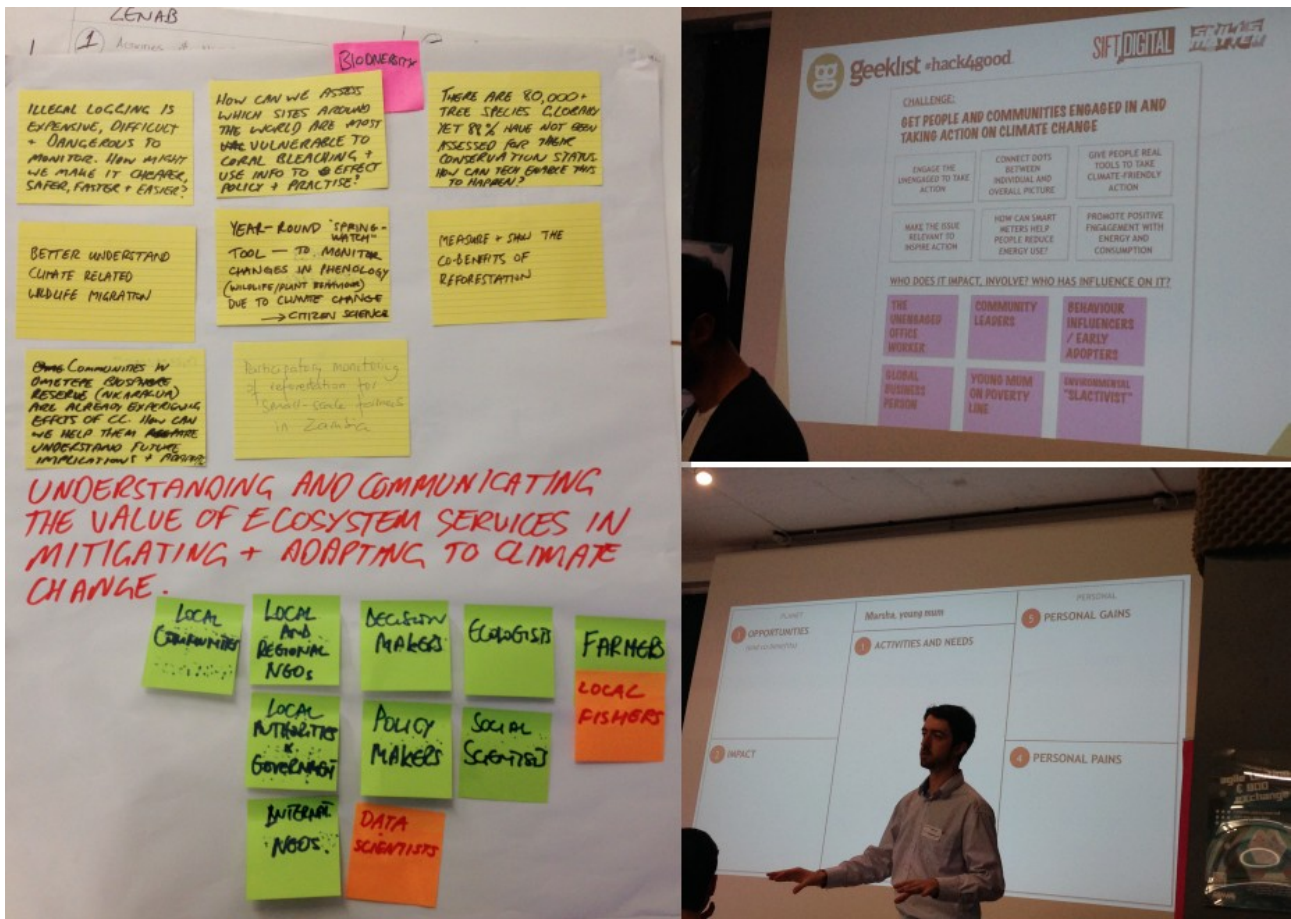
10 Quoted from <http://gwob.org/hackathon-best-practices/> [Accessed 15/August/17]

to provide space and catering when events are organised. These partnerships can be formally established as undertaking corporate social responsibility or informally through personal networks, which can be long-term or one-off. These partnerships ensure that basic event organisational needs are met and contribute to sustaining a longer-term development of civic hacking initiatives and events.

Furthermore, corporate project management and technology design practices can be appropriated. This appropriation is important because problem proposition for civic hacking and hackathons are tricky. If a problem or challenge proposed by participating NGOs are too broad, civic hackers are left to their own device to imagine a prototype that is unlikely to work in the NGOs' day-to-day work context. If a problem is narrowly defined, it can deter participants from joining. Accordingly, problem proposition is critical in facilitating project and team formation during hackathons by showing to the participants in concrete ways how their technical skills matter to the problems and what prototypes they are expected to develop. However, NGOs lack the experiences of proposing technical specifications that can be realistically achieved within a weekend or by a small contract afterwards. While some organisations do have that capacity, it is contingent upon the scale of the technical department and how well the technical department communicates and understands the problems faced by field workers.

The images in Figure 10 show a hackathon preparation workshop in action where the organiser and NGOs used design methods well established in the corporate sector to formulate project ideas for hackathon participation. At the workshop, the initial, broad problems that the NGOs sought to tackle were turned into statements of specific issues that technologies can address. While this process risks the compartmentalisation of complex issues and fixation on technical solutions, the post-it notes that were made by NGOs and populated the flip-boards still remind how one problem can be experienced and manifest differently to various groups of people and places and also the importance of local engagement with diverse stakeholders, policy makers and experts.

Figure 10: Appropriating corporate practices for formulating civic hackthon problem statements



### Hacking and innovation critiqued

Crucially, for hacking to become a critique or an instrument of engagement, event programmes have to be carefully reconsidered. In the breast pump hackathon mentioned above, the organisers ‘made use of the feminist HCI approach in our design process, namely by including and explicitly valuing as expert knowledge the voices and ideas of mothers at every event’ (D’Ignazio et al., 2016: 2614). In practice, they ‘convened around 25 midwives, mothers, lactation consultants, public health researchers, designers and engineers in an open-ended brainstorming session and conversation about the breast pump’ to identify various social and technological ‘pain points’ during or discouraging the use of breast pump, which are then turned into a call for ideas to the public for improving the breast pump (D’Ignazio et al., 2016: 2614–5). Furthermore, the emphasis on ‘innovation’, ‘productivity’ and ‘fixes’ in tech culture and industry can be critiqued and ‘hacked’. Encouraging the participation from women and moms, as well as from those with restricted accesses to technology due to races, classes or sexualities, these feminist and diversity initiatives

organise spaces and events that foreground the value of all kinds of curious pursuits, experiences (including failures), and the continuous development of coder and maker subjectivities (Maalsen and Perng, 2017; Rosner and Fox, 2016).

Finally, hackathons can be a pragmatic instrument for collective, political actions, without discursive or technological emphases on creativity or innovation. 'Data rescue hackathon' is a most recent example where a series of 'hackathons' in different US cities are organised and where 'issue publics' (Marres, 2007) emerge because of their shared concern with the removal of environmental data from US Environmental Protection Agency. The discontent with the removal has led to gatherings that repurpose hackathon event structure, of intensive work within a short period of time with a practical goal, to scrape and preserve the data that are still available to be archived by alternative means.

## **Conclusion**

Shared technology making has become important and valuable urban practices. It produces visions for collaborative, participatory and inclusive ways of governing cities by reinvigorating the ethical and societal values of F/OSS and open hardware in urban contexts. However, in the process of urbanising shared technology making, such practices encounter neoliberal co-optation where ethical and societal values are translated in market terms for capital accumulation. A pressing question arising from the neoliberal co-optation then concerns the prospect and possibility of shared technology making.

The paper draws on Tsing's concept of ruins to examine hackathons as a way to specify neoliberal ruination in action and also explore if shared technology is still possible. Traces of neoliberal ruination can be found throughout the explorations of the different ways hackathon parts assembled. This confirms again the generative and creative capacity of neoliberal logic in implementing the exploitation of wider societal and ethical values. However, the multiple existing of hackathons shows the first sign that there are entangled rationalities and practices emerging from the neoliberal ruins of shared technology making. The heterogeneous rationalities and practices that at times adhere to neoliberal and instrumental rationality but at others cripple, intervene, repurpose, resist or simply fail to comply with neoliberal fantasies and homogenising

operations. These entangled rationalities and practices emerge to question the perceived and usually silenced gender, racial, social, economic and political subjectivities and issues in innovation processes and explore means of repurposing corporate resources and practices to foreground these subjectivities and issues. These entanglements taken together create meaningful cracks and produce irregular patches when neoliberal city- and technology-making embodied by hackathons seek to extend their control.

More importantly, the analysis of neoliberal ruins suggests a need to consider the possibility of shared technology making by paying greater attention to the conflictual relationships and continuous struggles that the entangled rationalities and practices have already produced. The attention to these conflicts and struggles is equally important as critical examination of global political economy that influences shared technology making. Such re-focusing tells how: (1) future possibilities can build upon the agential effects of those holding and exercising values and judgements that disagree with and intervene in neoliberal logic and operations; (2) strategic alliances and pragmatic arrangements to involve corporate and industry actors can provide crucial social, technological and financial means to sustain the agential efforts; and more importantly (3) possibilities of future city- and technology-making are distributed and do not reside in a dichotomous split between mainstream/alternative (smart) urbanism or within/beyond global economy. Rather, these entanglements show hopes in most destructed places for shared technology making without claiming harmony or conquest as their endgame. Continuous work thus has to take into account the generative practices of global political economy in exploiting new hopes but also the irregularities and gaps produced by hopeful practices and the corresponding cultural, economic and regulatory interventions to sustain the patches.

## **Acknowledgements**

The paper is supported by The Programmable City project, funded by a European Research Council Advanced Investigator award (ERC-2012-AdG-323636-SOFTCITY) and a Ulysses award co-funded by the Irish Research Council and the French Ministry of Foreign Affairs. I owe immensely to Rob Kitchin for his unwavering support and productive critiques during the writing of this paper and my time on the project. I am equally grateful for the always warm, encouraging and constructive comments on this paper and other drafts from Aoife Delaney, Bob Bradshaw and Caspar

Menkman. I benefitted from the discussions at The Right to the Smart City and Ulysses knowledge exchange workshops at Maynooth University and Mines ParisTech, as well as the additional critical feedback from Liam Heaphy and Cesare Di Felicianantonio. Progcity/MUSSI writing group has shown me how to write, and all the Progcity people and the wider MU community (including those who left) never failed to provide heartening conversations when I needed them. Thank you.

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