Subject: Innovation and Enterprise
Module Code: MAN4335M
UB: 12039259

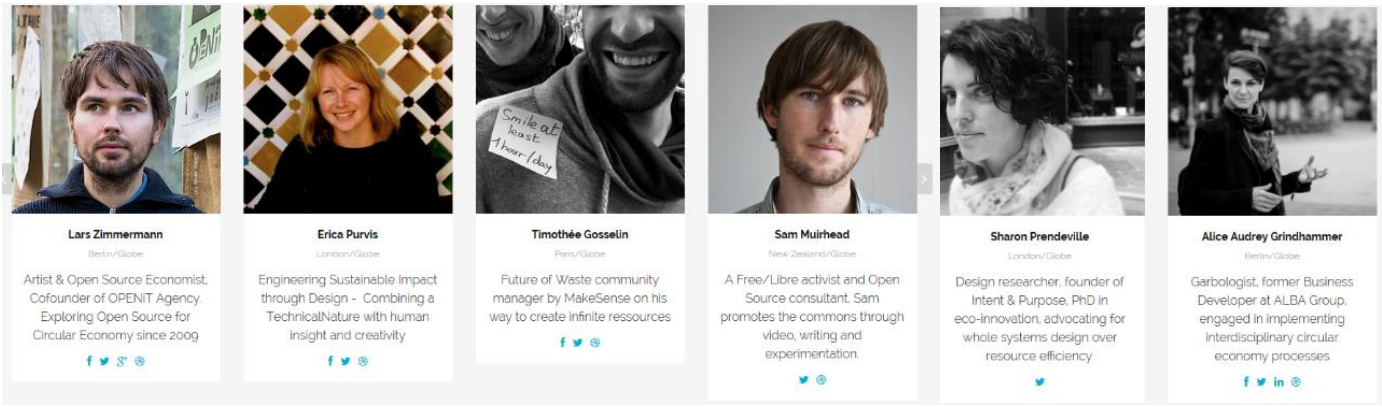
A study of how and why the Open Source Circular Economy Days initiative might be classed as being innovative and disruptive.

This report looks to briefly outline the Open Source Circular Economy (OSCE) model and the OSCEdays initiative used to promote its uptake. It also explores how this—as part of larger collaborative global commons movement (appendix 1)—might be classed as being systemically innovative and disruptive through questioning some of the standard definitions and terminologies by looking at them through a holistic lens.

In summary, the OSCE concept aims to harness the power of the Open Source (OS) methodology (appendix 2) that mutualises knowledge rather than ring-fencing it, to help promote a more collaborative and holistic Circular Economy (CE), as championed by the Ellen MacArthur Foundation (EMF) (appendix 3). The brainchild of the multidisciplinary entrepreneurs shown in figure 1, the purpose of OSCEdays is about *"starting a conversation, growing a network and kick-starting a movement" (DIF 2015a)*.

As such, the first globally distributed OSCEdays 'hackathon' event was staged in 33 cities across 25 countries over 5 days in June 2015. These locally organised events—synchronised around a central community platform of resources and discussions—manifested in organisers and participants from a multitude of fields, sectors and backgrounds connecting together to learn about OSCE concepts and work together on local and global CE-related challenges. (OSCEdays 2015a)

Figure 1: OSCEdays team (*Source:* OSCEdays, 2015b).



Why is it innovative?

As shown in appendix 4, there are multiple modern understandings for the word innovation, with the majority aligning with Schumpeter's ideas on 'creative destruction' from a capitalistic standpoint (1987). From these perspectives, Dance (2008) distils two fundamental common components:

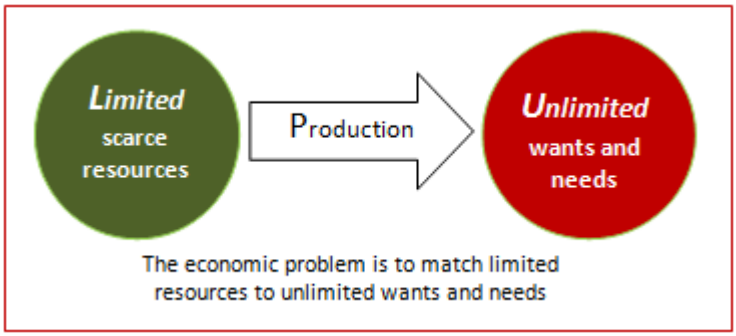
a) Something fresh (new, original, or improved)
b) Something that creates value

Under this definition, the present OSCE concept is the 'something fresh', whilst the OSCEdays initiative is the part that creates value and catalyses further distributed value creation. However, what

constitutes value is very subjective, hard to measure and often open to debate in any context. OSCEdays is no exception, considering its infancy and that it relies heavily on empirical analysis, much of which cannot fully be appreciated due to the decentralised Stigmergic nature of the value it creates.

From a historical perspective, innovation is the successor to the term heresy (Godin 2015a); meaning in a none-religious context *"dissent or deviation from a dominant theory, opinion, or practice" (MW 2015)*. Under this definition, the CE framework is clearly innovative as it proposes a tangible alternative to the dominant 'lineal' economic model, whilst indirectly undermining aspects of the traditional economic 'problem' that underpins it (figure 2). The addition of the OS component—as part of the commons—extends this further, providing a possible solution to what Perez describes as an *"[…] absence of alternative proposals beyond the false dichotomy of State or Market" (2007 p.24)*.

Figure 2: The economic Problem (*Source:* economicsonline n/d).



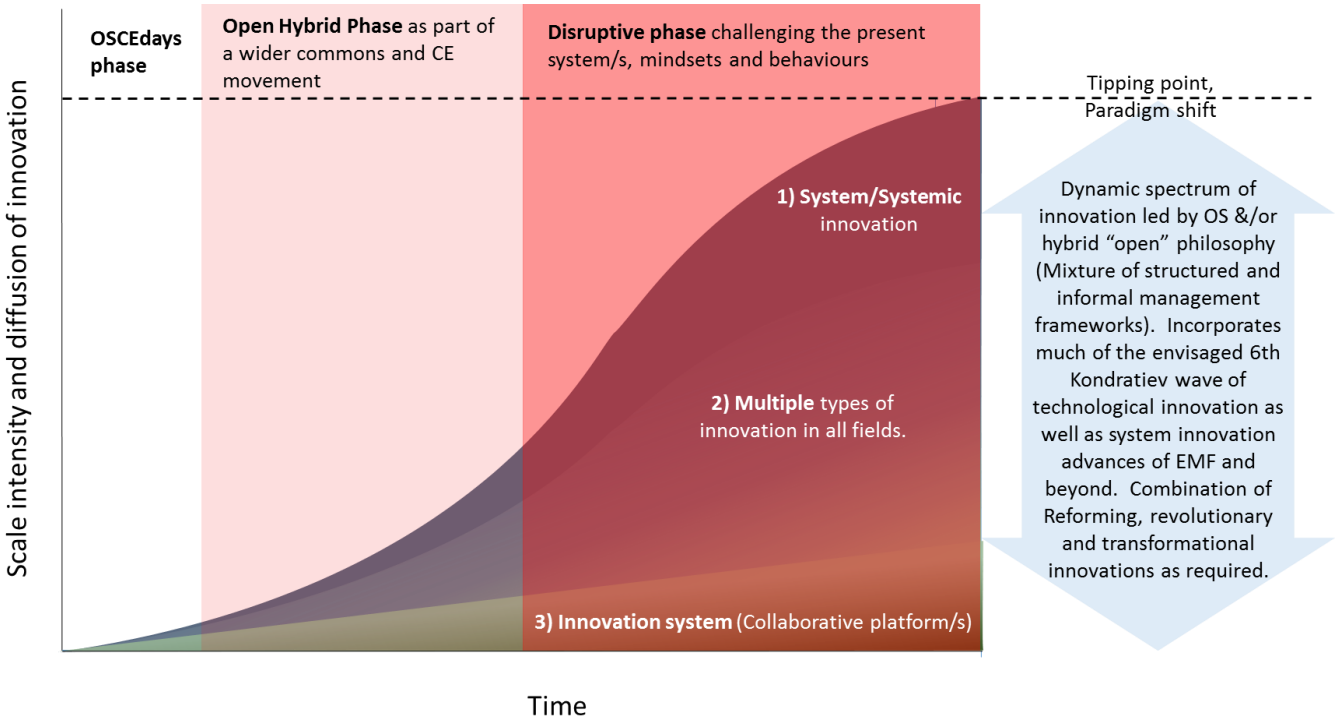
As the initiative fits within various innovation frames of reference, which gravitate around the OS philosophy, 3 interdependent theoretical levels of innovation have been identified progressing and evolving through 3 hypothetical phases as the concept scales. As shown in figure 3, these levels include:

1. **System/systemic innovation**
   Overarching OSCE (commons) concept where the intention is to reshape the complete economic system through an *"interconnected set of innovations, where each influences the other with innovation both in the parts of the system and in the ways in which they interconnect" (Mulgan and Leadbeater 2013 p.4).*

2. **Multiple innovation**
   More technologically driven 'set' of product and services innovations, which depending on the contextual factors may include: Zero-based design, Base of the pyramid, Reverse and other more predominantly 'need pull' focused innovations.

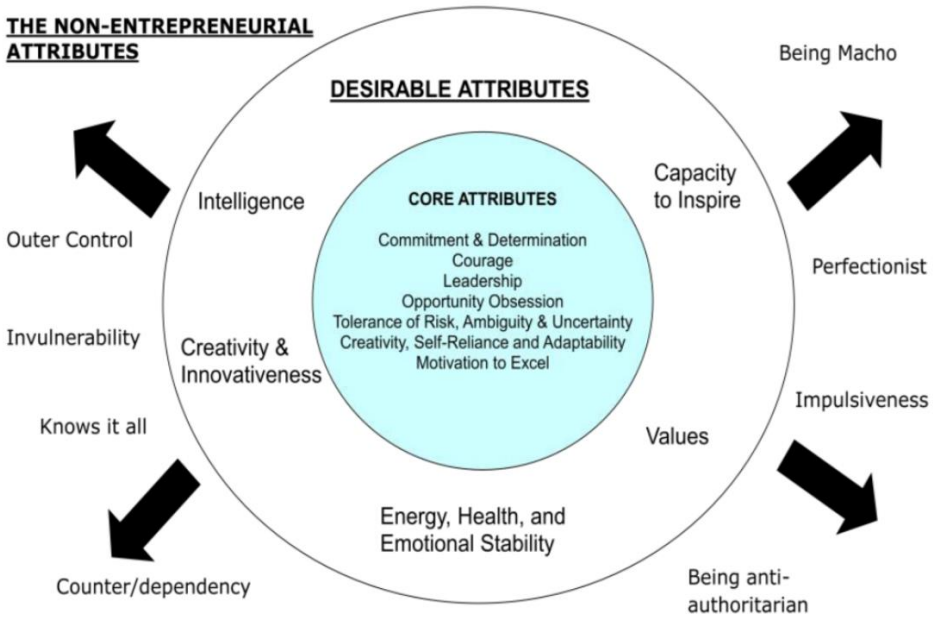
3. **Innovation systems**
   OSCEdays initiatives and any future collaborative platforms and tools. This aligns with innovation systems theory as there has been a clear focus on the creation, dissemination, and utilization of knowledge (Carlsson et al 2002).

Figure 3: OSCE innovation roadmap



As part of the development process of OSCEdays members have demonstrated many entrepreneurial characteristics, although some think more of themselves as enablers—noting that entrepreneurship, including 'social/environmental', is still too focused on monetary growth which often leads to poor decision-making (Muirhead 2015). Although not 'opportunity obsessed', various examples show many of them demonstrating the 'Seven Dominant Traits' depicted in the Timmons and Spinelli (2009) model shown in figure 4. But perhaps more importantly to this context, these appear to be balanced by many of the 'desirable attributes', shaped by their social environment influences and wider systemic factors (Hopkinson et al 2015).

Figure 4: Seven Dominant Traits (*Source:* Timmons and Spinelli, 2009)



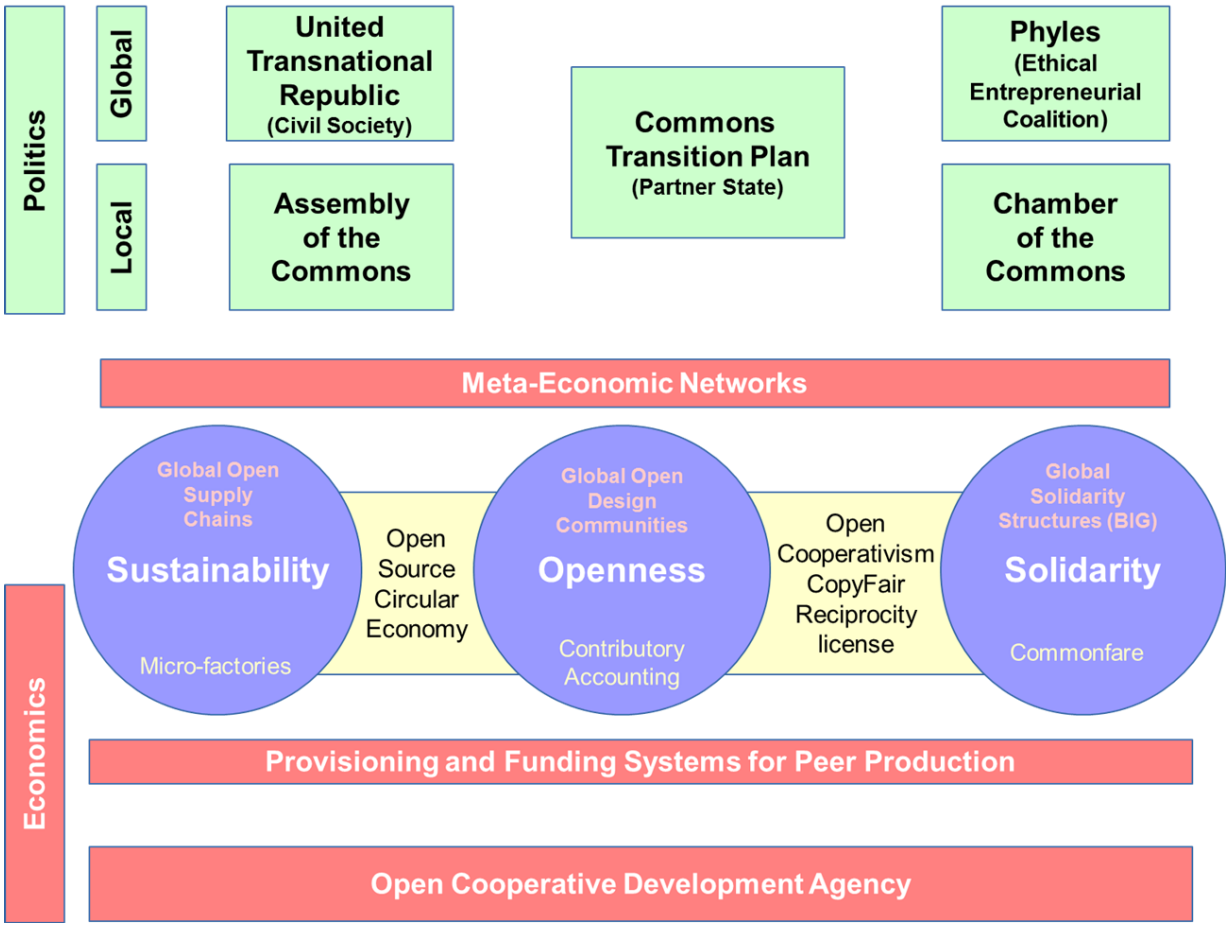
Taking an 'integrated approach', the process by which they have leveraged these traits to spot a clear need, mobilised under-utilised or uncontrolled resources, maximised enablers and brought about the innovation/s described is a clear sign of 'collaborative entrepreneurship' (Drayton 2011).

Is the innovation disruptive?

There is much debate surrounding what constitutes a 'disruptive innovation'. Coined by Christensen and Bower in 1995, disruptive theory, from which it derives, is deeply rooted in economic theory and business strategy (Christensen et al 2015) as outlined in appendix 5. However, as Lepre contest, it *"is a theory about why businesses fail. It's not more than that. It doesn't explain change" (2014).* Considering this and other limitations (Kitroeff 2015), it is therefore deemed as being an inadequate yardstick, especially since the mainstream use and understanding of the term often differs. Although not clearly defined, it is described as the change in the status quo brought about by the innovation.

Under this definition and without the benefit of hindsight the answer is that the OSCEdays cannot currently be classed as being disruptive. However, there is a growing belief amongst influential economists and thought leaders (Mintzburg 2015; Rifkin 2014; Eisenstein 2011) that we are at the cusp of what Scharmer (2014) calls the *"4.0 co-creative economy"*. Within this new paradigm—of which there are slight variations—something akin to an OSCE is usually envisaged as shown in figure 5.

Figure 5: Commons proposal including OSCE (*Source:* P2P Foundation 2015)

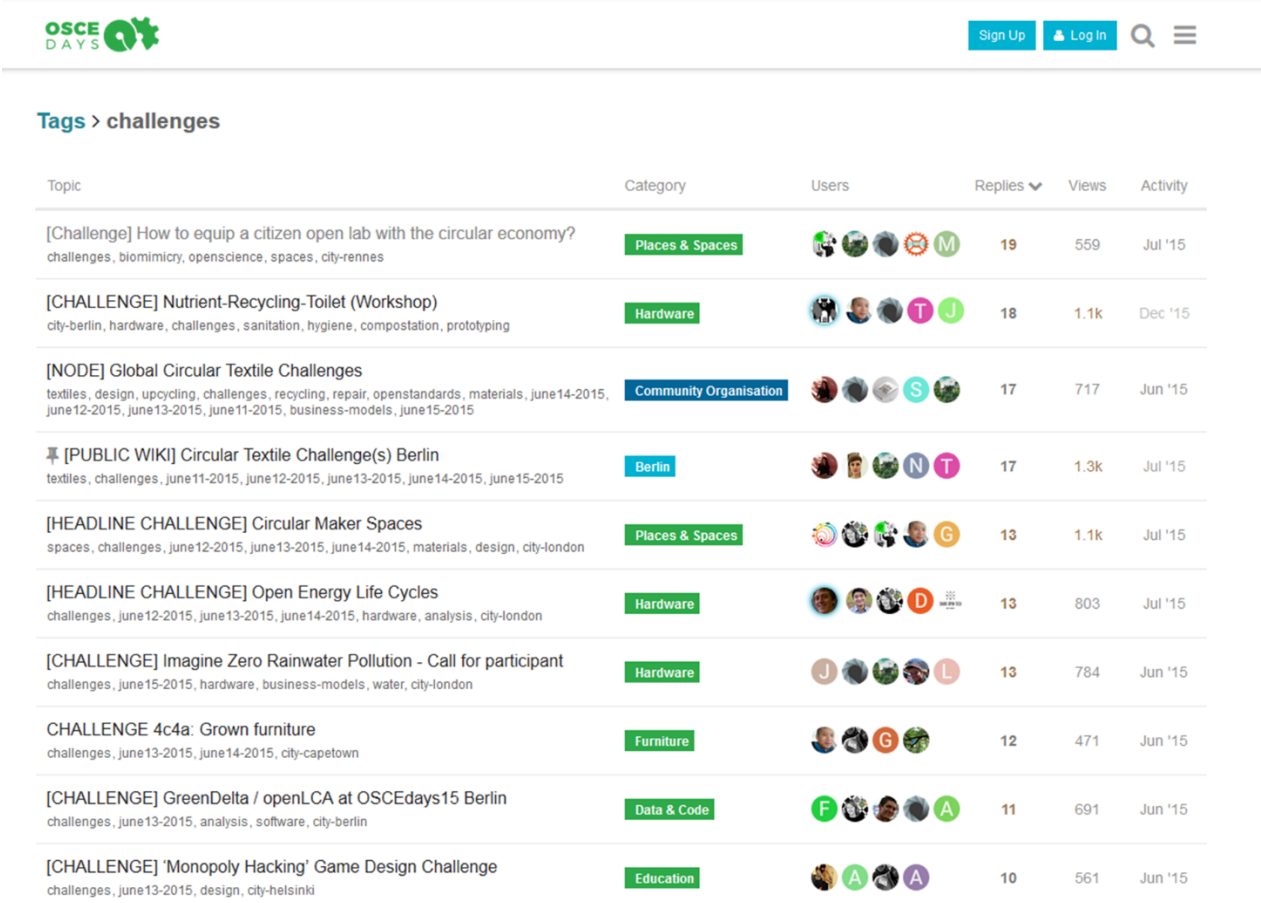


How did the innovation come about?

The initial OSCEdays idea emerged during a call between four founding members in November 2014 (Muirhead 2015). Combining expertise and experience in the fields of CE, OS, R&D and beyond, they shared the belief that a truly CE could only work if it was developed in an open, transparent and collaborative sense rather than a series of closed or semi-closed loops (OSCEdays 2015a).

Assisted by additional members, work began on creating and finalising the strategic purpose, event specifics, marketing and participation material (how-to guides), as well as the branding and webpage. Then in early 2015, they embarked on the advertising, networking and community building campaign. This included tapping into extended networks to find local organisers/partners (see appendix 6), using digital communication technology to form relationships and assist with organisation. In parallel, the online forum was developed; going live in April 2015, participants were asked to post local or global challenges, create content and share knowledge (OSCEdays 2015c), see figure 6.

Figure 6: OSCEdays Platform (*Source:* OSCEdays, 2015e)



Whilst the majority of the work was unpaid, some basic sponsorship was gained from Suez (waste management) and iFixit to cover global fixed cost as well as The Knowledge Transfer Network (London) and Veolia (Berlin) for local events (Muirhead 2015).

In an effort to minimise costs and maximise resources, the initiative was intentionally developed using a decentralised OS, agile approach, exploiting the use of free & OS software, social media, and the

core open forum that served as a platform to disseminate information. Subsequently, many of the barriers and time needed to organize and run an equivalent 'centralised' event were avoided both for the organisers and participants. However, the process posed challenges, including: resolving technical issues, balancing personal commitments (jobs), engaging participants, and maintaining continuity and scale-up long term (OSCEdays 2015d).

What have been and might be the possible outcomes of the initiative?

After just 7 months, the first distributed globally linked events where held in June 2015 and deemed a unanimous success by participating experts, innovators and practitioners in the fields of OS and CE, the maker/fablab movement, local cooperatives, academia, business, local authorities, and beyond (OSCEdays 2015d). This has resulted in: CE and OS awareness building, idea development, prototyping of new products and solutions, and ongoing innovation resulting in substantial knowledge diffusion and documentation. Equally, an ecosystem of local and global networks and communities have been forged resulting in the development of new alliances, initiatives, projects, and enterprises (OSCEdays 2015d). Some of the major beneficiaries practicing these concepts include Agora, a German collective/co-working/maker-space, and Showerloop, a semi-closed loop shower system. Additionally, OSCEdays featured at the DIF festival (DIF 2015) and in the 'Top 10' peer-to-peer trends list of 2015 (Bauwens 2015).

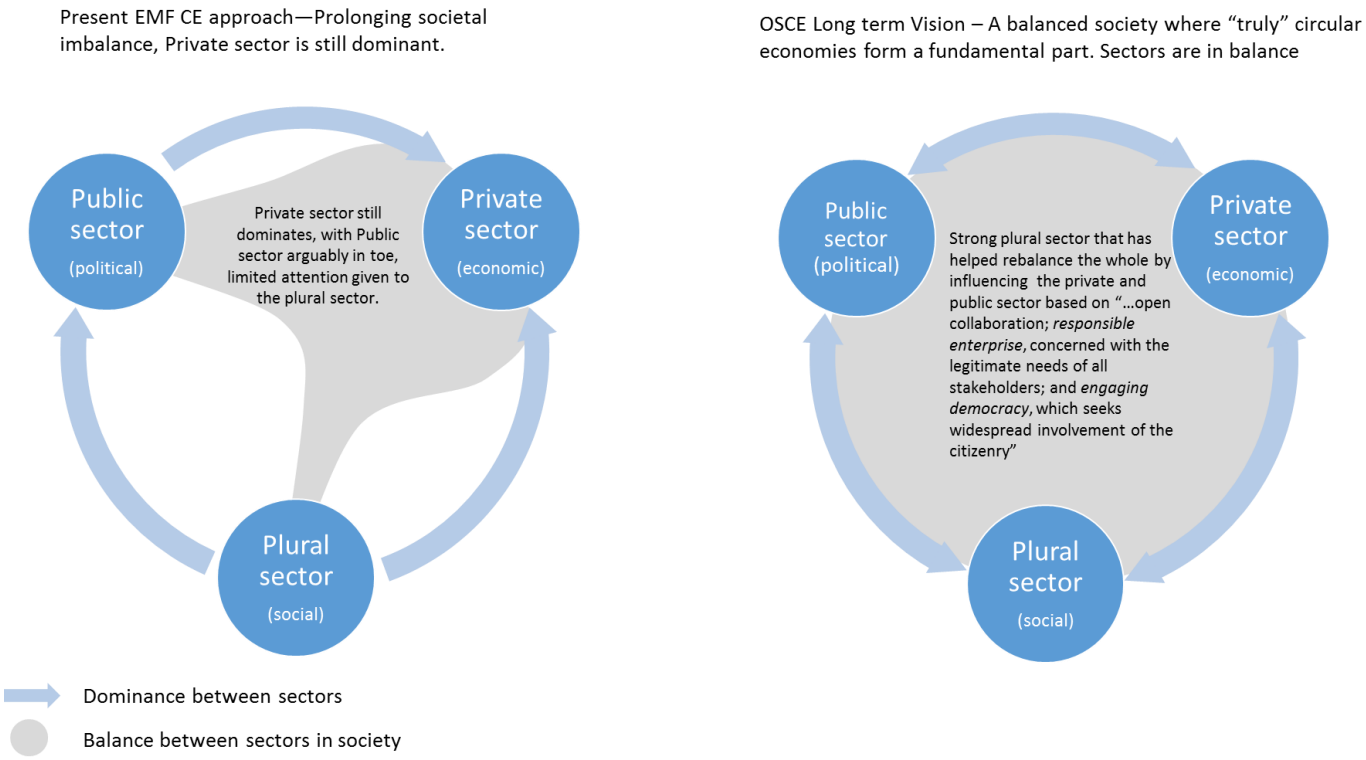
Current work includes: scaling up the initiative and gaining exposure, formulating a non-for-profit organisation/foundation, securing sponsorship/funding to allow for some paid employees, and developing a high-level platform/portal which will incorporate and facilitate the development of the tools and functions outlined in appendix 7. Within the coming years Muirhead (2015) hopes for a scenario whereby the OS methodology forms an important part of the CE concept as a whole, and that by 2050 we have a truly fully functioning CE as alluded to in figure 3.

Lessons to be drawn from the innovation in general and the perspective of the CE?

Our societies are in a state of imbalance, suffering the consequences of multiple socioenvironmental externalities, brought about by a dominant private sector which is underpinned by an economic dogma conceived in a mechanistic era. As such, our modern ideas of innovation and disruption, which are central to this predicament, are in fact endogenous to it (Lepore 2014).

OSCEdays is seen as part of a growing 'plural sector' movement of responsible social initiatives that are challenging this status quo, which Mintzburg sees as *"the greatest hope we have for regaining balance" (2015 p.57).* Rather than just rethinking how an economy can work better at the material resource and energetic level, which is a crude simplification of the CE, OSCE aims to challenge the actual innovation processes and ideologies by which knowledge—critical to all the systems and innovations needed to make it work— is created , owned and used. Democratising knowledge in this way is felt to help eliminate the multiple effects of 'artificial scarcity' created by standard mechanisms such as intellectual property law, whilst providing numerous benefits. Subsequently and without wanting to discredit the great work done by the EMF and alike, figure 7 show how a more systemic approach is needed to rebalance society and permit a CE that really does 'work long term'.

Figure 7: Balancing Society (*Developed from:* Mintzburg, 2015)



Definitions aside, economist and OS innovation expert Von Hippel (2009) feels that there are few scenarios in which properly equipped OS initiatives cannot surpass closed innovation. In fact, history has shown users to often be the source of innovation. That does not mean that the transition towards this new collaborative commons paradigm is going to be easy. As shown in appendix 8, there are still substantial barriers to be addressed. However, OSCEdays is testament to the speed and what can be achieved by a small committed team utilising the disruptive technologies of this digital information age.

Conclusion

To conclude:

1. A truly CE needs to be developed in an open, transparent and collaborative sense. More innovation is needed to facilitate this.
2. Innovation should be viewed more as a process towards achieving a meaningful long-term purpose on various interdependent system levels, rather than just an ideology or outcome biased towards short-term, siloed economic value creation (Jackson et al 2015; Seelos & Mair 2012).
3. Much of the success of OSCEdays is due to its design which maximises Stigmergic collaboration which ultimately enables innovation.

With the likes of OSCEdays are we witnessing the dawn of a new unprecedented age of innovation in response to the repercussions of the incessant 'creative-destructive' forces of capitalisms (Schumpeter 1987)? Only time will tell.

References

Bauwens, M. (2015). *Top 10 P2P Trends of 2015*. *http://www.shareable.net/blog/top-10-p2p-trends-of-2015* [Accessed 02/01/2016].

Carlsson, B., Jacobsson, s., Holmén, M., and Rickne, A. (2002) Innovation systems: analytical and methodological issues. *Research Policy*, vol. 31, no. 2, pp.233-245.

Christensen, C.,Raynor, M., and McDonald, R. (2015) *What Is Disruptive Innovation?*, [Online] Harvard Business review, Dec. Available at https://hbr.org/2015/12/what-is-disruptive-innovation [Accessed 04/12/2015].

Dance, D. (2008). *What is Innovation? 30+ definitions lead to one fresh summary.* http://www.freshconsulting.com/what-is-innovation/ [Accessed 20/12/2015].

DIF: Disruptive Innovation Festival (2015a) Open Source Circular Economy- Lars Zimmermann and Sam Muirhead. , YouTube, 9 Nov, https://www.youtube.com/watch?v=LiR9QzX6CJc [Accessed 06/12/2015].

Drayton, B. (2011). Collaborative Entrepreneurship - How Social Entrepreneurs Have Learned to Tip the World by Working in Global Teams*.* [Online] *Innovations.* Spring. Available at https://www.ashoka.org/sites/ashoka/files/Innovations_Collab_Ent_with_Empathy_Overview.pdf [Accessed 23/12/2015].

Economicsonline (n/d). Economic problem. [Online]. Available at http://www.economicsonline.co.uk/How%20markets%20work%20graphs/EconomicProblem.png [Accessed 07/01/2016].

Eisenstein, C. (2011). S*acred Economics: Money, Gift, and Society in the Age of Transition*. Berkeley: Revolver.

EMF: Ellen MacArthur Foundation (2015) Growth Within: A circular economy vision for a competitive Europe*.* http://www.ellenmacarthurfoundation.org/assets/downloads/publications/EllenMacArthurFoundation_Growth-Within_July15.pdf. [Accessed 12/12/2015]*.*

Godin, P. (2015a). *Innovation Contested: The Idea of Innovation Over the Centuries*. New York: Routledge.

Grams, C., & Lindegaard, S. (2010). Open innovation and open source innovation: what do they share and where do they differ?. https://opensource.com/business/10/10/open-innovation-and-open-source-innovation-what-do-they-share-and-where-do-they-diffe [Accessed 13/12/2015].

Hopkinson, P., Webster, K., Johnson, C., Finucane, S., & Kalantaridis, C. (2015). Innovation and Enterprise, from Distance learning MBA study book, 2015, University of Bradford, School of Management.

Jackson, T., Gupta, V., and Raworth, K. (2015) RSA Replay: RSA Makers Summit - Session #5-6, YouTube, 2 Dec, https://www.youtube.com/watch?v=W7raJeMpyM0 [Accessed 08/12/2015].

Kitroeff, N. (2015). Is the Theory of Disruption Dead Wrong?*.* http://www.bloomberg.com/news/articles/2015-10-05/did-clay-christensen-get-disruption-wrong- [Accessed 13/12/2005]*.*

Lepore, J. (2014). The Disruption Machine What the gospel of innovation gets wrong. http://www.newyorker.com/magazine/2014/06/23/the-disruption-machine [Accessed 12/12/2015].

Mintzburg, H. (2015) *Rebalancing society: radical renewal beyond left, right, and center*. Oakland: Berrett-Koehler.

Muirhead, S. (2004). Email to A. Thomson re. Answers to questions, 22/12/2015. (See Appendix 9)

Mulgan, G. and Leadbeater, C. (2013) System Innovation – discussion paper. Nesta. https://www.nesta.org.uk/sites/default/files/systems_ innovation_discussion_paper.pdf. Accessed 17 November 2015.

MW: Merriam-Webster dictionary. (2015) *'Definition: Heresy',* http://www.merriam-webster.com/dictionary/heresy [Accessed 13/12/2005].

On the Commons (n/a). *About Commons.* http://www.onthecommons.org/about-commons [Accessed 02/01/2016].

OSCEdays: Open source Circular Economy Days (2015a). *Mission statement*. https://oscedays.org/open-source-circular-economy-mission-statement/ [Accessed 02/01/2016].

OSCEdays: Open source Circular Economy Days (2015b). *About us.* https://oscedays.org/#about/ [Accessed 05/12/2015].

OSCEdays: Open source Circular Economy Days (2015c). *How to develop global OSCEdays15 - A Timeline of Tasks.* http://community.oscedays.org/t/event-docu-oscedays15-1-how-to-develop-global-oscedays15-a-timeline-of-tasks/801 [Accessed 02/01/2016].

OSCEdays: Open source Circular Economy Days (2015d). *Documentation 2015.* https://oscedays.org/documentation-2015/ [Accessed 02/01/2016].

OSCEdays: Open source Circular Economy Days (2015e). *OSCEdays Community.* http://community.oscedays.org/ [Accessed 02/01/2016].

OSHWA (n/a). Open Source Hardware definition. http://www.oshwa.org/definition/ [Accessed 13/12/2015].

P2P Foundation (2015). Transformative proposal. [Online]. Available at http://p2pfoundation.net/Main_Page [Accessed 07/01/2016].

Perez, C. (2007) Great Surges of development and alternative forms of globalization. Working Paper 15. http://hum.ttu.ee/wp/paper15.pdf. [Accessed 06/12/2015].

Rifkin, J. (2014). *The Zero Marginal Cost Society: The Internet of Things, the Collaborative Commons, and the Eclipse of Capitalism*. New York: Palgrave Macmillan.

Scharmer, O. (2014) From Ego-System to Eco-System Economies: Otto Scharmer, YouTube, 13 Nov, https://www.youtube.com/watch?v=GcbB1I__BmM [Accessed 03/12/2015].

Schumpeter, J. (1987). *Capitalism, socialism and democracy, 6th edition*. London: Counterpoint.

Seelos, C., and Mair, J. (2012). Innovation Is Not the Holy Grail - It is time to move from innovation as an ideology to innovation as a process. [Online] *Stanford Social Innovation Review.* Fall. Available at http://ssir.org/articles/entry/innovation_is_not_the_holy_grail [Accessed 23/12/2015].

Timmons, J.A. and Spinelli, S. (2009) *New Venture Creation*, *Entrepreneurship for the 21st Century* 8th edition. International edition. New York: McGraw-Hill, Irwin.

Von Hippel, E. (2009). The open-minded Professor – An interview with Eric von Hippel. [Online] *Deloitte Review.* Issue 4, pp.30-41. Available at http://dupress.com/articles/the-open-minded-professor-eric-von-hippel-on-open-innovation/ [Accessed 20/12/2015].

Bibliography

Appropedia. (NA). Open Source Appropriate Technology. http://www.appropedia.org/Open_Source_Appropriate_Technology [Accessed 13/12/2015].

Baregheh, A., Rowley, J. and Sambrook, S. (2009) Towards a Multidisciplinary Definition of Innovation. *Management Decision*, vol. 47, no. 8: pp.1323–1339.

Bass, C. (2012) TEDxBerkeley - Carl Bass - The New Rules of Innovation, YouTube, 25 Feb, https://www.youtube.com/watch?v=YKV3rhzvaC8 [Accessed 06/12/2015].

Bauwens, M. (2014). *Beyond Jeremy Rifkin: How Will the Phase Transition to a Commons Economy Actually Occur?. http://www.huffingtonpost.com/michel-bauwens/beyond-jeremy-rifkin-how-_b_5185948.html?ir=Australia* [Accessed 02/01/2016].

Bauwens, M. (2015). *Michel Bauwens: Here's What a Commons-Based Economy Looks Like. http://bollier.org/blog/michel-bauwens-heres-what-commons-based-economy-looks* [Accessed 02/01/2016].

Chesbrough, H., and Richards, H. (2013) *Interview: Talking #Open Innovation with Prof. Henry Chesbrough*, http://www.intelligenthq.com/innovation-management/interview-talking-open-innovation-with-prof-henry-chesbrough/01 [Accessed 05/12/2015].

CJDEW. (2015). *Post-Capitalism: Rise of the Collaborative Commons The Revolution will not be Centralized.* https://medium.com/basic-income/post-capitalism-rise-of-the-collaborative-commons-62b0160a7048#.r847do3sq [Accessed 13/12/2005].

Dance, D. (2008). *What is Innovation? 30+ definitions lead to one fresh summary.* http://www.freshconsulting.com/what-is-innovation/ [Accessed 20/12/2015].

Disruptive Innovation Festival (2015b) The Open Source Movement and Why You Should Join It, YouTube,15 Nov. https://www.youtube.com/watch?v=n13pkWWM_bk [Accessed 06/12/2015].

Disruptive Innovation Festival (2015c) 3D Printing: Open Systems and Closed Loops, YouTube, 3 Nov, https://www.youtube.com/watch?v=QXAa94KDZsA [Accessed 06/12/2015].

Disruptive Innovation Festival (2015d) Open Innovation Strategies, YouTube, 16 Nov, https://www.youtube.com/watch?v=5X4ixQBHV0E [Accessed 06/12/2015].

Disruptive Innovation Festival (2015e) The Sharing Economy Redefined, YouTube, 12 Nov, https://www.youtube.com/watch?v=L4bR-NG81b0 [Accessed 06/12/2015].

Drucker, P. (2002) Free For All: *The Power of Open Source*, [Online] Harvard Business review, Aug. Available at https://hbr.org/2002/08/the-discipline-of-innovation [Accessed 04/12/2015].

Duet, D. (2015) Free For All: *The Power of Open Source*, Goldman Sachs, Jun, http://www.goldmansachs.com/our-thinking/pages/open-source.html?cid=PS_02_32_07_00_01_15_01 [Accessed 06/12/2015].

Eisenmann, T. (2013). *Entrepreneurship: A Working Definition.* https://hbr.org/2013/01/what-is-entrepreneurship/ [Accessed 10/01/2016].

Godin, B. (2015b). *Innovation: A Conceptual Historyof an Anonymous Concept.* http://www.csiic.ca/PDF/WorkingPaper21.pdf [Accessed 20/12/2015].

Godin, B. and Lane, J.P. (2013) “Pushes and Pulls”: The Hi(story) of the Demand Pull Model of Innovation. Project on the Intellectual History of Innovation Working Paper No. 13, 2013. http://www.csiic.ca/PDF/Demand-pull.pdf. [Accessed 04/01/2016].

GOTEO (N/A). *Match funding Social investment pool.* https://en.goteo.org/service/resources [Accessed 10/01/2016].

Haquer, U. (2011) *Capitalism at a Crossroads*, [Online] Harvard Business review, Jan. Available at https://hbr.org/2011/01/capitalism-at-a-crossroads [Accessed 04/12/2015].

Henrekson, M. and Sanandaji, T. (2013) Small Business Activity Does not Measure Entrepreneurship. IFN Working Paper No. 959. Research Institute of Industrial Economics. http://www.ifn.se/wfiles/wp/wp959.pdf. [Accessed 06/12/2015].

Henrekson, N. and Jakobsson, U. (2000). *Where Schumpeter was nearly Right – the Swedish Model and Capitalism, Socialism and Democracy.* http://swopec.hhs.se/iuiwop/papers/iuiwop0533.pdf [Accessed 10/01/2016].

Kander, D. (2014) Our approach to innovation is dead wrong | Diana Kander | TEDxKC, YouTube, 27 Aug, https://www.youtube.com/watch?v=pii8tTx1UYM [Accessed 06/12/2015].

Kostakis, V., Niaros, V., Dafermos, G., and Bauwens, M. (2015) *Design global, manufacture local: Exploring the contours of an emerging productive model.* [Online] Futures, Issues 73. Available at http://www.p2plab.gr/en/wp-content/uploads/2015/09/Futures.pdf [Accessed 04/12/2015].

Leadbeater, C. (2008) TED - Charles Leadbeater: The era of open innovation, YouTube, 14 Apr, https://www.youtube.com/watch?v=W7raJeMpyM0 [Accessed 06/12/2015].

Mota, C. (N/A). *Open Materials.* http://www.openmaterials.org/catarina/openmaterials/ [Accessed 10/01/2016].

POC 21 (2015). *What is poc21 about?. http://www.poc21.cc/in-short/* [Accessed 02/01/2016].

Potts, J., and Harley, J. (2014) *Toward a new cultural economics of Innovation*. https://editorialexpress.com/cgi-bin/conference/download.cgi?db_name=ACEI2014&paper_id=245 [Accessed 05/12/2015].

The economist (2011) *Oh, Mr Porter-The new big idea from business’s greatest living guru seems a bit undercooked*. http://www.economist.com/node/18330445 [Accessed 05/12/2015].

Wooldridge, A. (2014) What exactly is an entrepreneur? *The Economist*, 16 February. http://www.economist.com/blogs/schumpeter/2014/02/our-schumpeter-columnist. [Accessed 06/12/2015].

Appendices

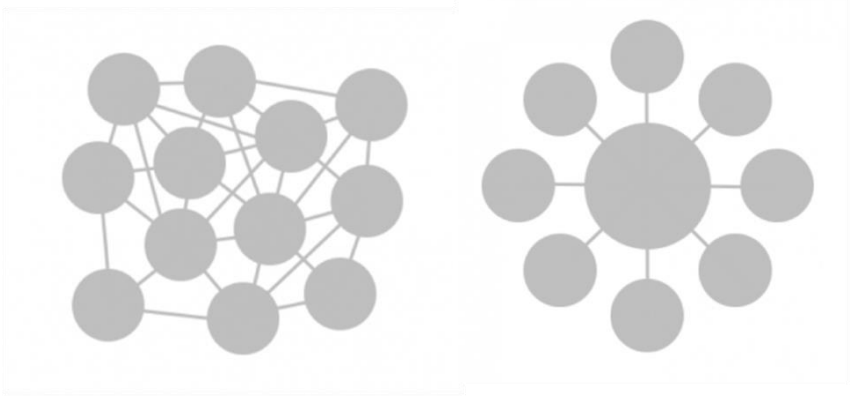
Appendix 1: Commons movement overview (On the Commons n/a)

A growing social and political movement that believes the commons is a crucial sector of the economy and society and useful prism for talking about resources that should be shared. The commons offers not only an affirmative vision of a more equitable, eco-friendly society: it also serves as a countervailing force to keep excesses of the market and government sectors in check. Some speak of an emerging commons paradigm as a new way of looking at the world, one that opens up the competitive, mechanistic, profit-centric mindset that has ruled Western civilization since the dawn of the Industrial Revolution, with a more humanistic, environmentally aware and holistic world view. A wider appreciation for the enduring importance of the commons has developed over the last eight years, especially among people deeply involved in the politics of water issues, the internet, the over commercialization of culture and public spaces. This world view is now reaching into many other arenas, including economics, the environment, social justice and numerous citizens movements around the world.

Appendix 2: Open source definition (Grams & Lindegaard 2010)

In production and development, **open source** as a development model promotes universal access via a free license to a product's design or blueprint, and universal redistribution of that design or blueprint, including subsequent improvements to it by anyone.

Open source is synergistic to Open Innovation but differs in the traditional sense because collaboration is not contractual or transactional and the problem at hand rather than the central company being the focus as shown below. (*Source:* Grams & Lindegaard 2010).



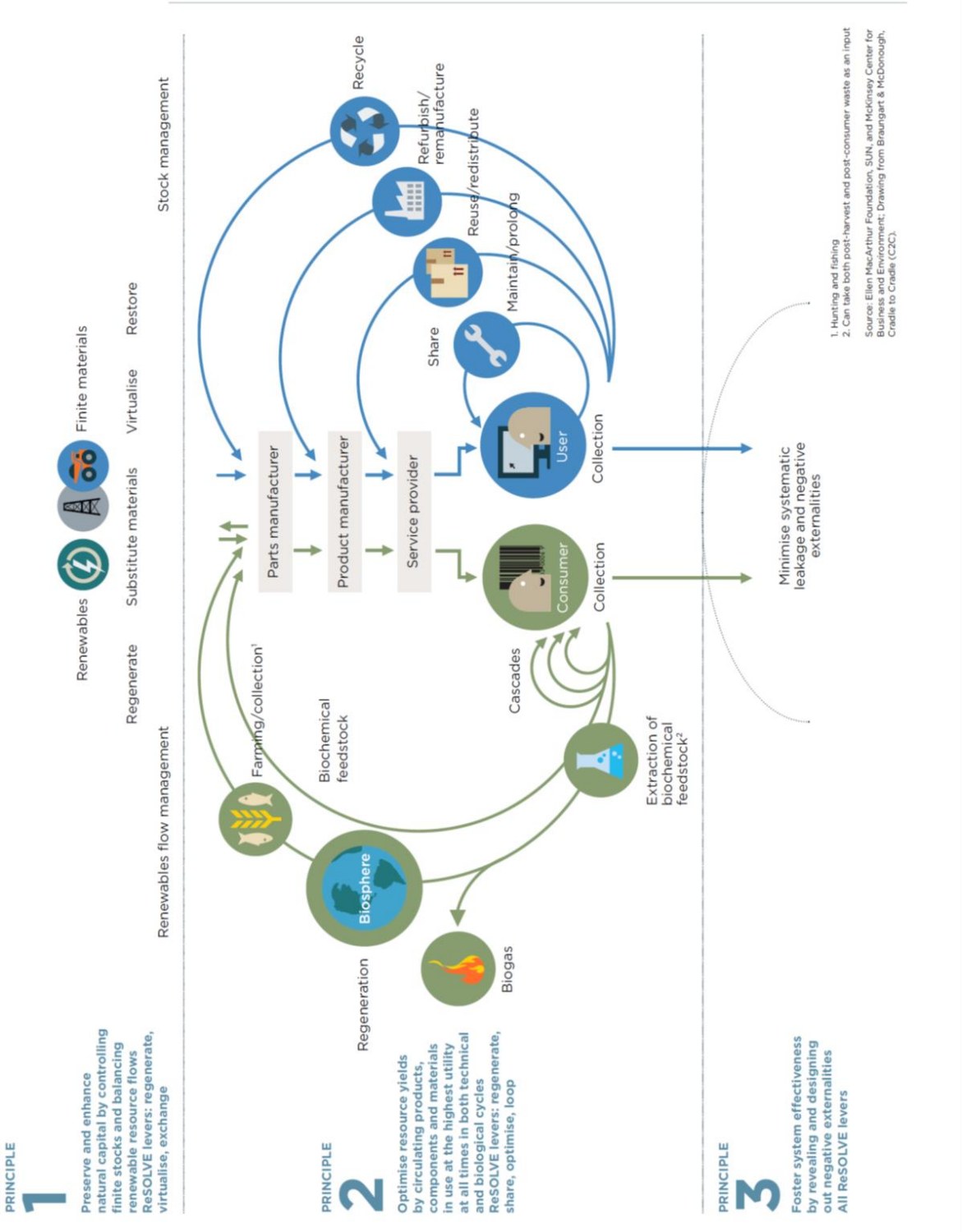
Open Source Hardware (OSHW) Statement of Principles 1.0 (OSHWA n/a)

Open source hardware is hardware whose design is made publicly available so that anyone can study, modify, distribute, make, and sell the design or hardware based on that design. The hardware's source, the design from which it is made, is available in the preferred format for making modifications to it. Ideally, open source hardware uses readily-available components and materials, standard processes, open infrastructure, unrestricted content, and open-source design tools to maximize the ability of individuals to make and use hardware. Open source hardware gives people the freedom to control their technology while sharing knowledge and encouraging commerce through the open exchange of designs.

Appendix 3: Circular economy overview (*Source:* EMF 2015)

A circular economy is restorative and regenerative by design, and aims to keep products, components, and materials at their highest utility and value at all times. The concept distinguishes between technical and biological cycles.

As envisioned by the originators, a circular economy is a continuous positive development cycle that preserves and enhances natural capital, optimises resource yields, and minimises system risks by managing finite stocks and renewable flows. It works effectively at every scale.

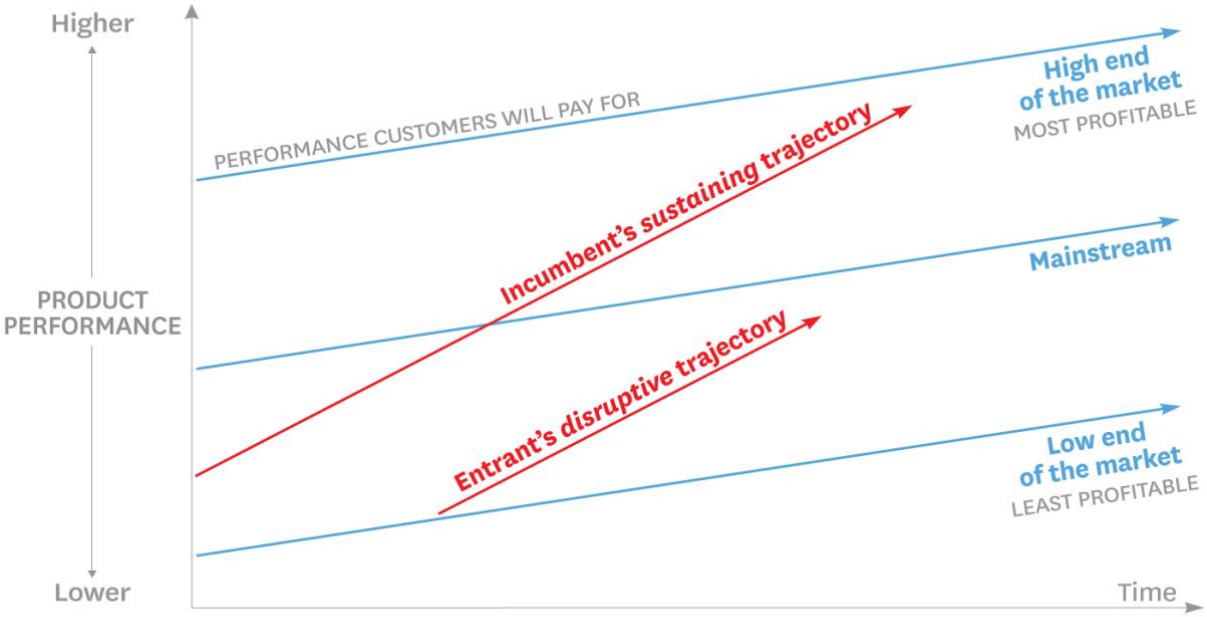


Appendix 4: Modern definitions of Innovation (Dance 2008)

1. "fresh thinking that creates value" Richard Lyons via Economist
2. "new products, business processes and organic changes that create wealth or social welfare" OECD think tank
3. "Innovation is the specific instrument of entrepreneurship… the act that endows resources with a new capacity to create wealth." Peter Drucker
4. "Innovation: a creation (a new device or process) resulting from study and experimentation; the creation of something in the mind; the act of starting something for the first time; introducing something new" Wordnet
5. "Innovation: First of all, here is my own definition of innovation: 'invention refers to new concepts or products that derive from individual's ideas or from scientific research. Innovation, on the other hand, is the commercialization of the invention itself" Merriam-Webster Dictionary
6. "The term innovation may refer to both radical and incremental changes to products, processes or services. The often unspoken goal of innovation is to solve a problem. Innovation is an important topic in the study of economics, business, technology, sociology, and engineering. Since innovation is also considered a major driver of the economy, the factors that lead to innovation are also considered to be critical to policy makers." Wikipedia
7. "Something new or different introduced"Dictionary.com
8. "Innovation is converting ideas to numbers" Information Week
9. "Innovation is a process, involving multiple activities, performed by multiple actors from one or several organizations, during which new combinations of means and/or ends, which are new for a creating and/or adopting unit, are developed and/or produced and/or implemented and/or transferred to old and/or new Joerg Gemuenden at Innovation.cc
10. "Innovation is then simply new technology, i.e. the systematic application of (new) knowledge to (new) resources to produce (new) goods or (new) services" Maciej Soltynski at Innovation.cc
11. "Any creative idea, getting implemented or realized successfully, is Innovation." Hexaware Blog
12. "PEOPLE using new knowledge and understanding to experiment with new possibilities in order to implement new concepts that create new value "Think Smart Blog
13. Innovation: "The practical translation of ideas into new or improved products, services, processes, systems or social interactions" The University of Melbourne
14. "Innovation is the creation of the new or the re-arranging of the old in a new way " Michael Vance "Innovation: The process of creating a product or service solution that delivers significant new customer value. The process begins with the selection of the customer and market, includes the identification and prioritization of opportunities, and ends with the creation of an innovative product or service."Ulwick, Anthony W., What customers want. New York: McGraw-Hill 2005, Glossary,180.
15. "Innovation is the embodiment, combination, and/or synthesis of knowledge in novel, relevant, valued new products, processes, or services." Leonard, Dorothy, and Swap Walter. 1999. When Sparks Fly. Boston: Harvard Business School Press, 7.
16. "Innovation is the creation of something that improves the way we live our lives" Barack Obama

Appendix 5: Disruptive innovation model (*Source:* Clayton et al 2015)

This diagram contrasts *product performance trajectories* (the red lines showing how products or services improve over time) with *customer demand trajectories* (the blue lines showing customers' willingness to pay for performance). As incumbent companies introduce higher-quality products or services (upper red line) to satisfy the high end of the market (where profitability is highest), they overshoot the needs of low-end customers and many mainstream customers. This leaves an opening for entrants to find footholds in the less-profitable segments that incumbents are neglecting. Entrants on a disruptive trajectory (lower red line) improve the performance of their offerings and move upmarket (where profitability is highest for them, too) and challenge the dominance of the incumbents.



SOURCE CLAYTON M. CHRISTENSEN, MICHAEL RAYNOR, AND RORY MCDONALD
FROM "WHAT IS DISRUPTIVE INNOVATION?" DECEMBER 2015

Appendix 6: OSCEdays Partners (*Source:* OSCEdays 2015d)

Appendix 7: Further developments (*Source:* OSCEdays 2015a)

We will rethink approaches to communication, design, development and business for a circular economy supported by open source. In many cases open strategies require certain adjustments to existing models – sometimes minor alterations, sometimes transformative change. There are strong business, communication and design models tried and tested by existing open source projects, but they are yet to be more fully explored by our wider culture.

Open Educational Resources – to share best practices and tutorials, for example on compost-cycles or regenerative design

Open Source Hardware/Open Design Products – Open and transparent products are easier to maintain, repair, refurbish, reuse and (if the product is designed for it) also recycle. Open products tend toward modular designs which make all of the aforementioned processes even easier

Open Source Software – Software to organize and analyse data about products and production is constantly improving. Making it open source would allow greater access to this technology, and allow better interoperability between collaborators. Life Cycle Assessment can already be done using openLCA, and our own team is developing a software within the IPO tables project.

Open Materials and Open Standards – Which materials are recyclable? What design principles and components have been proven to work for circular production? What machines and techniques for recycling work effectively? Making open standards in this field would enable compatibility, and ensure wider access to these technologies. Allowing others to help improve these techniques can also help promising prototypes develop into tangible solutions.

Open Production Data – Manufacturers collect ever more data in order to better organize flows of materials, products and energy; reducing material use or waste, maybe even creating some basic cycles. But this information tends to stay within the walls of one factory or company. Imagine what could be achieved by opening it up and reinventing collaboration between whole networks of factories and industries!

Open Waste Data – What kind of waste is produced by households, cities, and factories? how much, and where does it go? Making this information open allows people to analyse data, find anomalies and problems, develop solutions, and it also provides evidence to advocate for change.

Business Models – for an Open Source Circular Economy.

Appendix 8: Success Barriers and Enablers

Area	Barriers	Enablers required
Education and awareness	• Poor understanding of OS in mainstream. OS=free and no payed employment. • Closed loop innovation is only option. • Economic theory. • Mindsets.	• Development of awareness building channels to educate and dispel the myths. • Champion and promote success stories. • Engage high-profile companies, groups and /or individuals • Do not polarize. OS is not always the best option in every context.
Legal	• Predatory capitalism. • Dominant Industrial property model and mentality (copyright) • Industrial standards and responsibility. • Environmental responsibility.	• Industrial property reform and/or more extensive copyleft licence development. • Mix of centralized and decentralized testing bodies including OS protocols and procedures.
funding	• Funding and resource allocation. • Value exchange (compensation) mechanisms.	• Sponsorship or funding • New investment models, (alternative economist assure that the money is available just need to redirect). • New reciprocal crowdfunding ideas. • Blockchain technology (*Ethereum)*
Materials and components	• Material and component identification, tracking and sourcing to fulfil requirements • Closed systems.	• Use of new blockchain for material and component passport. • Open Material and waste data platforms. • Interoperability standards.
Production and supply chains	• Legend supply infrastructures often require economies of scale. • ROCE in present infrastructures • Embodied energy etc in the present infrastructures	• Additive manufacturing provides decentralized manufacturing options. • Maximise the use of legend systems in most effective and efficient way so not as to create rebound effects. • Mixture of economies and diseconomies of scale and scope that best satisfy triple bottom line.
Others include - coordination platforms and tools, metrics, business model development		

Appendix 9: Responses to question received from Sam Muirhead via email , 22/12/15.

How did the innovation come about? When and how?@cameralibre: Via online calls, I think originally connected by @unteem in his role at Future of Waste - he knew @Alice_audrey @TechnicalNature & @sharmarval from FoW workshops and the Sustainability Jam. I don't know how @unteem and @Lars2i knew each other..? Lars brought me in later as we have worked together for some time on OpenIt Agency

Then there was a formulation of a plan for an event, a name and website set up, a call for cities, a spamming of networks, and some helpful catalysers who helped get the right people involved. Through this process we met @Gien and many other key community members of OSCE.

How—if at all—was/is it funded? @cameralibre: Very little - we had some very basic sponsorship for the international organisation from Suez and iFixit, and local events in London (Knowledge Transfer Network), Berlin (Veolia, Berlin Partner) and France (Suez). This paid for location rental and costs such as website hosting, materials etc. However, the vast majority of the work was unpaid, Costs were kept low by coordinating local events (no accommodation/travel required), sharing knowledge amongst different local organisers, and using existing free & open source software solutions.

Did you use any specific type of development process to get the initiative off the ground, if so what?@cameralibre: Working in the open to reduce doubling up of work. (eg using the forum, rather than private emails)

Linking to existing information rather than recreating it over and over again - for example, providing information to participants on Posting a Challenge, Community Building, Documentation Templates etc

Do you see yourself as a form of entrepreneur (social+environmental, systemic) or something else (pioneer)?@cameralibre: activist, artist, enabler... it changes depending on the situation.the others can speak for themselves!

What are the reasons for this?@cameralibre: to me the current use of 'entrepreneur' is too focused on monetary growth, and even 'social/environmental entrepreneur' still makes the social and environmental aspects take a back seat. To me financial sustainability is a necessity to achieve social/political/environmental change, but when the financial becomes a focus it distorts people's decision-making. I find the term 'artist' usefully vague, you can fit a lot of activities under it, while also challenging the idea that you have to be exhibiting in galleries and selling on the art market in order to call yourself an artist.

How do you see the OSCE scaling up, what is needed? @cameralibre: -It needs to be easier for participants to take part in, to understand and spread. There are many problems to solve here, from education resources to UX to storytelling.Some financial support to allow some people to focus on it (more) fulltime, and to pay people for specialized services, eg website design & development. Partnerships with other organisations to build larger projects (eg with academic institutions for research projects)

How do you envision the world to be in 2050, and how bigger role do think the OSCE will play—including the larger commons movement?@cameralibre: I hope that within 10 years we will have attached the Open Source methodology to the Circular Economy concept, in a way that we can be well along the way to a functioning circular economy by 2050. Whether we still use the terms Open Source or Circular Economy, and whether our organisation is still around, is irrelevant. What is important is that the information, the work that we do now survives for others to learn from.

Do you think Innovation, disruptive innovation, enterprise and entrepreneurship are simply overused buzz words?@cameralibre: Mostly, yes.

If so what words would you use from an open source CE perspective?@cameralibre: I think that/hope that we enable people to build communities, to work together effectively, to have a positive impact on their local area and their planet and allow them to meet their potential as human beings. That may be by inventing, discovering and testing new ideas, building businesses, creating art, connecting people, educating themselves and others.