Information and Communication Technology (ICT) and the Social and Solidarity Economy

Raymond Saner
The Centre for Socio-Eco-Nomic Development (CSEND)

Lichia Saner-Yiu
The Centre for Socio-Eco-Nomic Development (CSEND)

Samuel Bruelisauer
University of Bern

UNTFSSE Knowledge Hub Draft Paper Series

For more details, please visit the Edward Elgar's Companion Website (https://www.e-elgar.com/textbooks/yi/) and Main book page (https://www.e-elgar.com/shop/gbp/encyclopedia-of-the-social-and-solidarity-economy-9781803920917.html)

Abstract

Principles and values associated with the SSE played an important role in the early production and use of information and communication technology (ICT). What began with the 'free software movement' which promoted the development of operating systems and applications for computers, servers and smart phones based on collaboration, openness, and control by users, has grown into a variety of organizations that offer products and services. At the same time, a few large ICT companies of the commercial private sector lead and dominate. This entry explains the emergence of ICT and its impact on the economy and describes the role of SSE organisations and enterprises (SSEOEs) in developing and producing ICT. It further discusses how SSEOEs respond to trends associated with ICT by using and operating technologies in line with their principles and values. The entry closes with an examination of the challenges and opportunities of SSEOEs in the face of recent ICT-related trends.

Keywords

1. Background

Information and communications technologies (ICT) are part of the modern infrastructure of organising and producing services and interactions. They are generally referred to as a collection of devices, networking tools, software applications and operating systems that allow individual or corporate users to collect, access, store, transmit, analyse, compute and share data and information. Cutting-edge ICT such as high-speed internet, mobile technology, machine learning and artificial intelligence (AI), robotics, internet of things (IOT) and block chain have transformed everyday human interactions in an unprecedented manner.

The spread of ICT has given rise to the 'digital economy', defined as "that part of economic output derived solely or primarily from digital technologies with a business model based on digital goods or services" (Bukht and Heeks 2017). In 2016, the digital economy worldwide was worth 11.5 trillion USD, or 15.5 percent of global GDP. By 2025, it is expected that the digital economy will reach 24.3% of the global economy (Huawei & Oxford Economics 2017). Since 2020, the COVID-19 pandemic has accelerated the deeper adoption of the ICT technologies and transformed core aspects of an operation or an organisation when producing products or delivering services. With the prolonged pandemic restricting human interactions and curtailing mobility, it is foreseeable that these trends will continue in all sectors.

It is, however, widely acknowledged that many trends associated with the growth of the digital economy also pose major socio-economic challenges such as rising inequality and the proliferation of non-standard work contracts in the 'gig economy' enabled by online platforms (Gurumurthy, Chami, and Bhartur 2021). The production and use of ICT also has a large and growing environmental footprint. In 2018, the sector used an estimated 3.6 percent of global electricity and caused 1.4 percent of global carbon emissions, while extracting large amounts of minerals and natural resources (Malmodin and Lundén 2018).

Social and solidarity economy (SSE) overlaps with the ICT sector through its production and service delivery. SSE organizations and enterprises (SSEOEs) are also affected by emerging business models that are anchored in ICT and the corresponding so-called Fourth Industrial Revolution where the role of technologies and autonomous

2

intelligence is expected to further impact human cognition and emotions (VDI Nachrichten 2020). ICT enables SSEOEs to scale up and to re-image new modalities of organising collaboration and may also affect the manifestation of the SSE principles of solidarity, fair benefit sharing and democratic decision-making.

2. The Role of SSEOEs in Developing and Producing ICT

SSE principles and values have been applied to the development and production of ICT since the 1980s – a decade which was characterized by important breakthroughs which set the path for the widespread adoption of digital information and communication technology. Whereas SSEOEs play a relatively significant role in the development of software and provision of ICT services, hardware production is mostly dominated by for-profit private sector businesses. It may be due to the high entry barrier of capital requirement which SSEOEs have more difficulties meeting. The following three sections describe these trends.

From Free Software to the Digital Commons

A large part of software was developed at universities and corporate research centres in the 1960s and early 1970s. In these places, an academic culture of knowledge sharing was prevalent, and developers with research funding did not face the immediate pressure for cost recovery or return on investment. As commercial distribution of proprietary software came to increasingly dominate the software industry, ideals of sharing and collaboration also became less prevalent and intellectual property rights became more vigorously defended.

In 1983, Richard Stallman founded the Free Software movement which later became institutionalized as the Free Software Foundation (FSF). The declared mission of this non-profit organization is to "promote user freedom" and to "defend the rights of all software users" by advocating for and developing 'free software' (Free Software Foundation 2019). FSF formulated a set of 'four essential freedoms' which software developers must grant to users before being qualified as 'free' (not necessarily being free of charge):

1. The freedom to run a programme as a user wishes, for any purpose;

2. The freedom to study how the programme works and change it so it does the computing as the user wishes […]

3. The freedom to redistribute copies so the user can help others;

4. The freedom to distribute copies of the modified versions to others [and to] give the whole community a chance to benefit from one's changes. (Free Software Foundation 2021)

Putting users and their interests first, together with a broader social objective beyond its own operational reach, reveals a resemblance with the principles and values of SSE. Stallman writes that "[these freedoms] are essential, not just for the individual user's sake, but because they promote social solidarity—that is, sharing and cooperation" (Stallman 2009, 31). FSF is also the main sponsor of the GNU project which maintains a free operating system (GNU/Linux) and an extensive collection of free software packages. Another important aspect of free software is that 'free' does not prohibit commercial use or paid professional support which the foundation considers fundamental to achieve its aims (Free Software Foundation n.d.). The free software movement can therefore be counted as an innovative interpretation of SSE principles in

3

ICT development.

GNU/Linux (General Public Licence) marked the beginning of a widening community of developers who were convinced of the benefits of sharing source codes to enable its collaborative improvement. But not all of them may have been just as convinced of the 'ethical imperative' to maintain and defend users' freedom against the growing dominance of proprietary software, as promulgated by free software advocates (Stallman 2009).

In 1998, some of them became engaged in creating the Open Source Initiative (OSI) and open source label. Its founders were mainly convinced by the practical benefits of sharing source codes and improving them by engaging the developer community. Instead of insisting on a commitment to the idea that all developers should uphold users' freedoms like the FSF, the OSI founders also cherished the "pragmatic, business-case" approach for writing open source software, and decided to create a label and position it in clear distinction to the "philosophically- and politically-focused" free software label and movement (Open Source Initiative 2021).

Besides these ideological and strategic differences, however, the OSI's definition of open source does not contradict the four freedoms per se. Stallman himself (2009) acknowledges that "nearly all open source software is free software", although they "stand for views based on fundamentally different values" (p.31). Similarly, the FSF's free software license GNU is listed as one of the most popular open source licenses on the OSI's website together with others that comply with the open source definition (Open Source Initiative 2019). Both open source and free software are also often associated with the "copy left" concept and movement, which further encompasses licenses that apply the conditions to other works, including writing, photography, art, and scientific discoveries. Notable examples include the Mozilla Public Licenses, and the Creative Commons licence.

Similar to FSF's and OSI's approach, the *Creative Commons* licence is based on the idea of collaboration as a source of creativity and innovation and therefore waives a limited set of rights to any recipient or creator who wants to use the protected content for private or other creative purposes, provided that authors be attributed, and the resulting work will also enter the "creative commons". *Creative Commons* has become the one most widely applied in the realm of ICT-based content and services. The most notable platforms using the license are *Wikipedia* and the online photo sharing service *Flickr*.

The use of the notion "commons" emphasizes the nature of information and other content covered by the license as a type of common-pool resource accessible to all members of society (see the entry "the Commons and SSE"). A similar extension of the information and knowledge was later formulated by Hess and Ostrom (2006), observing the similarities between natural commons and "social commons" which are established and maintained through the voluntary contributions of individuals and groups. Yochai Benkler of Harvard University employs the term prominently to "commons-based peer production" as a "socio-economic system of production that is emerging in the digitally networked environment" (Benkler and Nissenbaum 2006, 394). In 2010, Mayo Fuster Morell further applied the concept to online creation communities as a form of collective action to create and govern the "digital commons" (Fuster Morell 2010). By extending the option of collective action from the natural commons, these authors suggest that governance arrangements can be found that may outperform market or hierarchies in managing software and other (ICT-based) content. While a general discussion on the overlap of the commons and SSE is provided elsewhere in this Encyclopedia (see the entry "the Commons and SSE"), some writings explicitly suggest

to make the connection between open source, digital commons and other related movements on the one hand, and SSE principles and values on the other. For instance, it is suggested that maintaining democratic principles in such communities is both possible and desirable. Development and application of a framework to assess the democratic quality of online platforms in general is also taking place, highlighting the role of platform cooperatives and other forms of SSE units creating and using digital content (Foster Morell and Espelt 2018). Platform 'commoning' has also been described as a new way to build and support SSE using commons-based pool production (Ridley-Duff and Bull 2021).

SSEOEs providing ICT services

SSEOEs and their practices can also be found in the ICT service sector which encompasses activities such as creation and maintenance of information and technology (IT) infrastructure (websites, databanks, etc.) and similar services. Examples of SSE providers of ICT services operate while observing SSE principles such as democratic self-management of workers or users, and often demonstrate a commitment to values associated with cooperation and openness which may also be expressed through the use and active promotion of open source or free software in their work. Two organisations that provide ICT-related services and organised along SSE principles - Koumbit and Enspiral - will be briefly profiled here to illustrate the spectrum of actors.

Koumbit is a member-based not-for-profit organization based in Montreal whose primary activity is providing web services, including designing, developing, and hosting websites. The individuals and organizations who become members of Koumbit must subscribe to a set of values which centre on non-hierarchical self-management by the workers, a commitment to open formats and free software, and solidarity (Koumbit n.d.). Around twenty worker-members belong to the Conseil de Travail (Council of Workers) where important decisions are made. In addition, issues that affect only some workers are dealt with in committees or teams, as is the case in many cooperatives (Koumbit 2022).

Enspiral, in contrast, is a more community-oriented cooperative organised around the principles of cooperatives and SSE networks. Enspiral is attempting systemic changes at a meta-level by facilitating an "ecosystem of purpose". The organisation consists of full and part time members who work on joint projects but can also work on projects separate from Enspiral. The Enspiral Network was founded in 2010 in Wellington, New Zealand, as a collective of individuals doing contract work together, excited by the possibility of creating something more. Enspiral Network now includes over 28 members and 124 contributors working on IT consulting projects for government, business or community organisations. Among the different modes by which people interact at Enspiral are 'stewards', or support pairs, and 'pods', which are any small group of people meeting in person or virtually generally around a common goal or discussion theme. Most of the internal work takes place through formal and informal working groups. Enspiral members share work (projects) and cherish ongoing learning opportunities (retreats) (Bevensee and Buck 2020).

Challenging market entry for SSEOEs Producing ICT Hardware

As for the industry sector overall, the SSEOs occupy only a marginal presence in the production of ICT hardware, mainly comprising components for telecommunications infrastructure, as well as computers, (smart)phones, servers, and other devices. In 2019, for instance, out of all the 300 largest cooperatives by turnover in USD, only three were

active in the industry sector (four if turnover is divided by GDP per capita) (Euricse and ICA 2021). Several characteristics of the production for industrial goods, including ICT hardware, make it relatively difficult for SSEOs to enter these markets. Particularly the high capital intensity of machinery required for serial production of high-technology components poses an issue for entities which depend a lot on member contributions and revenue. As "employment-oriented" organizations they further put particular emphasis on the value and rights of workers and often face difficulties in attracting financial capital due to their democratic governance structure and limited profit distribution (Fonteneau and Pollet 2019).

However, there are a few examples of SSEOEs that participate in the industrial production of ICT hardware. One of these exceptions is the Basque worker cooperative federation *Mondragon Corporation*. With more than 81,000 employees and a global turnover of 13.7 billion USD in 2019, it is by far the largest SSE organization in the industry and utilities sector, and the 37th largest cooperative in the world. Established in 1956 as a manufacturer of paraffin heaters, it has evolved into a multinational SSE organization active in banking, insurance, a wide variety of industry goods and services, retail (including supermarkets, gas stations, travel agencies and more), as well as knowledge-related activities combining education, training and innovation. From the universe of worker cooperatives that are part of Mondragon, two organizations stand out as producers of ITC-based goods and services. *Mondragon Sistemas* (MSI Grupo) is a group of SSE organizations specialized in the digitalization of production processes. Another SSE organization, Mondragon Telecommunications, provided telecommunication engineering services, but was dissolved in 2016.

Another company that embraces SSE principles and values in the production of ICT hardware industry is *Fairphone,* founded in the Netherlands. Launched in 2010 as an awareness raising campaign about conflict materials such as cobalt which are essential ingredients for smartphone components, the founders registered as a company in 2013 with a commitment to contribute to a 'fairer electronics industry' enshrined in the bylaws. Fairphone produces smartphones with extended longevity by making all components replaceable and easy to repair for standard users, continued software updates and long-term support. These product design features and related business practices are in stark contrast to other phone manufacturers or brands that prioritize profit over users' interests and the environment by stimulating unsustainable consumption, short product life span and waste. These brands require users to buy a whole new phone when only parts (such as the battery or display) need to be replaced or make it so difficult to repair that it becomes an expensive expert's job. *Fairphone* also demonstrates the 'SSE difference' through its organizational culture and participation of its workforce and stakeholders in decision making, which are institutionalized in an elected governing body, a Workers Council and ongoing communication on pay and satisfaction with in-house as well as supplier employees (Quiroz-Niño 2019).

3.   SSEOEs as Users and Operators of ICT

Besides the production of ICT-related goods and services, SSEOEs are also *users* and *operators* of these technologies as will be described in this section. As users, SSEOEs employ ICT software and hardware and consume services just like other organizations to manage operational processes of delivering goods and services for efficiency and productivity gains. Examples include the use of ICT for farm management and advisory services (Rijswijk, Klerkx, and Turner 2019) or the use of web platforms to improve

community-based healthcare provided by cooperatives (Biehl et al. 2021). They may also benefit from ICT solutions to organize internal governance, such as by using online voting in assemblies. Other SSEOEs, particularly social enterprises and foundations that are not member-based but statutorily bound to pursue social and/or environmental goals may use ICT to contribute to their mission. They are also considered part of this ecosystem and need to think through their ICT strategy in order to scale up their socio-economic impact.

They can be qualified as operators when deploying ICT as a core element of their business activities to provide services to their customers, members, or beneficiaries. SSEOEs worldwide, to varying degrees, adopted ICT to manage their core operations inline with SSE principles and values. Others created whole new SSEOEs as alternatives to existing online services in sectors dominated by shareholder-owned businesses. ICT operators in the SSE sector that are owned and controlled by users tend to leverage this role to strengthen users' rights and autonomy as they interact with other actors in an online platform or marketplace to earn their income, order goods and services, and engage with other governments and society at large (Brülisauer, Costantini, and Pastorelli 2020).

Platform Cooperatives and other User-Centred Applications

Many sectors face major disruptions and severe challenges to their business models due to the emergence of online platforms as direct, highly automated intermediaries between providers and consumers of goods and services. Key sectors where such business models are taking hold are transport, including the delivery of food and other goods; tourism, particularly short-term rentals; and other forms of service provision, including domestic and care services, but also programming, translation, learning activities and creative work where the provision of services takes place online and contracts tend to be transactional and time constrained. The wide variety of messenger apps, social media platforms and other communication and content sharing applications at their core complete the picture of the expansion of the 'platform economy'.

In many sectors affected by platform-caused disruptions, SSE sector developed alternatives *within* the platform economy by deploying ICT to control and operate the platform based on democratic governance and co-ownership of assets by the users themselves. As in the non-digital world, SSE platforms enable different user groups, including workers, producers, consumers, internet users, and communities (e.g., of residents) to gain control over the data and economic transactions in which they are engaged.

Platform cooperatives, a term coined and promoted by Trebor Scholz, Nathan Schneider and colleagues at the Platform Cooperative Consortium, are a core component of this movement (Scholz and Schneider 2017). It comprises organizations that leverage the cooperative principles to provide services over online platforms in a wide range of sectors and activities. The underlying premise is to use the platform as an enabling tool to pivot away from a super-extractive labour practice exhibited by the likes of Uber and to exert more influence in the gig economy so that workers could also enjoy a decent wage and a fair share of the benefits.

Examples and proposals are increasing in this ecosystem especially in the sectors that have been most affected by the COVID-19 pandemic, such as in the ride hailing sector. Cooperatives such as the Drivers Cooperative, Taxiapp, Green Taxi Cooperative, etc. are started up and growing. New funding schemes are also emerging to help finance the development of such drivers' cooperatives (Wefunder 2022).

Other economic sectors are also showing signs of emerging platform-based SSE and cooperatives. Smartcoop, for example, is an intermediary service provider that connects across Europe to support workers, entrepreneurs and organisations to invoice, to work together with other professionals and to manage a budget on an occasional or a long-term basis. Through a hub and spoke design it is presented in nine European countries and connects 35,000 members (Smart 2022).

4. Threats and Opportunities of the ICT economy for SSEOEs

Promoting SSEOEs in the ICT industry is not without its challenges. For instance, due to the small size of SSEOE producers of ICT products (mostly intermediary goods or small market size software consulting), these SSEOEs are in a weak position when competing with the dominant for-profit ICT enterprises over access to market opportunities. Sometimes, they cannot survive in the market.

Making partnerships or alliances among ICT producing SSEOEs to join forces and to produce ICT goods and services through collaborative efforts while maintaining autonomy is a strategy to address various problems associated with small scale of SSEOEs, such as purchase, sales, and research and development. Such a strategy would help SSEOEs to have more bargaining power, obtain lower sales prices from the ICT TNCs and possibly get agreements to produce intermediary ICT goods and services resulting in technology transfers without falling into the trap of monopsony related unfair business conditions.

Lack of financial resources undermines the potential of SSEOEs to increase productive capacity and diversify these products. Small SSEOEs have difficulties achieving economies of scale (which would have a cost advantage that arises when there is a higher level of production for one good) and economies of scope (which has lower average costs because costs are spread over a variety of products). Without both, business entities in general will not gain sufficient market size as producer of ICT products and services.

The case of Loconomics, a former SSE platform, is illustrative. Loconomics was a sharing economy platform start-up that offered shared services to freelancers. Having started as a traditional platform company, Loconomics transformed its Articles of Incorporation and became a workers owned cooperatives. For its socially oriented business model, it became a well-publicised case study and received broad academic and media attention interested in platform cooperativism since its founding in 2014. Yet, such reputational gains were never translated into sufficient funding or users to scale. In 2020 after six years of bootstrapping and product campaigning, Loconomics was closed in 2020. The case of Loconomics shows that without a sound capitalisation strategy, SSEOEs cannot gain and keep adequate size of production and large client networks and the chance of small ICT SSEOEs to survive the start-up stage of their business ventures may be slim.

Conclusion

The ICT field is characterized by rapid changes of products and services. Innovation is a key ingredient for successful entry and survival in the ICT business. SSEOEs need to find a balance between cherishing and preserving SSE values while at the same time exploring ways to foster innovation within their organisations. The example of *Enspiral* described above offers a way to strike this balance, which allows experimenting,

sharing, and collaboration without losing SSE values and principles.

SSEOEs interested or already operating in the ICT industry should consider partnerships or alliances to share financial resources or rely on alternative funding mechanisms that could be used to fund SSEOE start-ups and pay a premium for its people-centred and socially oriented economic principles. This means more financial SSE intermediaries, jointly owned, which could offer alternative financing other than being dependent on private sector banking or venture capital are needed (see the entries"SSE and finance sector" and "Financing for SSE"). SSEOEs could also create joint ventures with private sector companies in the ICT sector as long as the agreements with private sector companies guarantee the autonomy of SSEOEs, and prevent them from being drawn into a rat race of continuously increased pressures for efficiency gains which would make it difficult to keep the spirit of SSE alive.

The fundamental question to SSEOEs in ICT, therefore, is how to strengthen the ability of SSEOEs to avoid losing the SSE spirit of joint ownership and democratic forms of governance while at the same time engaging in more risk taking entrepreneurial initiatives needed to enter the ICT world of producing goods and services.

Bibliography

Benkler, Yochai, and Helen Nissenbaum. 2006. "Commons-Based Peer Production and Virtue." *Journal of Political Philosophy* 14 (4): 394–419. https://doi.org/10.1111/j.1467-9760.2006.00235.x.

Bevensee, Emma, and Emma Buck. 2020. "A Supportive Backdrop and a Warm Embrace: An Impact Report of the Enspiral Network." Wellington: Enspiral & Rebellious Data. https://emmibevensee.com/wp-content/uploads/2020/01/Enspiral-external-report-FINAL.pdf.

Biehl, Verena, Heidrun Becker, Alenka Ogrin, Alenka Reissner, Johannes Burger, and Andrea Glaessel. 2021. "User-Centered Development of a Web Platform Supporting Community-Based Health Care Organizations for Older Persons in Need of Support: Qualitative Focus Group Study." *Journal of Medical Internet Research* 23 (3): e24006. https://doi.org/10.2196/24006.

Brülisauer, Samuel, Anastasia Costantini, and Gianluca Pastorelli. 2020. "The Digital Social Economy: Managing and Leveraging Platforms and Blockchain for a People-Centred Digital Transformation: CIRIEC Working Paper 2020–11." Liège: CIRIEC. https://www.ciriec.uliege.be/wp-content/uploads/2020/10/WP2020-11.pdf.

Bukht, Rumana, and Richard Heeks. 2017. "Defining, Conceptualising and Measuring the Digital Economy." *Social Science Research Network Journ*al. https://doi.org/10.2139/ssrn.3431732.

Euricse and ICA. 2021. "World Cooperative Monitor 2021." Euricse and ICA. 2021. Brussels: International Cooperative Alliance. https://monitor.coop/sites/default/files/2021-11/WCM_2021%20spread%20FINAL.pdf.

Fonteneau, Bénédicte, and Ignace Pollet, eds. 2019. The Contribution of the Social and Solidarity Economy and Social Finance to the Future of Work. ILO. Geneva: International Labour Organization. 2019. https://www.ilo.org/wcmsp5/groups/public/---ed_emp/documents/publication/wcms_739377.pdf.

Free Software Foundation. 2019 . "About." Free Software Foundation. 2019. https://www.fsf.org/about/.

Free Software Foundation. 2021. "What Is Free Software?" GNU Project. 2021. https://www.gnu.org/philosophy/free-sw.html#four-freedoms.

Fuster Morell, Mayo. 2010. "Governance of Online Creation Communities : Provision of Infrastructure for the Building of Digital Commons." CADMUS. 2010.. https://cadmus.eui.eu//handle/1814/14709.

Fuster Morell, Mayo, and Ricard Espelt. 2018. "A Framework for Assessing Democratic Qualities in Collaborative Economy Platforms: Analysis of 10 Cases in Barcelona." *Urban Science* 2 (3): 61. https://doi.org/10.3390/urbansci2030061.

Gurumurthy, Anita, Nandini Chami, and Deepti Bhartur. 2021. "Platform Labour in Search of Value: A Study of Workers' Organizing Practices and Business Models in the Digital Economy." ILO. 2021. Geneva: ILO. https://www.ilo.org/wcmsp5/groups/public/---ed_emp/---emp_ent/---coop/documents/publication/wcms_809250.pdf.

Hess, Charlotte, and Elinor Ostrom, eds. 2006. *Understanding Knowledge as a Commons: From Theory to Practice*. Cambridge, MA: MIT Press.

Huawei & Oxford Economics. 2017. "Digital Spillover." Huawei Technologies. 2017. https://www.huawei.com/minisite/gci/en/digital-spillover/files/gci_digital_spillover.pdf.

Koumbit. 2022. "Self-Management." Koumbit. 2022. https://www.koumbit.org/en/content/self-management.

Malmodin, Jens, and Dag Lundén. 2018. "The Energy and Carbon Footprint of the Global ICT and E&M Sectors 2010–2015." *Sustainability* 10 (9): 3027. https://doi.org/10.3390/su10093027.

Open Source Initiative. 2021. "History of the OSI." Open Source Initiative. 2021. https://opensource.org/history.

Quiroz-Niño, Catalina. 2019. "Participatory Decision-Making Processes within a Mobile Communication Social Enterprise and SDG 16." UNTFSSE. Geneva: UN Inter-Agency Task Force on Social and Solidarity Economy (UNTFSSE). https://knowledgehub.unsse.org/knowledge-hub/participatory-decision-making-processes-within-a-mobile-communication-social-enterprise-and-sdg-16/.

Ridley-Duff, Rory, and Mike Bull. 2021. "Common Pool Resource Institutions: The Rise of Internet Platforms in the Social Solidarity Economy." *Business Strategy and the Environment* 30 (3): 1436–53. https://doi.org/10.1002/bse.2707.

Rijswijk, Kelly, Laurens Klerkx, and James A. Turner. 2019. "Digitalisation in the New Zealand Agricultural Knowledge and Innovation System: Initial Understandings and Emerging Organisational Responses to Digital Agriculture." *NJAS - Wageningen Journal of Life Sciences* 90–91 (December): 100313. https://doi.org/10.1016/j.njas.2019.100313.

Scholz, Trebor, and Nathan Schneider, eds. 2017. *Ours to Hack and to Own: The Rise*

of Platform Cooperativism, A New Vision for the Future of Work and a Fairer Internet. New York; London: OR Books.

Spitzberg, Danny. 2021. "The Slow Demise of Loconomics: A Post-Mortem of California's Most Ambitious #PlatformCoop." Grassroots Economic Organizing. May 10, 2021. https://geo.coop/articles/the-slow-demise-loconomics.

Stallman, Richard. 2009. "Viewpoint: Why "Open Source" Misses the Point of Free Software." *Communications of the ACM* 52 (6): 31–33. https://doi.org/10.1145/1516046.1516058.