The Future of Open Systems Solutions, Now.

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r0g_agency for open culture and critical transformation

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'I WANT AN ACCESS TO THE WORLD OF KNOWLEDGE.'[1]

Malala Yousafzai, Swat District, Pakistan

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[1] http://thelede.blogs.nytimes.com/2012/10/09/my-small-video-star-fights-for-her-life/

Contents

Abstract

The aim of this report is to provide an overview and analysis of WSIS Action Line C3 '*Access to Information and Knowledge*', with regards to the effects and applications of free and open ICTs and their related methodologies, referred to hierupon as 'Open Systems' on mitigating the effects of four identified United Nations global challenge areas:

- Climate Change and Environmental Responsibility
- Access to Quality Education and Knowledge
- Post-Conflict and Post-Disaster Response
- Gender and Minority Empowerment

The report focusses on action, implementation and connections between open systems solutions, particularly in regions of rapid societal and political transformation where simple access to technology and the internet are limited or infrastructurally challenged. It outlines the needs and means with which to interconnect a wide range of free and open ICT tools, frameworks, concepts and methodologies to create comprehensive open systems solutions to tackle the identified challenges.

The report encompasses three levels of detail. In the first or basis level, it introduces the leading concepts and historical frameworks behind the notion of 'open' that have emerged of the free and open source software (FOSS) movements, and their subsequent application in much broader realms of activity and social enterprise. It identifies the open source model as one of sustainability and collaborative practice based on publicly available knowledge and content which in turn acts as a key resource to social development, freedom of expression and self-determination. As such it provides rationale for governments, communities and its citizens to recognize the value of open systems in addressing their development, education, ICT literacy goals and challenges.

The second level of detail links the defined notions of open systems to the actual implementation of solutions and strategies. It emphasizes the ways in which open systems help cultivate new competencies for citizens to access and participate in global knowledge societies, thus breaking down the lingering effects of digital divides and promoting greater equality in dialogue between South and North. Innovative cross-disciplinary cases studies that show the interconnectivity between the identified challenges and how open systems solutions, rapidly moving from policy theory to implementation fact, have the potential today to address the mitigation of some of the most complex problems, particularly in the

contexts of international development.

The concluding segment regards the possibilities to create a comprehensive Open Systems Strategy for the newly independent state of South Sudan. Presented in the form of a very specific challenge that brings together the aims and elements of WSIS Action Line C3, applying these in an exemplary manner in which the international community has the opportunity to address the mitigation of deep-rooted conflict, bypassing the digital divide and helping set the scenarios for tangible freedom of expression and access to knowledge.

Seven recommendations are set forth to support universal and pro-active access to open knowledge and technology. As urgent calls to policy makers, the recommendations capitalize on the global acceleration of the technologies that have become the generators of prosperity and progress for many parts of the world. They emphasize the need to create comprehensive knowledge commons that, especially in conjunction with the rapid development of Open Educational Resources (OER) have the ability to become the 'libraries of the future', today. The vast and cross-disciplinary forms of knowledge and content that have been generated by the collaborative enterprise that has emanated of network culture must now be reaped to support the active participation of all players in strong, open and pluralistic knowledge societies.

Introduction

'I WANT AN ACCESS TO THE WORLD OF KNOWLEDGE.'[2]

This simple plea, penned by Pakistani schoolgirl and human rights activist Malala Yousafzai, a few days before she was shot by militant civil society opponents, sums up one of the greatest challenges faced by today's globalized media and communications society. She pleads not for the fundamental right to be able to go to school, not for the institution, but for the right to **access** the world of **knowledge** that lies just beyond her grasp. The statement graphically illustrates the basic problem of access to learning for many children worldwide. It points to the potentials of the vast resources for education, scientific research as well as social and economic development lying behind firewalls of fear and ignorance. It also signals the urgency attached to WSIS Action Line C3 '*Access to Information and Knowledge*' in in which UNESCO is the responsible facilitator, and to which governments are committed to provide freedom of access to public information and facilitate the technical accessibility to ICTs and the internet, especially for disadvantaged, marginalized and vulnerable groups.

A Slice of Open Evolution in the WSIS Process

In its efforts to promote and encourage global knowledge sharing and enabling unhindered and equitable access to the information that people around the world, be they urban citizens, remote rural land-workers, digital rights activists, policy makers or political representatives, UNESCO seeks to create a picture of the world of Open Systems ten years after the first World Summit on the Information Society – WSIS in Geneva in 2003, and its succeeding summit in Tunis in 2005.

This report, beginning with the core notion that the guaranteed and unhindered access to information and the sharing of knowledge are fundamental human rights, will explore specific and real results, degrees of implementation, successes and hindrances in the development of diverse ICT-led knowledge creation and dissemination scenarios. It will have a strong focus on social, political and cultural empowerment in regions that are experiencing the most rapid forms of societal transformation including Africa, Latin America,

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2   http://thelede.blogs.nytimes.com/2012/10/09/my-small-video-star-fights-for-her-life/

Central and South East Asia. Creating a clear picture of the world at WSIS +10, given the literal explosion of social media and the rapid expansion of Free and Open Source Software (FOSS) and its many related elements over the past decade is a complex task given the highly diverse global communities with often equally highly divergent agendas that are now actively applying 'Open' strategies. Alone the term 'Open Source' is no longer adequate when considering the vast realms of open technologies, and their concepts and methodologies – be they Open Data, Open Access, Open Education Resources (OER), Open Hardware, Open Design, Collaborative Digital Systems and Platforms, Device or Data Journalism[3], Free Culture, Sharism[4] and so on. For the sake of this report, and in order to better reflect the true value, intentions and complex interconnections of open, publicly available and sharable information, data and knowledge, the inference here will be to the broader realm of Open Systems and Open Cultures, rather than strictly Open Source, unless we are specifically discussing FOSS or related structures or methodologies.

Interaction between the UN's Four Challenge Areas

The Open Source model as a fundamental key philosophy has always been one of effective collaboration and innovative sustainability. Applying these elements to the broader view that an Open System provides, we are better equipped to address some of the UN's key global challenge areas:

- Climate Change and Environmental Responsibility
- Access to Quality Education and Knowledge
- Post-Conflict and Post-Disaster Response
- Gender and Minority Empowerment

These key global challenges are themselves highly interdependent and as is the case with the 'systems' approach to the realm of Open Source, addressing one element of these challenges ultimately directly benefits or influences the others. This global paradigm of interconnectivity coupled with the desire and attitude to attain just, free and prosperous civil societies acting collaboratively and responsibly is a key element in both understanding and applying Open Systems Solutions. It would be potentially misleading, for example, to

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3   i.e. using the power of open data, mobile technologies, aggregation and assessment software with traditional 'fact finding' journalism to tell complex stories that include user-friendly infographics. See i.e. the OKFN produced Data Journalism Handbook: http://datajournalismhandbook.org/

4   Together with a number of international contributors, Shanghai based technology entrepreneur, social media researcher and software developer Isaac Mao, one of China's first and most visible bloggers, has developed the notion of "Sharism" as a comprehensive philosophy of open culture collaborative practice. http://sharism.org/

speak of the applications of open data for education without making the potentially resultant connections to environmental responsibility and gender empowerment that the use of open data can enable.

Open Systems: A Global Model for Access and Action

By the time the WSIS convened for the first time in 2003 the notion of 'Open Systems' had begun to be understood in numerous sectors of society as a much broader field of activity beyond the very technical and software-associated terminology of 'Open Source'. In science, academia, media and cultural theory, digital activism and the many emergent fields of data-based knowledge creation, Open Systems emerged as the signifier of a new and uniquely sustainable form of collaborative practice. Systems based on the FOSS principles of free and sharable knowledge have application today in an infinite spectrum of creative and innovative development. These have included such diverse realms as robotics (i.e. swarm intelligence technologies), navigation, geo-mapping and orientation (i.e. via locative media) to demographics and citizen response (i.e. via real time data polling and crowdsourcing). The notion of a source 'code' for computer languages and software platforms being open, i.e. freely available, distributable and amendable without license – as a great deal of software code had been before the advent of the World Wide Web in the early 90's – was only one, albeit significant element of the 'open' realm. It was also felt by many of the pioneers of these ideas that since the word 'open' was difficult to clearly define across sectors and in a philosophically appropriate way, that distinctions must be made between what had become known as the Open Source Movement, as opposed to that which should more distinctly be known as the Free Software Movement. The term Open Source could in fact be interpreted to mean software that had proprietary elements, or was not as free to use as intended. Richard M. Stallman, a leading Free Software pioneer, squared off the argument by making the distinction an ethical one:

> "The fundamental difference between the two movements is in their values, their ways of looking at the world. For the Open Source movement, the issue of whether software should be open source is a practical question, not an ethical one. As one person put it, 'Open source is a development methodology; free software is a social movement.' For the Open Source movement, non-free software is a suboptimal solution. For the Free Software movement, non-free software is a social problem and free software is the solution."[5]

This debate essentially put both sides of a very similar coin into camps based on ethics

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5   http://www.gnu.org/philosophy/free-software-for-freedom.html

and ideology rather than making them partners in ethical creativity and macroeconomic jurisprudence. Stallman remarked that people are afraid of what they think is "free software", it makes them uneasy because "talking about freedom, about ethical issues, about responsibilities as well as convenience, is asking people to think about things they might rather ignore. This can trigger discomfort, and some people may reject the idea for that. It does not follow that society would be better off if we stop talking about these things."

And today we do talk about these things, more than ever before. The connections between ethics, sustainability, collaborative enterprise, freedom of choice and expression empowerment and self-determination are all elements beyond the basic questions of technical efficiency within the philosophies of Free (or Libre) and Open Source Software (OSS). It is the fused worlds of FLOSS that have spawned so many 'open' and 'freedom-enabling' technologies, methodologies and movements. In turn these have their greatest impact where people are allowed to have simple access to them, and can adapt them for the particular situation in which they find themselves. This allows those global regions central to UNESCO's mission where basic ICTs, access to information, knowledge and data, are emergent practices to embrace and better understand the advantages and implications of such 'open' systems.

Defining 'Open'

For the sake of this report, the criteria of 'open' as defined by the Open Knowledge Foundation (OKFN[6]) 'Open Definition' (Version 1.1)[7] will be followed. This definition, created shortly after the inception of the OKFN in 2004, is based in large part on the Open Source Definition set out by the Open Source Foundation in 1998[8], but covers a much broader realm than software to include the carriers of knowledge in general including:

- Content such as music, films, books
- Data be it scientific, historical, geographic or otherwise
- Government and other administrative information

Briefly summarised, this definition of 'open' entails a work whose manner of distribution

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6   see also the recent Open Knowledge Festival http://www.okfest.org
7   http://opendefinition.org/okd/
8   http://opensource.org/docs/osd

satisfies the following conditions[9]:

1. **Access** The work shall be available as a whole, without limitation of access by indirect means, for example by only allowing access to a few items of a database at a time.

2. **Redistribution** The license shall not restrict any party from selling or giving away the work either on its own or as part of a package made from works from many different sources. No royalty or other fee for such sale or distribution is applied.

3. **Reuse** The license must allow for modifications and derivative works.

4. **Absence of Technological Restriction** The work must be provided in such a form that there are no technological obstacles to the performance of the above activities.

5. **Attribution** The license may require as a condition for redistribution and re-use the attribution of the contributors and creators to the work.

6. **Integrity** The license may require as a condition for the work being distributed in modified form that the resulting work carry a different name or version number from the original work.

7. **No Discrimination Against Persons or Groups** The license must not discriminate against any person or group of persons or exclude them from the *open knowledge process.*

8. **No Discrimination Against Fields of Endeavor** The license must not restrict anyone from making use of the work in a specific field of endeavor, be they commercial or otherwise.

9. **Distribution of License** The rights attached to the work must apply to all to whom it is redistributed without the need for an additional license *or non-disclosure agreement.*

10. **Must Not Be Specific to a Package** The rights attached to the work must not depend on the work being part of a particular package.

11. **Must Not Restrict the Distribution of Other Works** The license must not place restrictions on other works that are distributed along with the licensed work.

How then do the interrelated 'Open' elements that make up comprehensive Open Systems contribute to the positive mitigation of the UN's four key challenge areas? How have governments perceived these challenges, what has been done to directly address them using FOSS and Open Systems methodologies? What have been the roles between those 'on the ground' in developing and implementing such solutions independently or in direct response to government initiative? How in fact have Open Systems themselves acted to

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9   This is a condensed version of the actual OKD http://opendefinition.org/okd/. Sections 7 - 11 are taken directly from the OSD http://opensource.org/docs/osd

open government itself, making it more transparent and accountable to the population?

Opening Knowledge and Education: struggles between crisis and vision

Unhindered access to shared knowledge is a key factor in cementing the fundamental right to quality education. In Malala Yousafzai's Pakistan, the numerous FOSS and Open Data initiatives that emerged in the late 1990's, and accelerated through the Geneva and Tunis WSIS rounds, have created a successful and commercially driven provision of internet services to a broad a segment of the population, both rural and urban.[10] A number of major programs and organisations formed in the period 2003 – 2005, such as the OSSFP: Free and Open Source Source Software Foundation, an independent FOSS advocacy group and the *Open Source Resource Center* (OSRC), set up by the *Pakistan Software Export Board* (PSEB), aimed at the widespread implementation of innovative FOSS and Open Systems programs to catalyze the widespread adoption of a truly open information and knowledge economy in Pakistan. While this development has undoubtedly contributed greatly to the high level of media literacy in Pakistan – Malala's shooting stresses the fact that access to basic education and knowledge especially for girls and women, remains a major challenge. Compounding this challenge, the organisations mandated by the government with research, development and advocacy of FOSS, OER and open systems as a major cornerstone of Pakistan's development have since disappeared[11].

Despite the turbulence in Pakistan's political establishment vis-a-vis FOSS and Open Access "there's much positive work which is liberal, progressive and for public benefit which tries to reverse the negative trends"[12] with the success in widely anchoring organisations such as B4A in Pakistan being one of these. "Media and new technologies, especially those that pronounce a FOSS direction weigh in on many conflicts and fault lines that run across Pakistan."[13] Digital culture advocate Yasir Husain points to a number of such fault lines such as dysfunctional school systems in which open systems methodologies, open data, open access and FOSS are actively working together to improve the access to quality education, to help increase environmental awareness, especially among children.

As a member of the Greener Karachi Trust[14], a group that works to promote green living in

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10 The rapid rise of telecenters and the wide application of FOSS within the IT industries as an economic alternative to proprietary software contribute to this. Please see the in-depth chapter on the development of FOSS in Pakistan by Fouad Bajwa, p. 196 - 242 in http://www.ifossf.org/files/Telecenters%20in%20Pakistan%20Volume%201.pdf

11 The FOSSFP site, one of the heaviest traffic sites in Pakistan, and the OSRC have since been shut down, http://web.archive.org/web/20071230154151/http://www.fossfp.org/

12 Email note from media theorist and environment activist, Yasir Husain, to Stephen Kovats, September 2012

13 ibid. Husain, 2012

14 http://www.cropsinpots.blogspot.de/ and http://www.facebook.com/GreenerKarachi

Karachi, Husain has begun a collaboration with The Federation of Pakistan Chambers of Commerce & Industry (FPCCI)[15], a leading trade body, partnered with municipal government schools in Karachi to to develop a radical climate and environmental awareness program for the pro-active greening of 700 schools (over 700,000 students) through hands-on sustainable urban farming practice, IT and media development, access to environmental data, and environment auditing. Aimed at real ecological capacity building, adhering to ISO 14000[16] environmental management and impact standards, the '*Eco-Literacy Project for School Systems*'[17] will re-generate interest about valuable lost practices (i.e. urban gardening), real time and space biodiversity as well as the value of an individual's carbon footprint with an intention to spread the education into the realm of the pupil's everyday life, extending the 'classroom' to the home and neighborhood. The project, divided into thematic sub-sections and elements such as 'The Learning Garden', 'Environment Improvement Projects' and 'Materials Development' is set to teach the relationships between urban life, pollution, resource management and natural ecosystems with their connections to the realities of climate change. Using open source platforms, tools, public domain data sets, DIY technologies – in some cases even open hardware and robotics[18] the initiative is an unique example of OER being applied, in perhaps one of the most challenging public education systems anywhere. It is estimated that of Karachi's 2700 public schools roughly 50% are completely dysfunctional.[19]

The forms of awareness the Eco-Literacy program is intended to cover include the increasing frequency of natural calamities – especially flooding which have been occurring in Pakistan. As living and threatening signals of climate change, the floods were, and remain, a graphic reminder of the interconnections between the natural and our built environment. For the first time in a major flood situation in Pakistan relief coordination was carried out by open source tools, crowdsourcing and public data using the Sahana Eden platform[20]. The Sahana Pakistan flood crisis management platform includes a complex multi-layered, real time and collaborative map with comprehensive information on the affected areas (including for example: damage, rescue equipment in use, requests, warehouses, shelters, dam status reports). The platform allows users including those directly affected by the flooding to request relief via SMS, find shelters as well as review reported incidents and potential errors in the information or data.

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15 http://fpcci.org.pk/
16 http://www.iso.org/iso/iso14000
17 Eco-Literacy Project for School Systems concept paper by Yasir Husain and Zahra Ali, September 2012
18 https://www.facebook.com/Robotics.labs and http://www.myrobotics.net/
19 ibid. Husain, 2012
20 http://eden.sahanafoundation.org/

From Disaster Response to Real Time Crisis and Data Mapping

The Sahana Software Foundation's 'Open Source Humanitarian Platform' *Eden*[21] used in the 2010 Pakistan floods is based on a rapid deployment open source solution originally sought out and "developed by members of the Sri Lankan IT community in the immediate aftermath of the 2004 Indian Ocean earthquake and tsunami. The community of Sahana developers has since grown to include experts in emergency and disaster management as full partners in the software development process. This is extremely unique in the governance of software projects, and a unique strength of the Sahana Software Foundation"[22]. The Lanka Software Foundation (LSF)[23] was the first owner of the intellectual property making up Sahana software, and under its stewardship, Sahana software grew into a global free and open source software project supported by hundreds of volunteer contributors from dozens of countries. It has supported national and local authorities and relief agencies in their response to numerous large-scale, sudden-onset disasters globally in developing countries and as well as highly industrialised regions including rapid response earthquake and flood management in Japan, China, Peru, Bangladesh, Indonesia, Haiti, Pakistan, Chile, USA and New Zealand among many others[24]. In 2009 Sahana was spun off the LSI into its own non-profit open source organisation, 'The Sahana Software Foundation' which now operates three primary channels of response[25]:

- **Eden** - flexible humanitarian platform to provide effective solutions for critical humanitarian needs management either prior to or during a crisis.
- **Vesuvius** - disaster preparedness and response for the medical community, contributing to family reunification and assisting with hospital triage.
- **Mayon** - emergency personnel and resource management, highly scalable to manage large numbers of events, persons and resources.

It is perhaps through mapping, crisis management and post-crisis relief, user driven and crowdsourced data that FOSS and Open Data solutions have become the leading disaster relief systems worldwide. Next to highly successful and innovative organisations like Sahana, Nairobi based **Ushahidi** has emerged as one of the world's leading FOSS organisations, creating software, platforms and interfaces for extremely user-friendly information collection, data visualisation and interactive mapping. Non-profit Ushahidi (meaning "testimony" in Swahili) prides itself with "building tools for democratizing

21 http://eden.sahanafoundation.org/
22 http://sahanafoundation.org/about-us/history/
23 http://www.opensource.lk/
24 http://sahanafoundation.org/community/deployments/
25 http://sahanafoundation.org/products/

information, increasing transparency and lowering the barriers for individuals to share their stories."[26] Begun as a website to map reports of violence in Kenya after the post-election fallout at the beginning of 2008, the Ushahidi platform anchored itself in the collaboration of Kenyan citizen journalists during a time of crisis. The original website was used to map incidents of violence and peace efforts throughout the country based on reports submitted via the web and mobile phones. The original website[27] had 45,000 users in Kenya, a fact that became the catalyst for the Ushahidi team to realize that there was a need for a platform based on this service, which could be used by others around the world. Since 2008 Ushahidi have grown from an ad hoc group of volunteers to a focused organization that have spun off a rapidly growing and vast spectrum of crowdsourced and independent data mappings and systems enabling the voices of citizens across the globe. In only four years of existence, there have been over 24,000 deployments of the Ushahidi platform, either from its own servers, outside of the organisation, or as rapid **Crowdmap[28]** deployments.[29] Whether it has been to crowdsource women's tech organisations in Africa[30], mapping gun culture in Serbia[31], monitoring elections across Africa and beyond[32], or fighting the culture of bribes and corruption in Zimbabwe[33], the Ushahidi Platform has perhaps also overtaken the most popular social media sites for the rapid, sharply detailed sharing of live and citizen based data.

Where Ushahidi has created a unique framework for virtually infinite forms of citizen based data mappings, the actual maps themselves - whether topological or political must also be generated. The fundamental content of most maps are based on satellite data processed by national governments and geodetic institutes, with detailing, updates and fine tuning being done by either local authorities or citizen reporting to major mapping publishers including, among others, Google Maps[34], and the open source user generated OpenStreetMap.org[35]. The accuracy and level of details that maps provide also helps form the basis for citizen representation vis-a-vis governments, defining how budgets are allocated, where schools, hospitals and other essential services are located. Often satellite data may be outdated, or the topographic detail of the landscape may be obscured, or comparatively underdeveloped, leaving undefined for areas that may be inconvenient for local authorities to publish blank. People living in such areas and their neighourhoods, commonly high-density, and in terms of urban planning relatively unregulated or informal districts,

26 Presentation quote from Ushahidi's African projects director Daudi Were at #OSJUBA, Berlin, June 2012
27 http://legacy.ushahidi.com/
28 http://ushahidi.com/products/crowdmap - a rapid deployment version of the Ushahidi platform that does not require installation on your own webserver.
29 Presentation quote from Ushahidi's African projects director Daudi Were at #OSJUBA, Berlin, June 2012, p. 5
30 https://womentechafrica.crowdmap.com/
31 http://www.oruzjenameti.org/
32 http://community.ushahidi.com/index.php/deployments
33 http://ipaidabribe.org.zw/
34 https://maps.google.com/ is a proprietary mapping service launched by Google Inc. February 8, 2005
35 http://www.openstreetmap.org/ is a free wiki-based user generated world map

are - due to their technical invisibility - left without a voice or legitimate representation. "Kibera in Nairobi, Kenya, was such a blank spot on the map until November 2009, when young Kiberans created the first free and open digital map of their own community. Map Kibera has now grown into a complete interactive community information project."[36] By taking advantage of open systems tools and platforms, including OpenStreetMap.org and Ushahidi's crowdsourcing methodologies the residents of Kibera were not only able to address local authorities with the sudden appearance and reality of their community, the building of the map has created a new found sense of place that has spurred economic development, activated dialogue that has helped reduced violence and strengthened democratic process.[37]

Climate Change, Open Data and Collaborative Enterprise

As one of the most abstract of challenges faced by the world's population, tangibly participating in its mitigation is often met by resignation coupled by a lack of specific tools and the knowledge to understand its tangible effects. *Sauti ya wakulima (The voice of the farmers)*[38] is a collaborative knowledge base and FOSS communications tool created in 2011 by farmers from the Bagamoyo District in Tanzania for the purpose of engaging them in the creation of an open knowledge platform about the effects of climate change, using smartphones as tools for observation, audiovisual evidence gathering and a web page to organise the recorded images and sounds.[39]

The Bagamoyo farmers struggle because of insufficient infrastructure and unreliable markets for their products, and are now also facing the challenges of a changing local climate. Less rains, less underground water and unprecedented threats caused by pests and plant diseases are some of the pressing issues that they have to deal with. However, they know that by sharing their knowledge on how to cope with these problems, they can become stronger and find ways to overcome them.

The participants of *Sauti ya wakulima* use laptops and a 3G Internet connection at local agricultural stations to view the images and hear the voice recordings that they have posted. They pass the available smartphones on to other participants, turning the phones into shared tools for communication. The smartphones are equipped with GPS modules and an application that makes it easy to send pictures and sounds to the Internet. Daily practices and observations regarding changes in climate and related issues are

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36 http://mapkibera.org/
37 i.e. via the subsequent http://voiceofkibera.org/ blog and community crowdmap.
38 http://sautiyawakulima.net
39 http://newswatch.nationalgeographic.com/2011/11/30/smart-phones-meet-smart-farming-indigenous-knowledge-sharing-in-tanzania/

documented, while interviews with other farmers expands the growing network of social relationships. By communicating their observations to extension officers and scientific researchers, who are often in remote locations, the farmers actively participate in the design of new strategies for adaptation.

The project directly addresses the social components of agriculture by tracking the tangible effects of climate change and is now an autonomous entity, with the local government providing support and financing for the data credit needed to send images and sounds from the phones. *Sauti ya wakulima* uses exclusively FOSS tools based around the **ojoVoz** mobile app[40] and web-based scripts, is published under a GPL license[41] and was nominated for the WSIS Stocktaking Prize in 2012. The platform is now also being used by researchers in Mexico City to map legal and illegal dumps, a youth group in Medellin, Colombia, is using it to map the situation of trash in their neighborhoods,[42] and the pilot for a *Children's Pavilion and Interactive Landscape[43]* using ojoVoz is being developed in the new state of South Sudan.

Challenging traditional notions about what makes a "modern city" and who decides on the planning of the urban landscape, the *Children's Pavilion and Interactive Landscape* aims to involve women and children directly in the development of their physical environment. The initiative, intended as a collaboration with the Ghanaian **Mmofra Foundation**[44] to create a network aimed to reverse the increasing 'compound mentality' and subsequent erosion of real, physical, public urban space for children in many African cities. Users - preferably children from Africa and beyond, will be able to upload their own content onto the site - show their playspaces (real, imagined, or desired) creating an interactive map and knowledge base giving users and planners more info and comparisons between particular urban or rural areas, from a child or care-giver's point of view.

Media Literacy and Empowerment: Networking Open Systems Initiatives

Initiatives such as these also illustrate ways in which FOSS and Open Data can be applied to support media literacy. Being able, not only to access, but to effectively use Open Systems tools and platforms to create, to learn are key elements to in making an individual's voice heard. Beyond the state or formal education level, where there are often

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40 http://sautiyawakulima.net/ojovoz/
41 FOSS General Public License http://www.gnu.org/licenses/gpl.html
42 Skype interview with project author Eugenio Tisseli, October 2012
43 http://childrenspavilion.yolasite.com/
44 http://mmofraghana.org

gaps in effectively linking education with livelihoods and empowerment a growing number of independent civil society organisations specialising in media literacy and open technologies have emerged - particularly to act as catalysts of empowerment for women[45].

For example The **MAUJ** *Collective for Open Technology, Art and Culture* in Karachi, founded in 2008 addresses digital media and open technologies in an artistic and cultural context from a grass-roots perspective. In pursuing their aims in applying open technology 'to empower society and people' MAUJ follows a strategy of narration coupled with media competency education, telling and disseminating the stories of women, cultural landscapes and marginalised groups in Pakistani society[46]. They are one of very few public domain organisations that provide access to media technologies – as well as media literacy training to the Karachi community, outside of the commercial or institutional academic sector. On their work as open technologies and cultural empowerment advocates one of the co-founders of MAUJ, architect and film-maker Atteqa Malik notes however that in the "fog of ineptitude that civil society is faced with today, the real game changer has not been the many well meaning open source initiatives Pakistan has embarked upon, but social media. For many citizens Facebook IS the open internet, providing the mechanisms for creating genuine forms of empowerment and emancipation, especially for women who are able to start companies and other economic ventures that they would otherwise not be able to engage in."[47]

Where *MAUJ* applies art and open culture as a vehicle in media literacy training, **Bytes for All** (B4A)[48] acts as a broad citizen's network in South Asia. It identifies, discusses and builds networks on emerging issues related to ICTs and their impact to development (ICT4D), as well as playing an active role in training and providing open access to technology for women. Active in Pakistan since 2010, B4A's globally acclaimed '*Take Back The Tech Campaign*' for example, focuses on the strategic use of ICTs by women and girls to fight violence against women in Pakistan."[49]

These groups are only small nodes in a number of open cultures, technologies and FOSS based networks actively working to promote and support empowerment issues. One such network, *bricolabs[50]*, has formed specifically to promote FOSS based environmental awareness, open access, OER, re-appropriated technologies, and freedom of expression. In 2010 a bricolabs-led initiative in Indonesia drafted the *Bandung Declaration on Open*

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45 see a.o. the excellent list of FOSS groups for women at http://www.wsis-community.org/pg/pages/view/582094/foss-groups-for-women
46 http://www.maujmediacollective.org
47 From a Skype interview with Atteqa Malik by Stephen Kovats, October 2012
48 httpCo-founded by Frederick Noronha in Goa, India and Partha Sarker in Dhaka, Bangladesh in 1999 http://www.bytesforall.org/?page_id=2
49 http://content.bytesforall.pk/about
50 http://bricolabs.net/

Cultures, Technologies and Ecologies[51] which seeks to set a framework for creating organised and identifiable places, primarily in the Asia-Pacific region, that actively support, encourage, promote and provide:

1. open platforms for communication, dialogue and interaction
2. open and unhindered forms of artistic and cultural expression
3. the use and development of open and free technologies
4. new forms of collaborative, inclusive and emancipatory digital practice
5. multi-disciplinary, cross-generational and trans-regional dialogue and exchange
6. open access to information, networks and knowledge
7. dedicated physical spaces committed to long-term and stable community-building

Although the concept of the 'community centre' itself is not new, the focus on creating 'open culture' spaces in which 'free' and 'open' culture can be practiced unhindered is aimed specifically at fostering open dialogue, promoting the use and understanding of open and public domain data and technologies - as well as providing hands-on training for making and applying FOSS (code, applications, methodologies), open hardware as well as a range of skills in which technologies act together creating new forms of enterprise.

Open Hardware - the next Free and Open Systems generation

Open Hardware is the logical extension of the FOSS movement into the actual creating of physical things. Where for example FOSS coupled with the potentials of crowdsourcing has established itself as one of the most powerful mechanisms for creating transparency, empowering otherwise silent – or silenced – groups, as illustrated in the many thousand implementations of platforms such as *Ushahidi* or *Savana*, serious attempts to create viable Open Hardware systems are now beginning to emerge. Long a domain of tinkerers, creative hacktivists, technology labs[52], academic physical computing[53] and artists[54] - as well as being, out of necessity, the backbone of many developing economies[55] where new and expensive machines, parts, technologies and industrial production are simply unavailable, the notion of Open Hardware is also not that new. Applying the principles of FOSS and growing knowledge sharing methodologies such as DIWO[56] Open Hardware will be, if it is not already in a number of contexts, an absolutely indispensable element in

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51 http://culture360.org/magazine/new-ways-of-promoting-artistic-and-cultural-expressions/
52 i.e. http://www.media.mit.edu/research/groups-projects
53 i.e. http://itp.nyu.edu/sigs/program/
54 http://www.normill.ca/artpage.html or http://www.conceptlab.com/
55 i.e. recycling production at the Addis Ababa Merkato http://www.ft.com/intl/cms/s/0/11731f16-e35b-11dd-a5cf-0000779fd2ac.html#axzz29aqLsSo4
56 DIWO - Do It With Others, a collaborative open cultures derivative of DIY, Do It Yourself

the realm of the Knowledge Society with huge potential for UNESCO's focus areas. As with FOSS, there are numerous interpretations and definitions of what exactly constitutes 'Open Hardware', with considerable attention being given to the Open Source Hardware and Design Alliance (OHANDA) '4 Freedoms' proposal[57]:

- **Freedom 0:** The freedom to use the device for any purpose.
- **Freedom 1**: The freedom to study how the device works and change it to make it to do what you wish. Access to the complete design is a precondition to this.
- **Freedom 2**: Redistribute the device and/or design (remanufacture).
- **Freedom 3**: The freedom to improve the device and/or design, and release your improvements (and modified versions in general) to the public, so that the whole community benefits. Access to the complete design is a precondition to this.
-

Of the many streams of Open Hardware innovation that have crossed paths in contemporary FOSS culture, the development of the Arduino[58] open source circuit board by Massimo Banzi and David Cuartielles in 2005 and its predecessor Wiring[59] by Hernando Barragán have had profound global impact on people making open source electronics systems for a wide range of uses in the physical world. Arduino, a cross between hardware (the circuit board) and software (the Arduino programming language) "can sense the environment by receiving input from a variety of sensors and can affect its surroundings by controlling lights, motors, and other actuators."[60] As such Arduino, and to a certain extent Wired, which is being developed in Colombia, can be considered a form of sharable 'stem-cell' that has the potential to impact the world of Open Knowledge and ICT for Development in terms of hardware – machines, tools, robotics, environmental sensors etc., that the crowdsharing platform Ushahidi achieved with citizen generated Open Data. Learning how to use Arduino is an integral part of most open source technology curricula as well as being central to the understanding, research and development of FOSS tools and systems at events globally such as the African iHub 'Afrilabs'.[61]

iHubs and Fablabs: Rhizomatic Global FOSS Initiatives

Injecting 'Open Hardware' methodologies to the idea of the 'open culture space' creates

57 http://www.ohanda.org/
58 http://arduino.cc/
59 http://wiring.org.co/
60 http://arduino.cc/
61 http://afrilabs.com/posts/creative-robotics-boot-camp

additional new forms of open knowledge and specialised skills transfer. The prevalence of such *maker labs* can be perhaps best seen through the global development of *Fablabs* (from *fabrication laboratories*). Coming out of the *MIT Media Lab*[62] and demonstrating an applied collaborative practice in Open Hardware spaces, the *Fablab* allows citizen driven education in design and production methods with access to high-end fabrication technology.

"Fablabs are a global network of local labs, enabling invention by providing access to tools for digital fabrication. They began as an outreach project from MIT's Center for Bits and Atoms (CBA)"[63]. CBA assembled millions of dollars in machines for research in digital fabrication, ultimately aiming at developing programmable molecular assemblers that will be able to make almost anything. *Fablabs* fall between these extremes, comprising roughly fifty thousand dollars in equipment and materials that can be used today to do what will be possible with tomorrow's personal fabricators, including:

- a computer-controlled lasercutter, for press-fit assembly of 3D structures from 2D parts

- a larger (4'x8') numerically-controlled milling machine, for making furniture (and house) sized parts

- a signcutter, to produce printing masks, flexible circuits, and antennas

- a precision (micron resolution) milling machine to make three-dimensional molds and surface-mount circuit boards

- programming tools for low-cost high-speed embedded processors

Fablabs have spread from inner-city Boston to rural India, from South Africa to the North of Norway. Activities in Fablabs range from technological empowerment to peer-to-peer project-based technical training to local problem-solving to small-scale high-tech business incubation to grass-roots research. Projects being developed and produced in Fablabs include solar and wind-powered turbines, thin-client computers and wireless data networks, analytical instrumentation for agriculture and healthcare, custom housing, and rapid-prototyping of rapid-prototyping machines." And more than just an international network, they are a collaborative ecosystem fostering true FOSS and Open Systems forms of work, education, as well as specialised ICT training - very often where the facilities for and access to such training do not exist at all.

The Fablab charter[64] states that:

"Fablabs share an evolving inventory of core capabilities to make (almost) anything,

62 http://fab.cba.mit.edu/
63 http://fab.cba.mit.edu/about/faq/
64 http://fab.cba.mit.edu/about/charter/

allowing people and projects to be shared. The (international) Fablab network provides: operational, educational, technical, financial, and logistical assistance beyond what's available within one lab. Available as a community resource, offering open access for individuals as well as scheduled access for programs."

Some of the most interesting fablabs are in so-called 'developing nations', such as the Indonesian based Yogyakarta *HONFablab* which provides access for schools, individuals, businesses and beginners "to create (almost) anything"!

HONFablab[65] is a local laboratory connected with other Fablabs around the world in a global network where everyone can engage in a creative learning process, share ideas and techniques, and even open their designs to one another. "*HONFablab* was created in accordance with the vision and mission of the *House of Natural Fiber* (HONF)'s *Education Focus Program* (EFP). The EFP is a curriculum carried out by HONF and conducted independently for more than 10 years, that concentrates on interdisciplinary scientific and academic exchange on complex societal transformation issues including alternative forms fo energy and biodiversity. The EFP aims to build an open mindset and mentality in society by bridging culture, science and technology through focussed and accessible educational activities."

One of its current initiatives is the *Low-Cost Prosthesis* Project "which is developing a low-cost fabrication method for below-knee prostheses that utilize local materials and meet ergonomics and aesthetics standards. The method can thus be shared to and applied by any individuals and institutions in need of prostheses."[66]

The proposed *Fablab Burkina* in Burkina Faso[67] will be the first of its kind in Francophone Africa, where after an intensive phase of the *InnovAfrica* week, a digital milling machine was developed. "Facilitating the fabrication of thousands of devices for agriculture could have very beneficial results. Currently, machines in Burkina Faso are, for the most part, controlled manually. The equipment is ageing and the work is manual and time-consuming. There is potential to use Fablab equipment for many purposes, including:

- cutting calabash[68] in organizations working with people with disabilities

- projects to avoid desertification resulting from the manufacturing of burners

- replacing inefficient manufacturing of biogas burners, whereby the digitalization of covers using a computer program manufacturing be 7 times more efficient

Fablab Burkina was developed following a meeting of people with multidisciplinary skills: electricians, computer scientists, and electronics engineers who put their heads together to

65 http://www.honfablab.org/index.php/en
66 http://www.lowcostprosthesis.org/
67 http://imaginationforpeople.org/en/project/fablab-burkinafaso/
68 a highly versatile gourd used for making bottles and other utensils, i.e. http://en.wikipedia.org/wiki/Calabash

build a digital milling machine." The potential for revitalising and creating more efficient tools to facilitate agricultural practices is immense.

In conjunction with the global networking of the Fablab movement, particularly as catalysts for Open Education Resources (OER), the rapid growth of innovation and technology hubs act as highly popular and technologically cross-disciplinary engines of economic growth. Networked hubs such as the *ice* (Innovation - Collaboration - Entrepreneurship) hubs in Addis Ababa and Cairo[69], or Nairobi based *iHub*[70] promise an "Open Space for technologists, investors, tech companies and hackers."

Appropriate technologies (AT) - Enabling Open Sustainability

Appropedia is a wiki for Open solutions in sustainability and development[71] based on the 'Appropriate technology (AT) notion of technology that is designed with special consideration to the context of its use - including environmental, ethical, cultural, social, political, and economical aspects of the community it is intended for. With these goals in mind, AT proponents claim their methods require fewer resources, are easier to maintain, and have less of an impact on the environment compared to techniques from mainstream technology, which they contend is wasteful and environmentally polluting.'[72]

It focusses on knowledge management and knowledge sharing, while participating people and programs do the actual on-the-ground projects. The *Appropedia* vision is very much aligned with UNESCO's "Open solutions for enhancing access to information and knowledge" stream. With the continued development of Open Hardware, FOSS and Open Access accelerating the *Appropedia* community's growth and expanding its academic partnerships, the platform's mission is now focussed on putting the materials together into a structured OER framework[73].

One of *Appropedia's* highlighted projects is the *Hexayurt*, a model Open Hardware zero-waste "autonomous building" refugee shelter system[74]. It provides not just a shelter, but a comprehensive family support unit which includes drinking water purification, composting toilets, fuel-efficient stoves and solar electric lighting.[75] The *Hexayurt* is ideally suited to

69 http://icehubs.com/
70 http://www.ihub.co.ke/pages/home.php
71 http://www.appropedia.org
72 http://www.appropedia.org/Portal:Appropriate_technology
73 Email interview information from appropromedia co-founder Chris Watkins, October 2012
74 http://hexayurt.com/
75 http://www.appropedia.org/Hexayurt

large scale disasters within a couple of day's drive of urban centres or other scenarios where large numbers of people reside, such as coastal regions that tend be relatively close to ports.

Although there is no common procedure for testing new shelter technologies prior to their use in the field, *Hexayurt* units are currently being evaluated by *Haiti Communitere*[76], a Haitian based disaster recovery organization and in Sri Lanka by *Sarvodya* the country's largest civil society organisation, engaged in relief efforts in the war-torn north of the country as well as ongoing development projects. However *Shelter Centre*, a Swiss NGO that responds to the transitional settlement and reconstruction needs of populations affected by conflicts and natural disasters[77] has actively blocked the hexayurt and similar Open Hardare shelters in favour of their own Shelter Module. *Hexayurt* initiator Vinay Gupta notes that "since Shelter Centre control both the standards and their own shelter prototype, they rewrite the standard to favour their own system."[78]

Open Source Ecology (OSE)[79] is an international network of people and organisations working on a broad spectrum of ecological, social and technical systems according to sustainable criteria and providing the designs, solutions and methodologies as FOSS or open hardware via the internet. According to *OSE*, "an Open Source Economy thus gets created, an economy that optimizes both production and distribution, while providing environmental regeneration and social justice. From tractors to wind turbines to cars - all technologies are designed to be modular, scalable, simple, low-cost, Do It Yourself (DIY) and suitable for flexible fabrication. This form of open development promotes quicker innovation, open access to economically significant information supporting and creating strong local economies, which ultimately replace resource conflicts with common welfare."

Open Publishing: Transparency, Empowerment and the Case of OpenOil

If we consider the complex interrelations between climate change, environmental sustainability and post-conflict response (with significant effects in the realms of access and empowerment) there is no greater generator of closed, anti-democratic and opaque systems than the global oil industry. Whether it is combating CO2 emissions, fossil fuel

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76 http://www.haiti.communitere.org/ formerly Grass Roots International
77 http://www.sheltercentre.org/about
78 Email interview information from Hexayurt founder Vinay Gupta, October 2012
79 http://wiki.opensourceecology.de/

dependency or simple measures of good governance and equitable distribution of income to provide such basic needs as quality education, viable infrastructure, health care – as well as affordable and functional energy – the world's oil and gas industries have the power and resources to play a key role in positive forms of development. OpenOil.net is an Open Systems "energy consultancy and publisher aimed at creating transparency while seeking market-driven solutions to produce better outcomes from the oil and gas industry for the people of producing nations." Under its motto "Imagine an Open Oil Industry ..." OpenOil is "founded in the belief that creative, practical and socially progressive policy making in the oil and gas industries is both vital to our collective future, and possible within current constraints."

The OpenOil book, published in Arabic in November 2012 about the Iraqi electricity crisis is being released under a *creative commons* attribution and share alike license[80]. As a public domain book it is intended to 'break apart' and reveal the various elements of the oil industry's chain of power delivery, control and economy. By acting to open up opaque systems makes them become both real and legible to citizens, as well as elected officials. In fragile post-conflict states such as Lybia, Iraq and South Sudan OpenOil's series of country-by-country Oil Almanacs[81] have the potential to play a crucial, if not pivotal role in the much larger and longer battle for transparency, accountability, and empowerment, working against corruption, sectarianism as well as the further destruction of the delicate balances that are being attempted in the climate change battles.

Using the *book sprint*[82] methodologies in conjunction with the FOSS *Booktype*[83] editorial platform, the OpenOil publications reference real data and survey results from states that have enacted functional mechanisms for open data including Brazil and Kenya as well as media sources, CSO's and reliable UN material. *Booktype*, as well as the *FLOSS Manuals*[84] initiative out which its software and collaborative editing format was developed, provides a means to 'rapid-prototype' all forms of publications using live authoring techniques (as was the case with the many groundbreaking manuals that emerged to help cement the documentation of FLOSS) as well as the ability to custom create books using mixing, matching and collating chapters, notes and materials for new publications, while clearly referencing the source materials. As an aggregator tool implemented in conjunction with today's vast Open Educational Resources, customized, low-cost and easy-to-produce libraries can be created just about anywhere.

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80 http://creativecommons.org/licenses/
81 http://openoil.net/oil-almanacs/
82 http://www.booksprints.net/
83 https://sourcefabric.org/en/booktype/ see also: http://booki.cc/list-books/
84 http://www.flossmanuals.org/

Autopoeisis: Latin America's Four Decades of Open Systems

Chile, one of the pioneering countries in Latin America on information society policies, adopted a digital strategy after a Presidential Commission for New Technologies of Information and Communication was established by presidential decree in 1998. This committee produced the report 'Chile: Towards the Information Society', which helped establish the country's incorporation into the knowledge society where "the significance of which has been such that several Latin American countries have opted for inclusion in the Knowledge Society"[85]. In preparing this report, published in 1999, participants from the public and private sectors, coordinated by the commission, were grouped into four categories:

- law and trade regulation
- new technologies and digital networks for productive use
- technological modernization of the state
- new technologies and information society in equality and cultural development

This led to the creation of a large number of projects, particularly in the field of e-government, "placing Chile among the most developed countries in this area."[86]

Chile has a long history in systems theory, with many of the concepts in computer and network theory in relation to our current use of the term 'open' stemming from the work of Chilean neuroscientists Humberto Maturana and Francisco Varela. Attempting to define the rules of living organisms, they concluded in 1972 that a way to explain the nature of living systems was that of "an autopoietic machine, organized as a network of processes which: (i) through their interactions and transformations continuously regenerate and realize the network of processes that produced them; and (ii) constitute the machine as a concrete unity in space in which they exist.[87]" Using this model of autopoiesis a relationship is established between open systems and social organisations where a continuous interaction is necessary in order to keep the social system alive, nurtured and most of all, «connected». This ability of a project to maintain itself, finding the right network, placing elements in organisational units not defined by a central entity, is akin to the model of continuous user input and development which marks the sustainability of many FOSS and open culture communities.

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85 Beacon, 2005

86 Aballi Fernandez, 2007

87 Maturana, Humberto & Varela, Francisco ([1st edition 1973] 1980). *Autopoiesis and Cognition: the Realization of the Living*. Robert S. Cohen and Marx W. Wartofsky (Eds.), Boston Studies in the Philosophy of Science **42**. Dordecht: D. Reidel Publishing Co. ISBN 90-277-1015-5 (hardback), ISBN 90-277-1016-3 (paper) —the main published reference on autopoiesis. p.78

The Chilean government emphasizes the importance of this notion due to the country's own geographic marginalization where "in the digital world, there are no longer countries at the center and others on the periphery. Some observers have proclaimed the death of distance."[88] These notions help fuel Chilean open systems projects, many of which reflect the education, social empowerment and environmental goals of UNESCO's primary challenge areas. These include initiatives as diverse as:

- *La Huerta del Pez*, a pioneering independent ecolab, developing aquaponics, an agricultural technique that uses fish to feed plants, in pools with ceramics instead of soil. Located in Cental Chile's Quillota, Valparaiso region, they are an independent, privately funded group researching ways to grow food under extreme conditions, including Chile's Northern desert regions.
- *Karol School Comuna Pedro Aguirre Cerda* in Santiago where a system of 'free' money and services exchange aimed at engaging students in more successful learning has been implemented
- *Ciudadano Inteligente*[89] - a Latin American civil society development and transparency platform that develops and connects FOSS and OER programs across the Caribbean and Latin American region, with projects emphasising open knowledge and collaborative technologies, such as *Sentido Comunes*[90], which implements simple interfaces for civil society to query the judicial system on information about laws and decrees.

However when what was seen as major deficiencies in institutionalized education in Chile surfaced in 2011, where the systemic failures in meeting the needs of students resulted in the massive 'Chilean Winter' street protests, riots and even the occupation of elementary schools by its pupils[91], independent FOSS oriented open access and social technology incubators helped to counter the unrest. A number initiatives, for example these in Valparaiso rose to greater prominence filling the gaps left in the traditional education system:

- *Ciber Pancha*[92] - a FOSS Hacklab installed in a school to improve the technological skills of students using i.e. the *SCRATCH*[93] programming environment to develop animations, games, art and music. The experiment, seen as added value to the

88 President Ricardo Lagos (2000) in"The country we want" http://www.gobiernodechile.cl
89 https://www.accesointeligente.org/AccesoInteligente/#list;type=general

90 http://sentidoscomunes.cl

91 http://en.wikipedia.org/wiki/2011_Chilean_protests
92 at the Colegio San Vicente, Playa Ancha, Valparaiso http://ciber-pancha.wikispaces.com/
93 http://scratch.mit.edu/

school environment giving the students the freedom they lacked to develop their own interests with absolute freedom, is now being repeated at other locations.

- *Espacio G[94]* - an autonomous socio-political space for free expression, cultural self management and biological sustainability founded in 2004 to foster critical thinking and empower local communities

- *Teatro de Tierra[95]* - a multimedia theater group that develops projects in remote locations such as Putre (2000-2011), Mapuche (2006-2008), Porvenir (2010). Using various digital media techniques and cultural tactics their activity is aimed at strengthening local communities, the role of women and the conservation of traditional cultures and knowledge. The re-creation of oral stories and its distribution through a knowledge commons that forms the narrative of their sound and theater helps communities exercise their living patrimony, cultivating, compiling and passing these on as oral knowledge[96].

Brazil and India: Bridging the Gaps between Grass-roots and Policy

Many of the Open Systems initiatives and solutions, including the majority in this report, are not a direct result of governmental input, incentive or policy asserting the implementation of FOSS solutions to meet pressing challenges. They grow out of a broadly identifiable need, clear sense of purpose, probably lack of adequate existing solutions, a collective interest - often pressing or urgent, or a combination of these factors. Even in the case of Chile, which has had a strong and globally influential history in open systems theory, there is often little trickle down from policy - or decree - to effective sustainable real-world solutions. Solutions are often bottom-up rather than policy induced, showing serious gaps in the means of flexibility, discourse and effective development between governments and developers. While not an ideal situation by any means, this nonetheless a situation that has its pros and cons. FOSS creators and users on the one hand can act more independently and create crucial transparency, accountability, economic and social development links between government and civil society. As such, they can act neutral partners, or if necessary in critical opposition roles. On the other hand the reach and ability to scale FOSS and open culture initiatives nationwide or globally can often be hindered without strong government commitment, limiting their effectivity.

One prominent exception to this is the successful - long term - strategy of India's Kerala

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94 http://www.espacio-g.cl/
95 http://teatrodelatierra.net/
96 Different types of media as theater plays, songs, recipes, videos, mural painting, books.

State Government in the implementation of FOSS in education and other key sectors. With programs such as the *IT@School*[97] integration of FOSS in education, reaching upwards of 2 million students, this high level government initiative constituted itself in 2011 as *ICFOSS*, the *International Centre for Free and Open Source Software*.[98] Coupled with highly engaged and internationally active NGOs such as Bangalore's *CIS - Centre for Internet and Society* that "critically engages the areas of digital pluralism, public accountability and pedagogic practices, with particular emphasis on South-South dialogues and exchange"[99]India has taken a global leadership role in promoting the effective implementation of FOSS, coupled with open access to online knowledge and resources, as tools of empowerment, quality pluralistic education and economic development.

Alongside India for many years Brazil has also been a 'global role model' of effective and successful development and implementation of open systems and FOSS policy. Beginning in 2003 the country has followed a politically pro-active open source and civil digital rights strategy that was coupled with the inclusion of open culture practitioners inside sectors responsible for digital inclusion programs. This fostered a wide policy connectivity with the population, helping to create the foundations for an open and free access oriented sharing of popular culture, knowledge and data. For example, the developers of the CulturaViva programme, responsible for a network of Cultural Hotspots, were also partners in the first drafts of policy bills whose focus was to strengthen the freedoms in the digital age.[100] Alone CulturaViva was implemented in over 600 communities across the country to encourage cultural production using open-source tools.[101] Emanating from these policies and initiatives, or working concurrently with them have been a number of local as well as internationally recognised organisations, networks or projects which have been directly engaged in the issues of social empowerment of women and marginalized groups. Also towards creating active forms of environmental awareness, in particular towards resource management, recycling and the systemic effects and conditions of climate change open culture, FOSS and enabling the access to ICT for all segments of the population has been results. Most are embedded in solid open access, shared knowledge and education practice constructs, involving community practitioners and scientific researchers, cultural hactivists and technologists as well as policy makers and political representatives.

Of these the *MetaReciclagem*[102] network operating since 2002 has had perhaps the greatest community and international impact addressing the UNESCO challenge areas

97 https://www.itschool.gov.in/
98 http://www.icfoss.in/
99 http://cis-india.org/
100Rodrigo Savazoni, the director of CulturaDigital.Br lecture at Duke University, Durham, N.C., U.S.A. 2011
101http://davidsasaki.name/2009/11/brazil-a-ministry-of-culture-for-the-21st-century/
102http://rede.metareciclagem.org/livro/english

through the development of decentralized, hands-on, user and community oriented actions using appropriate technology. One of the first organisations to openly and demonstrably address the recycling of computer equipment *MetaReciclagem* (or 'Meta' / 'Recycling') began as a partnership in São Paulo with the NGO *Agente Cidadão* (*Citizen Agent*) collecting and refurbishing used computers that were later distributed to social projects. With an ideology based on the re-appropriation of hardware, the use of free software and open licenses as a networked action in the support social transformation[103] *MetaReciclagem* now has about 500 members internationally with 10 local points of articulation, known as spores, in operation. Theirs is an eminently socio-political network aimed at providing solutions to complex environmental, education, social transformation issues and the linkages therein. As one key method for designing and implementing large-scale government open culture initiatives such as the *Culture Points* and *Casa Brazil, MetaReciclagem's* use of technological reappropriation has been noted as an 'Information for All' (IFAP) success story by UNESCO[104].

#OSJUBA - Responsive Open Systems Solutions in South Sudan

"Sometimes practice needs to come before policy."[105]

On July 9th, 2011 South Sudan became the United Nations 193rd Member State. It's nascent civil society, emerging from four decades of shattering conflict and revolution is faced with the challenge to (re)construct an entirely new nation. It is a post conflict *tabula rasa* where everything from the political system, state identity, economic self-determination to the entire infrastructures for health, education, food security, the basic freedoms of expression, respect for human rights and the necessary mechanisms of reconciliation among resolute opponents has to be addressed. Considering this seemingly overwhelming scenario in the age of social networks, collaborative enterprise and open technologies a broad international, multi-stakeholder and cross-disciplinary initiative, #OSJUBA, is coming together to create a comprehensive open systems strategy for the development of South Sudan. At the point in time where South Sudan has a unique window of opportunity in defining it's path into the future as a truly new and innovative state, an equally unique opportunity to apply the power of open systems solutions in creating a model of rapid development and sustainability presents itself to the international community. By applying the means, methodologies and resources of the world's diverse open source and open

103 MetaReciclagem co-founder Felipe Fonseca in his 2011 book Laboratórios do pós-digital (Post-digital Laboratories) http://efeefe.no-ip.org/livro/laboratorios-pos-digital
104 http://www.unesco.org/new/fileadmin/MULTIMEDIA/HQ/CI/CI/pdf/ifap/IFAP%20success%20stories.pdf
105 Philip Thigo, SODNET, Nairobi, Kenya at MEDIA & MAKERS JUBA 2012

knowledge communities #OSJUBA, working with South Sudanese civil society organisations, government agencies and ministries to examine how open source software and comprehensive open systems solutions can help create a framework of sustainable development for the country as a whole.

In fusing diverse cultural traditions into existing, established and highly engaged global communities, the elements of cultural collaboration, grass-roots enterprise and economic innovation inherent to Open Systems Solutions that are intended to support and augment the mitigation of South Sudan's most complex development issues and scenarios include:

- creating forms of inclusive participation & involvement of all citizens and Civil Society Organisations (CSOs)

- creating access to data and information as citizen accessories for socio-political development (i.e. via creation of a South Sudan Open Server Backbone)

- establishing accountability and transparency models for participation and interaction with policy making in government

- improved resource management, including better use of existing existing UN structures and local resources

- augmenting literacy training with media and ICT literacy training

- increasing digital mobility, networking and communication for freer expression and cultural diversity

- new forms of citizen-based, community or device journalism, incl. SMS, radio, data streaming

- creating new economies and user-based technologies informed by local knowledge

- enabling OER methodologies and open peer to peer education formats complementing traditional learning structures

- supporting user centered design, scalability and sustainability (assessment and application of open and appropriate technologies)

- giving priority consideration to skills exchanges, maker & DIY culture, and better collaboration between diaspora and local residents

- fusing information, reports and other forms of data from the international development community into accessible knowledge banks (i.e. an Open Humanitarian Information Management System)

- creating Task Force on ICT4D (i.e. w/ Gov't. line Ministries, WB, UNICEF, relevant NGOs)

Following the first MEDIA MAKERS Open Knowledge and Sustainable Media Forum in Juba, December 2012, co-chaired by Berlin based r0g_agency for open culture and critical transformation and Media in Cooperation and Transition - MICT in collaboration with UNESCO, UNICEF, FOSSFA, the Federal German Foreign Office, icehubs and partners in South Sudan including the South Sudan Ministry of Information and Broadcasting, the South Sudan National Bureau of Statistics, the Juba Civic Engagement Center (CEC), AMDISS and the University of Juba the first steps in establishing an Open Systems pilot have been taken. As a result a number of South Sudanese civil society organisations involved directly in post-conflict mitigation are now adopting Open Systems solutions in the optimization of their work, including the Community Empowerment for Progress Organisation (CEPO) and Kapital Movie Industry Corporation. The latter is a community based, non profit network of ca. 100 visionary young artists, film makers and ICT professionals "who are interested in sharing and nurturing a vibrant civil society through the power of open media. As a group committed to empowering the communities they live, work and study in Kapital Movie's focus messages are about health, conflict mitigation, and the development of peaceful methods of association through the power of films and short commercials."[106] In collaboration with such groups and relevant Knowledge Communities oriented international development agencies, the Government of South Sudan's Warrap State is "to embark on an initiative to promote transparency, empower citizens, fight corruption, strengthen peace and security through participatory conflict management and harness new technologies to strengthen governance and the process of creating a stable and prosperous democratic entity to the advantage of all the citizens of Warrap State. Elements of the Open Systems Warrap Strategy to be developed include, among others, means to create:

- participatory, accountable, open governance

- rapid implementation of systems to enable education, communication, economic development

- conflict and violence resolution to foster effective peace and security

- sustainable, transparent and cost effective management of land and key natural resources (incl. water, forest, extractives)

- innovation in linking traditional with contemporary skills and knowledge" [107]

106http://www.kapitalmovie.net
107 post WSIS+10 Review Conference "Memorandum of Intent" signed on to by H.E. Governor of Warrap State

Some of the key aims of #OSJUBA include fundamental issues where, for example, open source and open data can most effectively be optimized to create tangible results, such as increasing transparency and security, enhancing communication, fostering the utilization of local knowledge and encouraging collaborative learning. Above all, #OSJUBA is aimed to make government institutions and policy, new business innovation, education, independent media and expression, as well as genuine peace efforts and post-conflict dialogue more sustainable and responsive to the needs of citizens. From the use of wide ranging Open Educational Resources (OER) in jump starting literacy and education systems to citizen empowerment and knowledge building initiatives open systems methodologies are being developed to help create what UNESCO identifies as strong and independent Knowledge Societies as part of the United Nations' Millennium Development Goals (MDGs), to which South Sudan itself is now a signatory.

Accelerating Active Open Solutions: 7 Key Recommendations

Today the potentials for Open Systems Solutions to address the UN's principal challenge areas based on free, publicly available resources and collaborative practices are readily at hand. This report makes the cross-disciplinary connections, linking innovation to need, context and challenge to illustrate how Open Systems Solutions can have their greatest impact where people have simple access to them. These questions are also not entirely ones of technology or access to the Internet. The creation of secure spaces and places that in themselves are free, open and conducive to an open exchange of ideas, experience and opinion is one of the key overarching challenges linking almost all the scenarios of development, education, and empowerment which are aimed at by the WSIS Action Line C3 on 'Access to Information and Knowledge'. As such, key recommendations to strengthen the application of Open Systems Solutions in the creation and support of Knowledge Societies include:

1. Enabling **universal access to the internet** as a gateway to Open Data, Open Knowledge and Open Educational Resources. Lower the barriers for youth, women and marginalised groups to effectively access technology, in particular the requirement by public education facilities (i.e. universities, community colleges, elementary schools) to provide free and unhindered access to the internet, doing in open spaces, rooms and means that are inclusive.
2. Securing and enhancing the creation of multi-sector **Open Knowledge Commons**

Nyandeng Malek Dielic on March 2, 2013

that enable access to the growing range of public domain Open Systems Solutions, in particular FOSS, Open Educational Resources (OER), Open Data, Open Hardware and their related processes, methodologies and experiences. Enable visible, transnational peer review platforms for endorsing innovative FOSS and Open Systems Solutions (i.e. via http://www.wsis-community.org/)

3. Fostering the use of Open Systems Solutions as both effective **rapid-response** deployments and **sustainable long-term development priorities** to address the UN's four identified challenge areas of Climate Change, Post-Conflict / Post-Disaster Response (PCPD), Gender and Minority Empowerment, and Access to Quality Education and Knowledge (in particular OER).

4. Fostering directed **Open Systems Media Literacy Training** for professionals, extension services mentors and public interface officials (***Education of the Educators***) as well as making this a basic requirement in children's elementary and secondary education.

5. Acknowledging and **supporting grass-roots**, small scale or independent FOSS and Open Systems incubators, highlighting the interconnectivity between individual tools and methodologies to create thoroughly comprehensive Open Systems Solutions. Facilitate the networking of (esp. fragile) community and independent Open Culture organisations across regions and continents, mapping these according to criteria incl. resources available, aims and programmes/projects.

6. Developing **universal criteria, vocabulary** and effective multi-lingual Open Systems 'Toolkits' for more rapid implementation and better understanding of FOSS and Open Systems Solutions.

7. Linking the **economic and long-term sustainability advantages** of Open Systems Solutions in the allocation of public funds and procurement processes.

Conclusions

This report is intended to paint a critical impression of the realm of FOSS and Open Systems Solutions, in particular how innovative and often grass-roots development and implementations can take on model character to address some of the greatest challenges we as an interlinked and global society - reliant on one another across borders, time zones and diverse cultures - are faced with. FOSS and the broad spectrum of open methodologies, tools and systems today already form irrevocable elements of our lives, strengthening such linkages. Indeed the potential of applying the knowledge created through open forms of collaboration, public process and collaborative enterprise will, in the

future, be harnessed in ever more realms of social, political and scientific activity as the tools to more effectively use, implement and share this knowledge become increasingly accessible, language independent and more economical. The power of Open Systems lays in the hands of innumerable networked users and determined citizens ... global players who recognize - like Malala, no matter what their social status or where their home may be - that access to knowledge, technology and collaborative experience are inevitable keys to development and social empowerment. Not just for individuals and societies, but also the Earth, our common home.

Many themes, significant geographic regions, forms of implementation and explicitly related co-sections such as *Open ICT4D*[108] could not be taken up directly within the scope of this report. At the same time, the field of innovation, development, trial and implementation of Open Systems Solutions is advancing so rapidly that this report can only allude to the trends that will make up everyday practice in the years to come. Yet common understanding as to what the actual realms of FOSS and Open Systems represent are still unclear to many policy makers, politicians, institutions and organisations charged with developing and mitigating the effects of the world's major challenges. Such unclarity, misperceptions and *lack of knowledge about open knowledge*, must be addressed with more focus on examples, assessments of successful case studies - as well as failures, as these are also intrinsic to creating new, improved and sustainable methodologies. Better understanding and use of the vast resources representing OER - Open Educational Resources, exploiting the rapid implementation possibilities of crowdsourcing and Open Hardware systems, or effective training in FOSS can, for example, alleviate vast amounts of resource redundancy in re-creating curricula for schools, create rapid, specialized libraries where none exist today, or enable new social and political identity and awareness for historically marginalized peoples. As a global organisation focussed on educational, scientific and cultural innovation - the traditional bedrock fields of FOSS and Open Systems development and application - UNESCO has the potential to tap these resources beyond the tip of the iceberg where they sit today, and champion the future of Open Systems Solutions, now!

Acknowledgements

The original draft of this report was prepared in the Fall of 2012 in the run up to the first conference in South Sudan addressing the issues of open source, open data, open government and the broader realm of open knowledge and open systems. The **MEDIA &**

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108 see the excellent wiki, resource and platform on Open ICT4D provided by the Canadian IDRC at
http://openict4d.wikidot.com/

MAKERS JUBA 2012 Sustainable Media and Open Knowledge Forum[109] which was supported through the active participation of UNESCO and UNICEF as well as local South Sudanese organisation including AMDISS[110] (Association for Media Development in South Sudan) and CEPO[111] (Community Empowerment for Progress Organization) broke important ground for initiating the development and implementation of a strategy in which all realms of FOSS and open resources have an opportunity to come together to help build a new state - one born of decades of conflict and destruction. The resonance that emanated from this event allowed for a discussion on *Open Systems Solutions for Peace and Development*[112] at the **UNESCO WSIS+10 Review** held in February 2013.

I would like to express my thanks to the UNESCO Knowledge Communities team that I collaborated with through this process, Mika Yamanaka, Abel Caine and Davide Storti, for their insight and dedication to the rapidly evolving realm of Open Systems and the support they showed towards the initiative in South Sudan. As such I would also like to thank them for their patience in the finalisation of this report, which was delayed by the overwhelming feedback and follow-ups that came of the Juba event and the subsequent preparations to the conference in Paris, at which over 200 remote participants joined live from 16 specially organized remote locations - many of which were related to the examples and scenarios discussed in this report. In particular I would like to thank Ela Kagel and Amrit Naresh in Berlin, Georgia Nicolau in Sao Paolo, Jodi Rose and Eugenio Tisselli in Barcelona, Atteqa Malik and Yasir Husain in Karachi, Alejandra Perez Nunez in Valparaiso, Alessandro Ludovico in Bari, Eva Yayi in Juba and Vinay Gupta in London for their open collaboration, input and engagement in helping to organise the remote sessions that accompanied the WSIS +10 Review.

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109 http://media-and-makers.tumblr.com/MMJuba2012
110 http://anoud.org/amdiss
111 http://ceposs.org/
112 https://www.unesco-ci.org/cmscore/events/10-open-solutions-addressing-global-challenges

OuagaLab	http://ouagalab.info/	Africa, Burkina Faso	The Fablab Burkina brings together makers and fans of digital creation to stimulate the spirit of creativity and knowledge sharing. A new form of open collaborative enterprise in Burkina Faso, OuagaLab is a melting pot where the creative spirit of sharing and learning culture to strengthen society are at the core of its endeavours.
ActivSpaces	http://activspaces.com/	Africa, Cameroon	An open collaboration and co-working space for African techies, including a broad community of makers, coders and entrpreneurs, as well as being a creative resources centre for open and digital cultures.
icecairo	http://icecairo.com/	Africa, Egypt	icecairo is a place for action, creation and collaboration. They seek to leverage, support and enable Cairo's vibrant community of innovators and changemakers, in order to fulfill a common desire for positive and sustainable change through the invention, adaptation, production and spreading of green technologies.
Conflict Early Warning and Response Mechanism (CEWARN)	http://www.cewarn.org/	Africa, Ethiopia	Their manadte is to receive and share information concerning potentially violent conflicts as well as their outbreak and escalation in the IGAD region, undertake analysis of the information and develop case scenarios and formulate options for response.
ICE Addis	http://www.iceaddis.com/	Africa, Ethiopia	University-based innovation hub, incubator and co-working space contributing to Ethiopia's economic growth by tightening the interaction between researchers, developers, entrepreneurs and creative workers by promoting green, open local technological solutions to the public.
Advanced Information Technology Institute	http://www.aiti-kace.com.gh/	Africa, Ghana	This is Ghana's first Advanced Information Technology Institute that works to stimulate the growth of the ICT Sector in the ECOWAS region. This state-of-the-art facility provides a dynamic environment for innovation, teaching and learning as well as practical research on the application of ICT for development in Africa.
Mmofra Foundation	http://mmofraghana.org/	Africa, Ghana	A foundation aimed to open the world of ideas to children through books, the arts, experiential learning, resilient ways, cultural grounding, including the use and development of FOSS and open data platforms to do so.

iLab Africa	http://ilabafrica.ac.ke/	Africa, Kenya	To provide an envir-on-ment that pro-motes tech-no-lo-gical innov-a-tion and provides busi-ness sup-port struc-tures and policy dir-ec-tion to har-ness the poten-tial of ICT as a genu-ine tool for sus-tain-able devel-op-ment.
iHub Nairobi	http://www.ihub.co.ke/	Africa, Kenya	This is an open space for the technologists, investors, tech companies and hackers in Nairobi.
The Thorn Tree Project	http://www.thorntreeproject.org/	Africa, Kenya	This is a volunteer run organisation that works to give children of the traditional nomadic families of the Northern Samburu tribe the opportunity to attend school.
Code for Kenya	http://www.code4kenya.org/	Africa, Kenya	This is a 5 month pilot program that aims to create a sustainable ecosystem around the Kenya Open Data Initiative, that will allow Organizations, Developers and the Community at large derive the advantages that an Open Data Initiative provides.
Kenya Open Data Portal	https://opendata.go.ke/	Africa, Kenya	The Kenya Open Data Initiative makes key government data freely available to the public through a single online portal. The website is a user-friendly platform that allows for visualizations and downloads of the data and easy access for software developers.
NairoBits Trust	http://www.nairobits.com/	Africa, Kenya	NairoBits Trust is a youth based organization that uses ICT multimedia creatively to improve the lives of less privileged children and youth from the non-formal settlement.
iHUB	http://www.ihub.co.ke/	Africa, Kenya	Nairobi's Innovation Hub for the technology community is an open space for the technologists, investors, tech companies and hackers in the area. This space is a tech community facility with a focus on young entrepreneurs, web and mobile phone programmers, designers and researchers.
MapKibera	http://mapkibera.org/	Africa, Kenya	Map Kibera is a free and open digital map of Kibera, the largest slum in Nairobi. It is an interactive community information project.
African Centre for Open Governance (AFRICOG)	http://www.africog.org/	Africa, Kenya	AfriCOG's programme activities built around the core functions of: Research; Advocacy and Partnerships; dissemination and linkages.
Maker Faire Africa	http://makerfaireafrica.com/	Africa, Nigeria	This is a yearly pan-African maker faire and also a community of makers in order to encourage the commitment to origin, inovation and ingenuity.

Eco Journalism	http://ecojournalism.org/	Africa, Nigeria	A project and open platform by run by a Nigerian editorial team of environmental journalists in collaboration with media activists across the world engaged in developing journalism projects addressing global challenges for the world of real-time media.
Co-Creation Hub Nigeria	http://cchubnigeria.com/	Africa, Nigeria	CcHUB is Nigeria's first open living lab and pre-incubation space designed to be a multi-functional, multi-purpose space where work to catalyze creative social tech ventures take place. The HUB is a place for technologists, social entrepreneurs, government, tech companies, impact investors and hackers to co-create new solutions to the many social problems in Nigeria.
Kër Thiossane Villa for Art and Multimedia	http://sicap1695.phpnet.org/	Africa, Senegal	A cultural centre providing African artists with access to multimedia tools and open source technologies. Projects and events also include themes around DIWO, creative hactivism and advancing digital knowledge commons.
Dakar Libre Meeting	http://blog.dakarlug.org/	Africa, Senegal	DakarLUG is platform, portaland resrouce network for the Senegalese Francophone FOSS community.
InnovAfrica	http://www.innovafrica.org/	Africa, Senegal	Focussed on innovation through experimentation, InnovAfrica is a leading francophone event for the exchange of innovatiive and cutting edge uses of technology.
South Sudan National Bureau of Statistics (SSNBS)	http://ssnbs.org/	Africa, South Africa	This is the official statistical agency of the Government of South Sudan. It is mandated by the Transitional Constitution to collect, analyse and disseminate all official economic, social and demographic statistics as open data.
The Local Government ICT (LGICT) Network	http://lgict.org.za/	Africa, South Africa	The LGICT network enables local authorities to share IT best practices, solutions, ideas and services – not only for their own mutual benefit, but for the public they serve.
Ubuntu	http://www.ubuntu.com/	Africa, South Africa	One of the world's leading FOSS operating systems.
Children's Pavilion / Interactive Playground	http://childrenspavilion.yolasite.com/	Africa, South Sudan	The Children's Pavilion and Interactive Landscape is an initiative aimed at South Sudanese children, to enable discourse on the (disappearing) space of play, following the notion that, if properly nurtured, they will the have the greatest potential to both embody and disseminate the vision and aspirations of their new country.

Community Empowerment for Progress Organzation - CEPO	http://ceposs.org/	Africa, South Sudan	CEPO is a non-profi civil society organization formed to engage fresh South Sudanese University graduates in building their respective communities/ societies on a voluntary basis. CEPO is engaged in the areas of peace and conflict mitigation, human rights, rule of law, livelihood, governance and democratic transformation. Its vision is to enable the capability of society's members through self reliance and genuine intervention.
Kapital Movie Industry Corporation	http://www.kapitalmovie.net/	Africa, South Sudan	Kapital Movie is a community based, non profit network of visionary young artists, videomakers, IT professionals and graphic designers interested in sharing and nurturing a vibrant civil society through the power of open media. Kapital Movie's focus messages are about health, conflict mitigation, and the development of peaceful methods of association through the power of films and short commercials.
Sauti Wakulima (The Voice of the Farmers)	http://sautiyawakulima.net/	Africa, Tanzania	This is a collaborative knowledge base created by farmers in Tanzania by gathering audiovisual evidence of their practices using smartphones to publish images and voice recordings on the Internet. The farmers at Chambezi use them to document their daily practices, make reports about their observations regarding changes in climate and related issues, and also to interview other farmers, expanding thus their network of social relationships.
KINU	http://www.kinu.co.tz/	Africa, Tanzania	KINU are a Social Enterprise with the mission of concentrating, growing and accelerating the Tanzanian tech and social landscape, forming communities and developing a culture of co-creation and innovation. As an open innovation hub it creates an ecosystem that facilitates the creative transfer of knowledge.
Free Software and Open Source Foundation for Africa (FOSSFA)	http://www.fossfa.net/	Africa, transnational	They promote the use of FOSS and the FOSS model in African development.
GIZ ICT@innova	http://www.ict-innovation.fossfa.net/	Africa, transnational	ict@innovation is a capacity building programme which supports small and medium ICT enterprises and aims to encourage the growth of African ICT industries

Global Health Blog	http://www.intrahealth.org/page/global-h	Africa, transnational	emphasis on collaboration, local capacity building and system strengthening is helping to create a new kind of 2.0 national health system. With targeted training and support, open source solutions enable African developers to create, customize and grow systems themselves based on the specific needs of local health workers.
African Virtual University	http://oer.avu.org/	Africa, transnational	African Virtual University (AVU) is a Pan African Intergovernmental Organization whose aim is to significantly increase access to quality higher education and training through the innovative use of Information and Communication Technologies.
Afrinnovator	http://afrinnovator.com/	Africa, transnational	A respected and trusted source of news and in-depth analysis of the African tech and innovation sectors. Aiming to be domain experts in three areas of technology innovation and entrepreneurship – Information Technology, Environmental Technology (cleantech / greentech) & Biotechnology.
AfriLabs	http://afrilabs.com/	Africa, transnational	AfriLabs exists to support the growth of communities around African technology hubs and to encourage expansion of the network by providing tools and resources for new and emerging labs.
Ureport	http://www.ureport.ug/	Africa, Uganda	Ureport is a free SMS-based system that allows young Ugandans to speak out on what's happening in communities across the country, and work together with other community leaders for positive change.
Women of Uganda Network - WOUGNET	http://wougnet.org/	Africa, Uganda	WOUGNET is a NGO promoting and developing the use of information and communication technologies (ICTs) among women and women's organisations as tools to share information and address issues such as poverty, illiteracy, violence against women and health care collectively.
Hive Colab	http://hivecolab.org	Africa, Uganda	Hive Colab is an open collaborative coworking space where people can meet, learn from one another, share knowledge. It's also a place to find mentors, or become a mentor to a young person, network to further your idea, get partners for your business, learn and share experiences and generally collaborate.

I Paid a Bribe	http://ipaidabribe.org.zw/	Africa, Zambia	This is an initiative to tackle corruption by harnessing the collective energy of citizens to show how much corruption is going on around. It aims to quantify petty corruption by understanding the role of bribery in public service delivery.
Africa Hubs Map	https://africahubs.crowdmap.com/	Africa, Zambia	They provide a place for technology entrepreneurs to meet, swap experience, and attend training, networking and hackathon events.
BongoHive	http://bongohive.co.zm/	Africa, Zambia	The essence of BongoHive can be described by three keywords: Innovation, Creativity and Sustainability. We believe some applications and services can leapfrog development in Zambia, and these need to have the capacity to endure with sustainable outcomes.
Women's Tech Organisations in Africa	https://womentechafrica.crowdmap.com	Africa, Zambia	A crowdsourced digital mapping of women's tech organisations in Africa.
Scientific Electronic Library Online (Argentina)	http://www.scielo.org.ar/	Americas, Argentina	The Scientific Electronic Library Online - SciELO is an electronic library covering a selected collection of Brazilian scientific journals. It includes the development of a common methodology for the preparation, storage, dissemination and evaluation of scientific literature in electronic format.
Fuel Economics	http://www.fueleconomics.info/	Americas, Bolivia	A web application to raise awareness and inform people that choosing a car with low fuel consumption can help the environment and climate change. It presents data visualizations so people can be informed about climate change and CO2 emissions using data from World Bank World Development Indicator
Ubalab	http://ubalab.org/	Americas, Brasil	Ubalab is an young articulation of open, experimental digital culture in Ubatuba, north of São Paulo. Developed within the network MetaReciclagem the lab focussed on three axes of action: collaborative mapping, digital culture and experimental exchange.
Brasuino	http://brasuino.holoscopio.com/	Americas, Brasil	This is a single board microcontroller that uses the AVR microcontroller. This Brazillian version of Arduino was redesigned using Libre Software, licensed as GPLv2+ and designed for easy prototyping.

REA Brasil (OER)	http://rea.net.br/	Americas, Brasil	The REA-Br is one of the first projects in Brazil to appropriate the reality of the Brazilian international discussion on Open Educational Resources (OER) and Open Education. The Community-REA Brazil is formed by educators, scientists, engineers, ICT professionals, journalists, lawyers and all those who believe in open education and open educational resources.
Ficha Pública (Public File)	http://www.fichapublica.org.br/	Americas, Brasil	The Public File is a nonpartisan space for the exchange of information between candidates and voters. Our mission is to become more visible to the voter, expanding the information available on more than 3000 Candidates for state and federal deputy in the state of São Paulo. All Candidates will have the same chance to provide voters with information only about what they want to do and what your priorities are in charge of who is running. It is up to the voter to research, analyze and monitor the work of their candidate, if they are elected.
Metareciclagem (Meta Recycling)	http://rede.metareciclagem.org/	Americas, Brasil	The MetaReciclagem is a distributed network developing decentralized and open actions to appropriate technology. Begun in São Paulo in partnership with the NGO Agente Cidadão (Citizen Agent) as a project to collect and refurbish used computers that were later distributed to social projects. The MetaReciclagem ideology is based on the deconstruction of the hardware, the use of free software and open licenses, in a network based action and in the search for social transformation.
The Map of Citizen Participation	http://www.mapadaparticipacao.org.br/	Americas, Brasil	The Map of Citizen Participation is a platform that allows users to search or register organizations that provide various forms of citizen participation in the city of São Paulo. Membership is free with the aim of greater information to stimulate the mobilization of society and strengthening social organizations.
Onibus Hacker Mobile Lab	http://onibushacker.org/	Americas, Brasil	The hacker bus is mobile lab where hackivists of all sorts board by a common desire: to occupy Brazilian cities with political actions. By politics they understand all forms of technological appropriation, all nasty and all questioning and exercise of rights. By share, they understand practicing the do it yourself of a radio antenna, a bill, a school...

Cultura Viva (Brazil)	http://www.cultura.gov.br/culturaviva/	Americas, Brasil	The cultural hotspots are intended to spread digital culture and technical knowledge throughout Brazil. The program is about democratization, permitting ideas of different places, from rich to poor cities, be exchanged. A hotspot is established with a broadband connection, infrastructure made with recycled equipment and technical workshops on open-source software.
Public Software Portal (Brazil)	http://www.softwarepublico.gov.br./	Americas, Brasil	The Brazilian Public Software Portal was created to share software in the public interest and treat the software as a public good.
Mootiro	http://maps.mootiro.org/	Americas, Brasil	On the Mootiro network you find other organizations and people who work in your area or share your cause. You can invite your employees and donors to be part of the network and get involved with community projects. MootiroWiki is a space for sharing knowledge and information between people who promote social change.
Queremos Saber (We Want to Know)	http://queremossaber.org.br/	Americas, Brasil	In a democracy, citizens have a right to know what their government is doing. For now, we have a limited idea of what our representatives do. Some data are available on the websites of government, but are still not enough to keep up, in fact, the activities of elected politicians, what happens to our money, or to find - and even discover - public services. This site was created by the Community Transparency Hacker and the Open Knowledge Foundation Brazil to facilitate such access, and visualize how public institutions are fulfilling their obligation to provide the information that is ultimately ours.
CDTC - Center for Technology and Knowledge Dissemination	http://cursos.cdtc.org.br/	Americas, Brasil	CDTC recognises the importance of the role of the state, both in brokering software market and in building a more just society, It proposes a joint effort between the public sector and universities with the aim of expanding the knowledge society in the use of free software.
Fora do Eixo	http://foradoeixo.org.br/	Americas, Brasil	An affiliation of 'cultural producers' (promoters, managers, labels etc.) who use the internet to connect and organise, work together and make a sustainable independent music and performing arts sector (English, see: http://p2pfoundation.net/Fora_do_Eixo)

Cultura Digital Portal (Brazil)	http://culturadigital.br/	Americas, Brasil	A platform for web content and flow of people linked to the construction of public policy and regulatory frameworks for digital policy. Over 2000 blogs, 400 discussion groups and 500 forums initiated by July 2012. The network is used not only as a space for discussion, but as a tool for collaboration of public and systematization of contributions made to government bills.
Caribbean Open Institute	http://caribbeanopeninstitute.org/	Americas, Caribbean	This is a regional initiative conceptualized by a community of Caribbean stakeholders that seeks to facilitate the emergence of a Caribbean Knowledge Economy.
Caribbean Information Society Portal (CARIB-IS)	http://www.carib-is.net/news/caribbean-	Americas, Caribbean	The overall objective of the CARIB-IS is to promote the development of ICT in the implementation of the Caribbean Information Society within the CARIFORUM member states.
Developing The Caribbean	http://developingcaribbean.org/	Americas, Caribbean	Is the first regional Conference and Software Developer Competition of its kind, focused on Open Data and Social development. It combines the thrill and competition a code sprint, with the social objectives on government, NGOs and Civil Society. Highlights the focus on Open Data as a catalyst for regional development, and the role of software development as a locus of innovation.
Silicon Caribe	http://www.siliconcaribe.com/2012/01/2	Americas, Caribbean	Is a triple award-winning blog that covers the Caribbean Tech Startup Scene – The Entrepreneurs, Developers, Designers, Investors, Advocates, Culture and Events. We keep you updated on the latest news and trends in Caribbean technology entrepreneurship and innovation.
HaitiCommunitere	http://www.haiti.communitere.org/	Americas, Caribbean	HC is an organization that follows an 'Open Systems' principle, striving for Haitian and International groups to operate as a community, thus increasing capacity and streamlining logistical operations. HC partners operate in a shared overhead environment, thus allowing their focus of operations to remain project based. HC continues to respond to the observed needs not being addressed on the ground while coordinating a Sustainability Resource Center that fosters creativity and connectivity while inspiring the Haitian and International development effort.

Economic Commission for Latin America and the Caribbean (ECLAC)	http://www.eclac.org/default.asp?idioma	Americas, Chile	This organisation was founded with the purpose of contributing to the economic development of Latin America, coordinating actions directed towards this end, and reinforcing economic ties among countries and with other nations of the world. The organisation also serves to promote the region's social development.
Centro de Innovación en Educación ~ Fundación Chile	http://educacionfch.cl/nuestro-centro/qu	Americas, Chile	The Center for Innovation Studies in Education develops innovative ICT and access oriented educational perspectives for municipalities, local networks and education organisations in Chile. Their work is also based on open data georeferencing to evaluate behavioral analysis of registry data, perception of quality of education, gaps and critical points of relevance of specialties and productive environments.
Ciudadano Inteli	http://www.ciudadanointeligente.org/	Americas, Chile	Non-profit ICT organization promoting transparency and citizen participation, as tools to protect and develop stronger democracies.
Espacio G	http://www.espacio-g.cl/	Americas, Chile	Space G based in Valparaiso, enables the interaction between emerging artists and art collectives. They employ open, networked and critical cultural practices as reflection and creation tools, as well as political spaces that allow the users to understand their own relationships with the broader world of knowledge and culture.
Librepesante	http://librepensante.org/	Americas, Colombia	Driven by the culture of DIY (do it yourself) and DIWO (do it with others) with regard to technological development and local industry, lirbeprensante explores the mitigation of local social, technological, environmental, cultural and economic problems. It is a point of convergence between content, network and community work.
Wiring	http://wiring.org.co/	Americas, Colombia	Wiring is an open-source programming framework for microcontrollers, allowing writing cross-platform software to control devices attached to a wide range of microcontroller boards to create all kinds of creative coding, interactive objects, spaces or physical experiences.

labSurlab	http://labsurlab.org/	Americas, Colombia	labSurlab is a meeting of labs, whether marginal, institutional or independent across Latin America and beyond, aimed at sharpening the cultural strategies of the network society. Focus on the rethinking of the experimental, artistic and social components of new media and open technologies.
International Centre for Free and Open Source Software (ICFOSS Kerala)	http://www.icfoss.in/	Asia, India	This is an autonomous institution with the objectives of co-ordinating FOSS initiatives within Kerala, as well as linking up with FOSS initiatives in other parts of the world in order to push the agenda of promoting democratic access to information and knowledge through equitable models of production and distribution of software in particular and knowledge in general.
The Centre for Internet and Society (CIS Bangalore)	http://cis-india.org/	Asia, India	This is a research organization that works on policy issues relating to freedom of expression, privacy, accessibility for persons with disabilities, access to knowledge and IPR reform, and openness (including open government data, free/open source software, open standards, open access to scholarly literature, open educational resources, and open video), and engages in academic research on digital natives and digital humanities.
IT@School (Kerala)	https://www.itschool.gov.in/	Asia, India	This is a project of Department of General Education, Government of Kerala, setup to foster the IT education in schools and which on a longer term would facilitate ICT enabled education in the state.
Good Stove	http://www.goodstove.com/	Asia, India	An initiative to mitigate climate change through adaptation. Sstoves are constructed using easily available local raw material - bricks, clay, ash and cow-dung
House of Natural Fibre - HONF	http://ix.natural-fiber.com/	Asia, Indonesia	HONF - the House of Natural Fiber, is an open digital cultures community engaged in an active worldwide practice to foster democratic, artistic and open means of creative expression and innovative collaboration. Within the framework of their Education Focus Program (EFP) they concentrate on interdisciplinary scientific exchange on the critical analysis of the circumstances that move Indonesia's post-dictatorship society.

Low Cost Prosthesis	http://www.lowcostprosthesis.org/	Asia, Indonesia	A project of the HONFablab, the LCP develops lower leg prosthetics with production costs below $50 using open source tools, technologies and methodologies.
Mauj Media Collective	http://www.maujmediacollective.org/	Asia, Pakistan	Open technology, art and culture. The initiatives of Mauj use open technology, art and culture to empower society and people. Their projects engage regional and international participants and audiences. MAUJ explores the phenomena of new media arts and the impact of technology within the context of the city.
Bytes for All, Pakistan	http://content.bytesforall.pk/	Asia, Pakistan	B4A, Pakistan is a, ICT focussed human rights organization that experiments with and organizes debate on the relevance of ICTs for sustainable development and strengthening human rights movements in Pakistan. B4A focuses on capacity building of human rights defenders on their digital security, online safety & privacy.
Sahana Eden	http://eden.sahanafoundation.org/	Asia, Pakistan (transnational)	Sahana Eden is an Open Source Humanitarian Platform which can be used to provide solutions for Disaster Management, Development, and Environmental Management sectors.
Transparency International	http://blog.transparency.org/	transnational	This blog will show what people are doing to stop corruption around the world through the unique perspectives of Transparency International's local, independent offices run by local staff in over 100 countries.
Open Government Partnership	http://www.opengovpartnership.org/	transnational	The Open Government Partnership is a new multilateral initiative that aims to secure concrete commitments from governments to promote transparency, empower citizens, fight corruption, and harness new technologies to strengthen governance.
Open Font Library	http://www.openfontlibrary.org/	transnational	The Open Font Library promotes freedoms relating to the use of type. All the fonts that appear on this site come with the freedom to use, study, share and remix them.
Open Data Census	http://census.okfn.org/	transnational	The open data census assesses the state of open data around the world. This site hosts the census and presents the results along with other key facts about the state of open data and especially open government data around the world.

GNU General Public License	http://www.gnu.org/licenses/gpl.html	transnational	The GNU General Public License is a free, copyleft license for software and other kinds of works. It is intended to guarantee users freedom to share and change all versions of a program to make sure it remains free software for all its users.
Tactical Technology Collective	https://www.tacticaltech.org/	transnational	Security in-a-box provides a collection of Hands-on Guides, each of which includes a particular freeware or open source software tool, as well as instructions on how you can use that tool to secure your computer, protect your information or maintain the privacy of your Internet communication.
Scriptsource	http://scriptsource.org/	transnational	ScriptSource is a dynamic, collaborative reference to the writing systems of the world, with detailed information on scripts, characters, languages - and the remaining needs for supporting them in the computing realm.
Open Culture	http://www.openculture.com	transnational	Open Culture brings together high-quality cultural & educational media for the worldwide lifelong learning community.
Open Source Hardware and Design Alliance (OHANDA)	http://www.ohanda.org/	transnational	OHANDA is an initiative to foster sustainable copyleft-like sharing of open hardware and design. It was first drafted at the GOSH!-Grounding Open Source Hardware summit at the Banff Centre in July 2009 and one of the first goals of the project is to create a label and to build a service for sharing open hardware designs.
International Aid Transparency Initiative (IATI)	http://www.aidtransparency.net/	transnational	IATI is a voluntary, multi-stakeholder initiative that seeks to improve the transparency of aid in order to increase its effectiveness in tackling poverty.
Creative Commons	http://creativecommons.org/	transnational	Creative Commons develops, supports, and stewards legal and technical infrstructure that maximizes digital creativity, sharing, and infrastructure innovation.
Open Data Resources for Climate Change	http://data.worldbank.org/climate-change	transnational	Central hub of information, data and reports about climate change around the world.

Association for Progressive Communications (APC)	http://www.apc.org/	transnational	APC empowers and supports organisations, social movements and individuals in and through the use of information and communication technologies to build strategic communities and initiatives for the purpose of making meaningful contributions to equitable human development, social justice, participatory political processes and environmental sustainability.
Random Hacks of Kindness	http://www.rhok.org/	transnational	A rapidly growing global initiative encompassing a community of over 5,500 innovators in over 30 countries making the world a better place by developing practical, open source technology solutions to respond to some of the most complex challenges facing humanity.
Appropedia	http://www.appropedia.org	transnational	Appropedia is a major global wiki for open systems and collaborative solutions in sustainability, appropriate technologies and poverty reduction.
Irrepressible Voices	http://www.irrepressiblevoices.org	transnational	Irrepressible Voices (IV) is an Internet-based participation platform for videos about human rights issues, drawing attention to concrete issues and developing strategies to improve human rights situations.IV uses visual reports to document human rights issues to discuss, rate, verify and work on solution proposals with partner experts.
Open Definition	http://opendefinition.org/	transnational	The Open Definition sets out principles that define "openness" in relation to data and content, aiming to ensure interoperability between different pools of open material.
Book Sprint	http://www.booksprints.net/	transnational	Book Sprints are short intense facilitated writing retreats, which bring together a group of four to twelve people along with a facilitator to produce a book in three to five days. Using open source tools and platforms, the process is aimed specifically at creating FOSS manuals, OER and other forms of open collaborative enterprise.
Greg's Cable Map	http://www.cablemap.info/	transnational	The map consolidates all available information about the undersea communications infrastructure. With initial data harvested from Wikipedia, further information is gathered from numerous sources and transcribed into a useful and rich geocoded format

Global Hackerspace Network	http://hackerspaces.org/wiki/	transnational	Hackerspaces are FOSS oriented and community-operated physical places, where people can meet and work on their projects. This website is for Anyone and Everyone who wants to share their hackerspace stories and questions with the global hackerspaces community.
Global Network of Fablabs	http://fab.cba.mit.edu/about/labs/	transnational	Fab labs provide widespread access to modern means for collaborative invention that have spread from inner-city Boston to rural India, from South Africa to the North of Norway. Activities in fab labs range from technological empowerment to peer-to-peer project-based technical training to local problem-solving to small-scale high-tech business incubation to grass-roots research. Fab labs share core capabilities, so that people and projects can be shared across them.
Sourcefabric	http://www.sourcefabric.org/	transnational	Book Sprints are short intense facilitated writing retreats, which bring together a group of four to twelve people along with a facilitator to produce a book in three to five days. Using open source tools and platforms, the process is aimed specifically at creating FOSS manuals, OER and other forms of open collaborative enterprise.
Open Source Ecology	http://opensourceecology.org/	transnational	With chapters around the world the OSE project is a network of farmers, engineers, and open technologies supporters that are creating a 'Global Village Construction Set' as an open source, low-cost, high performance technological platform that allows for the easy, DIY fabrication of industrial and agricultural machines that it takes to build a sustainable civilization with modern comforts.
bricolabs	http://bricolabs.net/	transnational	Bricolabs is a translocal, intraregional network that regards nationally determined cultural policies for 'new media' as attempts to dominate, rationalise, claim and own practices that by nature exist beyond such frameworks. Bricolabs investigates open content, software and hardware for community applications, bringing people together with new technologies and distributed connectivity.

ojoVoz	http://ojovoz.net/	transnational	ojoVoz is a FOSS platform which consists of mobile and web-side applications that help communities make their voices heard. The platform focusses on a methodology which encourages face-to-face meetings and the sharing of hardware, with one aim being to help communities in creating a knowledge commons and community memory. By collaboratively documenting, discussing and sharing their common issues, small groups of people with specific interests can use ojoVoz to strengthen their voice and create awareness.
Open Data for Africa	http://opendataforafrica.org/	transnational (AfDB)	The Open Data Platform is a user-friendly tool for extracting data, creating and sharing own customized reports, and visualizing data across themes, sectors and countries in tables, charts and maps. Through the Open Data Platform, users can access a wide range of development data on African countries from multiple international and national official sources
The Commonwealth of Learning (COL)	http://www.col.org/	transnational ((	This is an intergovernmental organisation created by Commonwealth Heads of Government to encourage the development and sharing of open learning/distance education knowledge, resources and technologies. COL is helping developing nations improve access to quality education and training.
Open ICT for Development (ICT4D)	http://openict4d.wikidot.com/	transnational (Canada)	This is a wiki which attempts to collaboratively build the theoretical and empirical understanding of Openness and its applicability to the field of human development, and ICT for development in general.
Steps for Peace	http://www.steps-for-peace.org/en/	transnational (Germany)	This is a non-profit organisation that supports social and political transformation processes in crisis regions. Their work focuses on education, researcch and development cooperation.

Open Oil	http://openoil.net/	transnational (Germany)	OpenOil seesk creative, practical and socially progressive policy making in the oil and gas industries, believing this possible within current constraints. They seek to link the global debates on climate change, energy and the resource 'curse', and publish country specific almanacs on the local oil industries. Using social media, FOSS and open content approaches works to publish oil contracts to create a more open atmosphere around the oil industry.
Front Line Defenders	http://www.frontlinedefenders.org/	transnational (Ireland)	A FOSS based international foundation for the protection of human rights defenders, working to provide fast and effective action to help protect human rights defenders at risk so they can continue their work as key agents of social change.
Ushahidi	http://www.ushahidi.com/	transnational (Kenya)	A non-profit tech company that specializes in developing free and open source software for information collection, visualisation and interactive mapping.
Publish What You Fund	http://www.publishwhatyoufund.org/inde	transnational (London)	Publish What You Fund was launched at the Accra High Level Forum on Aid Effectiveness by a coalition of governance, aid effectiveness and access to information organisations. They campaign for aid transparency, completely open, more and better information about aid and development assistance internationally.
One Percent Blog	http://onepercentblog.com/	transnational (Netherlands)	This is the marketplace or platform that connects smart development projects with people, money and knowledge around the world.
Reliefweb	http://reliefweb.int/	transnational (OCHA)	ReliefWeb is a leading source for reliable and timely humanitarian information on global crises and disasters providing updates and analysis to humanitarians, so they can make informed decisions and plan effective assistance.
Open Data Research Network (ODDC)	http://www.opendataresearch.org/	transnational (UK)	The Open Data Research network has been established to connect researchers from across the world working to explore the implementation and impact of open data initiatives.

The Data Journalism Handbook	http://datajournalismhandbook.org/	transnational (UK)	The handbook was born at a 48 hour workshop at MozFest 2011 in London. It subsequently spilled over into an international, collaborative effort involving dozens of data journalism's leading advocates and best practitioners.
Hexayurt	http://hexayurt.com/	transnational (UK)	Applying whole systems thinking to refugee camps and disaster response. It creates the capability to manufacture and distribute high quality, long lifespan housing at a price similar to tents.
Commonwealth Telecommunications Organisation	http://www.cto.int/	transnational (UK)	The CTO is an international organisation engaged in multilateral collaboration in the field of ICTs to deliver effective development interventions that enrich, empower, and emancipate people within the Commonwealth and beyond.
Gender Equality in Free and Open Source Software (FOSS)	http://www.wsis-community.org/pg/grou	transnational (UNESCO)	This Community aims at creating a network of different institutions and projects that deal with the issue of the under-representation of Women in Technology -and more deeply with the Gender Gap in FOSS.
Gender Equality in Free and Open Source Software	http://www.wsis-community.org/pg/grou	transnational (UNESCO)	This Community aims at creating a network of different institutions and projects that deal with the issue of the under-representation of Women in Technology -and more deeply with the Gender Gap in FOSS.
WSIS Knowledge Communities	http://www.wsis-community.org/	transnational (UNESCO)	A platform for facilitating information gathering and exchange, and common development of ideas and projects among the multi-stakeholder team for each Action Line through collaborative and community oriented online tools.
Open Source Initiative (OSI)	http://opensource.org/	transnational (USA)	This is the community-recognized body for reviewing and approving licenses as OSD-conformant. They are also actively involved in Open Source community-building, education, and public advocacy to promote awareness and the importance of non-proprietary software.
The International Republican Institute	http://www.iri.org/	transnational (USA)	This is a nonprofit, nonpartisan organization, which advances freedom and democracy worldwide by developing political parties, civic institutions, open elections, democratic governance and the rule of law.
Open Educational Resources (Open Educational Resources	http://www.oercommons.org/	transnational (USA)	A network bringing together approx. 45 000 OER (Open Educational Resources) tools for sharing curriculum with the world, along with news and training on the brave new world of open education.

Bright Path Foundation	http://www.brightpathfoundation.org/	transnational (USA)	BrightPath Foundation is an international non-profit organization focused on building local capacity through values-based technology training, education sector support and resource development initiatives. They facilitate innovative, locally customized, technology-based training and education solutions for communities across the world.