

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/327329360>

Chapter 8 What Role for the Social Enterprises in the Circular Economy?

Chapter · September 2018

DOI: 10.1108/978-1-78714-619-820181012

CITATIONS

2

READS

446

2 authors:



Ruth Lane

Monash University (Australia)

47 PUBLICATIONS 616 CITATIONS

SEE PROFILE



Wayne Gumley

Monash IVF

11 PUBLICATIONS 31 CITATIONS

SEE PROFILE

Some of the authors of this publication are also working on these related projects:



Adjie Pamungkas's PhD research [View project](#)



Ruth Lane's PhD research [View project](#)

Chapter 8

What Role for the Social Enterprises in the Circular Economy?

Ruth Lane and Wayne Gumley

Abstract

In debates about recycling and the circular economy, the role of existing organisations that already facilitate the circulation of materials through society can be neglected. Indeed, the social enterprise sector may currently be more significant than the commercial waste management sector in facilitating the circular economy within Australia. Drawing on interviews with organisations involved in collecting and reprocessing used electronics and scrap metal in Australia, the authors detail some of the synergies and tensions between the social enterprises and commercial organisations that have emerged as recycling gains traction through government policy and various forms of product stewardship. The authors conclude with suggestions for policy and governance approaches most likely to facilitate productive and perhaps symbiotic relationships between the two sectors in the future.

Keywords: Social enterprises; recycling; reuse; policy; commodity chain, circular economy; regulation

Introduction

The idea of a circular economy as a response to unsustainable trajectories of consumption of natural resources appears to be gathering traction with a growing presence at the World Economic Forum meetings in Davos, Switzerland (Ellen MacArthur Foundation, 2014; Giurco, Littleboy, Boyle, & Fyfe, 2014). Whilst international initiatives such as the Ellen MacArthur Foundation focus on engaging product designers and manufacturers in new forms of materials efficiency, it is critical to also acknowledge and better understand already

existing activities that currently facilitate commodity chains leading to reuse or recycling of goods and materials (Lane & Watson, 2012, Hobson, 2015; Hobson & Lynch, 2016). These range from the practices of households, the activities of charity sector organisations and their various interfaces with commercial recycling and reprocessing industries. Because some stages of commodity chains do not involve market transactions, understanding them requires a broader definition of ‘economy’ – what some scholars refer to as a ‘diverse economy’ (Gibson-Graham, 2006) – that includes activities such as gifts and donations, voluntary labour and many aspects of government policy aimed at supporting the public good benefits of charities and not-for-profit community organisations as well as those aimed at deflecting waste from landfill. In this paper, we focus in particular on the lesser known but highly extensive role of social enterprises in the circular economy, exploring their interface with both the broader community and with markets for recycled goods and materials. Our use of the term *social enterprises* follows that of Barraket and Yousefpour (2013, p. 448), ‘organisations that exist to generate a public or community benefit trade to fulfil their mission and reinvest a substantial proportion of their income in the fulfilment of their mission’.

The work reported on here forms part of the Wealth from Waste research program¹ which, in the context of global concerns around sourcing future metals and mineral needs through mining, is examining the feasibility of developing more advanced metals recycling in Australia (Corder, Golev, & Giurco, 2015; Giurco et al., 2014). The collection of used goods and materials is critical to this, and social enterprises play a significant role as an interface between the broader community in which goods and materials are redistributed and the commercial recycling industry that seeks to collect goods and materials with resale value. Whilst the passage of the National Waste Policy (Australian Government, 2009) and associated Product Stewardship Act (Commonwealth of Australia, 2011a) are encouraging developments in Australia, the policy and specific schemes initiated to date have focused primarily around the growth and expansion of a commercial recycling industry. The National Computer and Television Recycling Scheme (NCTCRS), the first e-waste collection schemes to be trialled under the new legislation, has drawn information for modeling the availability of the resource of used computers and TVs from sales and import data, but has so far not included information from consumers or social enterprises, both of which are important in the commodity chain for used electronics (Commonwealth of Australia, 2011b, 2014). Significantly, the scheme is entirely focused on the collection of used equipment for destructive materials recycling in which collected products are dismantled into component materials that can then be used as feedstock for new manufacturing. It does not address the issue of repair and reuse of functional items, nor does it create any significant drivers for improvements in product design, although industrial ecologists regard these approaches as important for materials efficiency in a circular economy (Allwood, Ashby, Gutowski, & Worrell, 2011; Ghisellini et al., 2016; Kissling et al., 2013).

In this paper, we examine some social, economic and regulatory factors that influence the motivation and capacity of social enterprise organisations to

undertake activities that facilitate reuse as well as recycling of goods and materials. We review different types of organisations and examine their interface with the broader community, with government agencies and policy initiatives and with the corporate sector.

Approach and Methods

Whilst our research for the Wealth from Waste research program spanned the full spectrum of organisations involved in reuse and recycling and included a wide range of commercial businesses and government agencies with various regulatory responsibilities, this paper is based on interviews conducted with 10 social enterprise organisations and a peak representative body, the National Association of Charitable Recycling Organisations (NACRO) (Table 8.1). Further information was drawn from the submissions made to the 2014 review of the National Computers and Televisions Recycling Strategy (Commonwealth of Australia, 2014).

Interviews were primarily conducted with operations managers at the site of the sorting and reprocessing facilities that they managed. Some interviews also involved visits to retail outlets. Interviews were semistructured and all except one were fully transcribed and submitted to thematic analysis using NVivo software to code for relevant themes of interest to our research and to capture issues and concerns raised by interviewees themselves. Information from both interviews and organisation websites was used to construct models of the commodity chains for used goods and materials that each organisation facilitated.

Table 8.1: List of Social Enterprise Organisations Interviewed.

Organisation	Location
The Salvation Army	National
St Vincent de Paul Society	National
The Smith Family	National
Lifeline (Brisbane)	Queensland
Computerbank	North Melbourne
Eaglehawk Eco Centre and Recycling Shop	Bendigo
Green Collect	Melbourne CBD
Outlook Environmental	Melbourne
Endeavour Foundation	Queensland, New South Wales, Victoria
Bright Sparks	Melbourne
NACRO	National (peak representative body)

Discussion of Findings

Within the social enterprise sector, a range of models exist for collection, including charity bins and drop-off centres, acceptance of donations at retail outlets, at-call collections and contracts for services to local government or business. The organisations we interviewed roughly fall into the following three groups²:

1. Large organisations, including church-based organisations, with extensive networks of collection and retail facilities across more than one Australian state – The Salvation Army, St Vincent de Paul Society, Lifeline (Brisbane) and the Smith Family.
2. Recycling centres connected with waste management facilities that link a primary goal of promoting employment opportunities and training with government objectives for waste diversion – Outlook Environmental, Eaglehawk Eco Centre and Recycle Shop, Endeavour Foundation.
3. Small niche recycling initiatives based on specific products or materials in an urban precinct with a mix of motives including employment training and supporting the needy as well as environmental concerns around materials recycling – Green Collect, Computerbank and Bright Sparks.

Whilst the organisations differ in terms of their role in transporting materials to central processing facilities, and in the extent to which collected goods are repaired or disassembled into component parts, we found certain elements in common across social enterprise organisations in their position in commodity chains for used goods and materials, their reliance on broad community support through donations, and in their reliance on voluntary or low-cost labour in facilitating their activities.

Role of Social Enterprises in Collection of Used Goods and Materials

Social enterprises operate the most extensive network of collection facilities for used goods and materials across Australia, including rural and regional centres as well as larger cities. The larger church-affiliated charities such as The Salvation Army and St Vincent de Paul Society are most significant in this respect, particularly for used durable goods and clothing. Most of what they collect comes in the form of donations of goods and materials from households and small businesses, motivated by both the convenient proximity of collection facilities and services as well as altruistic motives for helping the needy. In this respect, they dominate a critical stage in the commodity chain for reuse and recycling (Fig. 8.1). In 2012, the NACRO estimated 300,000 tonnes of donations were received and, of these, 38% were reused, 12% recycled locally and 10% exported for reuse or recycling (NACRO, 2013).

For goods and materials to become available for reuse or recycling, the first owners must surrender their property rights to the collecting organisation (Lane, 2011, 2014). The transfer of property rights in this context may present some

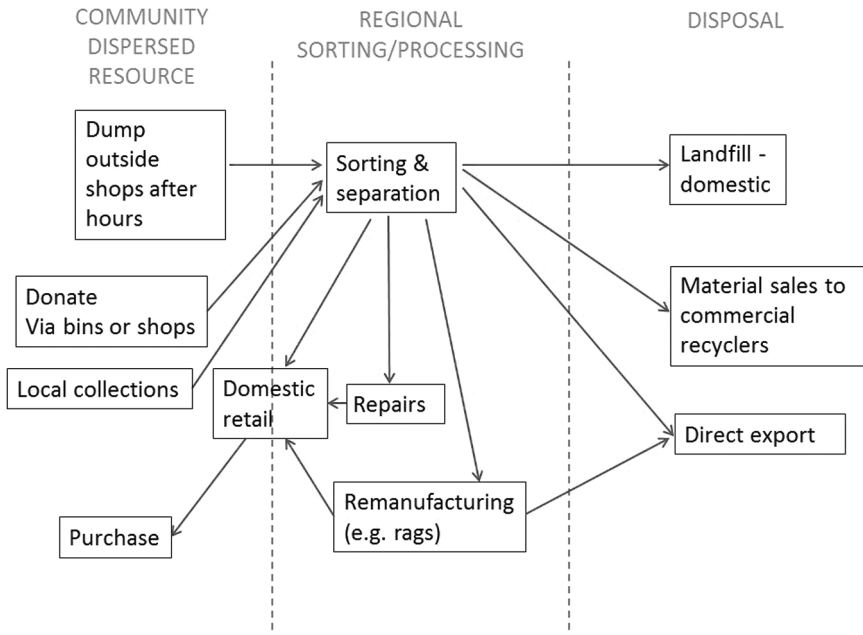


Fig. 8.1: Commodity Chain Characteristic of Large Charity Organisations with Extensive and Widely Distributed Collection and Retail Facilities.

legal difficulties. The law relating to ownership of goods or ‘chattels’ can be traced back to Roman times. Under the doctrine of *res derelicta*, once property was intentionally abandoned by its owner, the next person to take possession of that property became the rightful owner (Aitken, 1994). The modern practices of kerbside recycling and donations to charity through collection bins may also be interpreted as a form of *bailment*, which is the recognised legal relationship where a person voluntarily takes into custody goods which are the property of another (Lexis-Nexis, 2011). The recent advances in information technology and rapid turnover of used electronic equipment has led to an upsurge in donation of used electronic goods to social enterprises. The possibility that confidential information may be embodied in donated electronic goods, along with practices of scavenging kerbside bulky waste collections (Lane, 2011) and new social movements involving dumpster diving (Edwards & Mercer, 2012), requires significant reconsideration of these ancient property doctrines. Electronic goods containing computer memory chips (particularly computers and mobile phones) may require additional processing/digital cleansing before they can be on-sold as second-hand goods. An early MIT study found that many discarded hard drives contained information that was both confidential and recoverable (Shelat & Garfinkel, 2003). A plastic surgeon in Kansas who left a disused computer out for kerbside collection ended up being sued by several former patients whose ‘before and after’ photographs were found on the hard drive (Fraser, 2005). As part of our larger concern with collection systems for e-waste, the commercial e-waste recyclers we

interviewed indicated that compliance with privacy and cyber-security laws is already a significant issue for them, and this is one area where social enterprises also face additional compliance obligations and potential risks of legal liability.

The redistribution and reuse of goods and materials within the community by social enterprises is generally assisted by their reputation for delivering social benefits and charitable works in the community, as well as their extensive network of collection points and retail stores. Their reputation for altruistic activities that support the disadvantaged facilitates the willingness to donate, and removes inhibitions about surrendering property in goods and materials that could retain some form of market value. Some of the representatives we interviewed emphasised the importance of 'brand reputation' to their collecting operations. The representative from The Smith Family suggested that their knowledge of the full supply chain for products sold in their stores offers a significant market niche which has the potential to be formalised in the future through a formal certification or accreditation scheme. Several interviewees from large organisations emphasised that the used clothing trade is relatively profitable and the network of collection points and retail stores established for that purpose enables them to support various other less profitable lines including electronic goods, which tend to be more labour intensive and require specialist knowledge for testing, repair and/or dismantling for material recycling. Nevertheless, used electronic goods have been an important commodity for many social enterprises and considerable expertise has been developed in this sector to facilitate socially responsible processes for handling e-waste.

One unfortunate aspect of the NTCRS introduced in 2011 is that it seems to have diverted into commercial materials recycling channels a substantial proportion of electronic goods that previously would have been suitable for repair and resale by social enterprises through their second hand store network. The background papers preceding the NTCRS clearly identified social enterprises as part of the pre-existing collection and dis-assembly channels for e-waste (Wright-Rawtec, 2010). The Decision Regulatory Impact Statement (DRIS) for the NTCRS also recognised that charities could play an important role under the scheme if they were paid or reimbursed appropriately for their efforts (Price Waterhouse Coopers, 2011, pp. 176–177). The ultimate regulatory model preferred by the DRIS based upon a 'least-cost' approach was a co-regulatory model backed by Commonwealth legislation, whereby the television and computer industries would be jointly responsible for the collection of a certain proportion of their products (Commonwealth of Australia, 2011b). Under this model, the role of social enterprises was scarcely recognised at all, as it was envisaged that the industries would enter commercial arrangements with a group of 'co-regulators' who would be driven by market forces to meet their collection and recycling targets in the most cost-effective manner. Whilst this seems consistent with one of the National Waste Policy objectives, to 'manage waste as a resource' (Commonwealth of Australia, 2009), it is commercially very naive to believe that the numerous market failures which beset the electronics industry can be remedied by what amounts in substance to a scheme of self-regulation. The outcomes of the NTCRS over its first three years of operation reveal that:

- Under 40% of the e-waste arising from those industries has been collected under the scheme.
- The scheme has fast-tracked the export of e-waste by commercial recyclers at the expense of domestic repair and reuse by social enterprises.
- Commercial operators that have participated in the scheme have fared poorly due to the need to tender for contracts in a highly uncertain trading situation – in particular they have suffered from overly optimistic estimates of material supply and resource sale values in global commodity markets.
- The data on stocks and flows of relevant electronic goods in second hand markets and at end of life disposal stage was not highly accurate (Commonwealth of Australia, 2014).

These outcomes reflect a fundamental weakness in the high-level policy mindset of the Australian Government committed to competition policy reforms. This ‘small government’ agenda was specifically entrenched by principles of Best Practice Regulation which require all regulatory reforms to undergo regulatory impact analysis using cost benefit analysis (Australian Government, 2014). Value for money is generally viewed as a microeconomic outcome from the perspective of a private enterprise firm. This approach inevitably places undue emphasis upon financial costs of regulation to the firm at the expense of the broader social benefits which are notoriously more difficult to assess and value. As a result, the NTCRS is making only a minimal contribution to the collection costs of e-waste whilst imposing virtually no pressure on manufacturers to engage in more effective responses such as improving the composition and design of their products, or tightening contractual arrangements with their consumers to guarantee ‘take-back’ of disused products.

Due to the rapidly changing applications and design of electronic products, there are numerous ‘market failures’ to be addressed, including a range of regulatory pitfalls as the goods in question straddle the boundary between commodities and waste. The terms of exemption from second-hand traders’ legislation and licensing fees differs in every state, whilst occupational health and safety requirements and hazardous waste management rules also create significant compliance burdens. Goods and Services Tax liability could also be triggered, but in general, the sale of donated second-hand goods by a registered charity is exempt, provided there is no change in the original character of the goods (Australian Taxation Office, 2014).

The most significant challenge associated with the collection stage is that of illegal dumping, particularly outside retail stores after hours and beside charity bins located on public land, which represents a significant cost to charity organisations, especially if they are required to pay landfill fees for disposal of unwanted materials. Some organisations were engaging with police and local councils to prosecute those guilty, with the assistance of evidence recorded on security cameras. The issue of illegal dumping has been taken up by NACRO in lobbying state governments to acknowledge the likelihood of increased dumping as a side effect of the introduction or increases in the landfill levy in each state (NACRO, 2013).

A different problem exists for products and materials for which profitable markets exist, especially used clothing, where charity organisations compete with fully commercial businesses. Particular tensions have arisen with the colocation of commercial collection bins alongside those of charity organisations and, in some cases, with misleading labelling making it likely that donors will mistake them for the bins of charity organisations. The profitable trade in used clothing is largely run along commercial lines, often with professional managers drawn in from mainstream retail businesses. This is an international trade (Norris, 2012) and Australian-based charity organisations are significant exporters to buyers in Papua New Guinea and Dubai. Some organisations even import used clothing from other countries in order to maintain a constant high-flow rate for the companies they sell to. Profits from these commercial activities are used to subsidise their various noncommercial activities and programs.

A different collection model exists for social enterprises linked to waste processing facilities. In this case, donated goods and materials are brought to the facilities by donors, including builders and home renovators, who may be required to pay a gate fee for their disposal (Fig. 8.2). These recycling centres may operate on land owned or donated by local governments who also operate the associated waste transfer or landfill facility. In metropolitan Melbourne, Outlook Environmental³ provides an example of a disability employment agency that has developed its operations in conjunction with local and state government policy and targets for waste diversion from landfill. Their labour-intensive operations model allows them to undertake a high level of disassembly of products into component materials, including different metal types, plastics, etc., which are

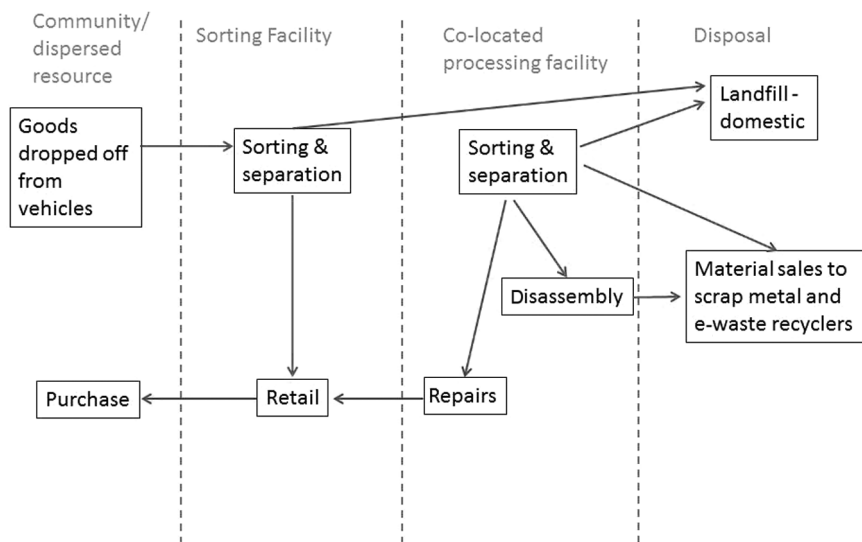


Fig. 8.2: Commodity Chain Characteristic of Recycling Centres at Waste Management Facilities.

then sold to commercial recyclers. They are now engaging with the disassembly of waste electronics, especially cathode ray tubes (CRT) from televisions and computer monitors, and have contractual arrangements with the commercial e-waste recycler, MRI E-cycle Solutions. Metals are sold to commercial bulk metal recyclers, OneSteel, SRS or Norstar depending on which offers the best price. Whilst money is made from commodity sales, more financially significant is the gate fee they are paid from the NTCRS for receiving and processing televisions, as the fee allows them to employ the staff required to undertake this work. Other funding was awarded by the Victorian Government's Metropolitan Waste Management Group for infrastructure to expand the capacity of their waste transfer centres in Melbourne to increase resource recovery. As a disability employment agency, Outlook Environmental had previously obtained government-funding assistance for employment training activities. Whilst recent changes linked to the National Disability Insurance Scheme has effectively removed this subsidy, the environmental side of the business could subsidise employment training activities if necessary. The Endeavour Foundation,⁴ another disability employment social enterprise, has developed an even more diverse range of business activities, ensuring it was well buffered from changes in government policy.

A slightly different model again is found in the Eaglehawk Eco Centre and Recycle Shop in Bendigo in central Victoria, which was reformed in 2016 as the Eaglehawk Recycle Shop Inc. Originally established by the not-for-profit organisation Future Employment Opportunities, the organisation is motivated by the need for job creation and employment training for long-term unemployed in a region with very high levels of unemployment. In collaboration with the Bendigo City Council, which provided land for its operations, a facility was established adjacent to the Bendigo landfill aimed at diverting recyclable and reusable materials from landfill. The Eaglehawk Recycle Shop interacts with local businesses and the regional community to receive goods and materials that are then sorted, repaired, disassembled and sold as either used goods or bulk materials. Workers at the centre develop innovations for disassembly equipment (they designed and constructed a machine for degassing refrigerators) and for adapting used goods for sale in the retail store located on the site. Within the centre, a computer repair shop was established that sells second-hand computer equipment. Approximately, 60% of revenue comes from sales of second-hand goods and 40% from sale of materials for recycling. Any surplus is invested back into the organisation and used for new infrastructure or equipment. The Eaglehawk Recycle Shop has strong support from the regional community who visit to both drop-off unwanted goods and materials and shop for second-hand goods. The social enterprise model has now been extended to similar initiatives in other regional towns in Victoria that have developed recycle centres alongside their landfills. It also forms part of an interstate network of community recycling organisations, the Community Recycling Network Australia (CRN Australia, 2015),⁵ that in turn is a member organisation of NACRO which lobbies governments on their behalf.

In addition to these larger organisations, a diverse range of small-scale organisations also play a role in the collection of more specific types of goods and materials for repair or recycling in urban precincts (Fig. 8.3). For example, in

North Melbourne, Computerbank was established in 1998 for the purpose of collecting old computers for repair and resale at low cost, and recycling non-reusable components through disassembly and sale to commercial recyclers.⁶ Green Collect was formed in 2002 with start-up funding from a BP corporate social responsibility program. It is focused on collection and recycling of office materials from the Melbourne CBD as a means of creating employment and training opportunities for people from disadvantaged backgrounds through collecting discarded items for reuse, remaking and recycling.⁷ Most small niche recycling organisations like these have some interaction with government funding schemes as providers of employment training programs or engaging with Work for the Dole welfare schemes. However, as these schemes fluctuate with governmental changes, their survival depends on sales of the goods and materials they collect and process.

Engagements with Government and the Corporate Sector

Whilst social enterprises are central to the circulation of used goods and commodities and do engage with the recycling of some commodities, such as reprocessing unusable textiles into saleable rags, most materials recycling is brokered by commercial businesses. Whilst there are facilities for recycling plastic, glass and paper within Australia, most metal recycling is undertaken offshore, with commercial businesses in Australia managing logistics for collection and sales to offshore buyers (Lane, Gumley & Santos, 2015). Only some of the activities involving the collection, reuse and recycling of specific products and materials are

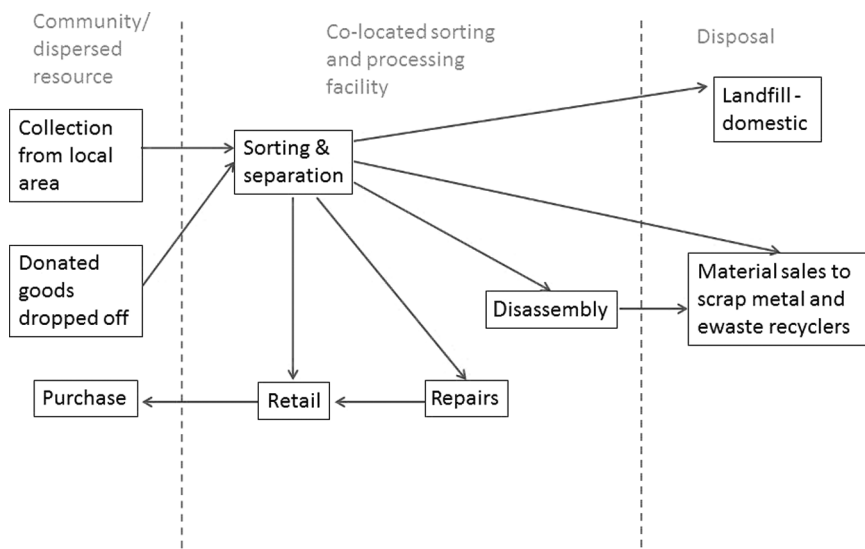


Fig. 8.3: Commodity Chain Characteristic of Small Niche Recycling Initiatives in Urban Precincts.

profitable on a commercial scale, and the largest costs involved are primarily in collection, sorting and, where undertaken, disassembly and repair work.

The introduction of the NTCRS has meant that a gate fee is now collected for depositing computers and televisions at waste transfer stations making activities at waste transfer stations more appealing to commercial businesses. In awarding contracts for managing used electronics at their transfer stations, local government authorities are obliged to follow guidelines about assessing value for money. However, this provision frequently disadvantages social enterprises compared with commercial businesses, due to the need to make an additional case around the economic value of the social benefits they bring from their employment training programs (Barraket & Yousefpour, 2013). A similar issue has been observed in Germany in relation to the awarding of local government contracts for managing waste electrical and electronic materials at transfer stations (Walther, Steinborn, Spengler, Luger, & Herrmann, 2010). Value for money provision is also easier to justify for destructive materials recycling than for repair and reuse, as the logistic costs are lower for materials destined for destructive recycling that do not need to be preserved in working order. In the Operational Review of the NTCRS (Commonwealth of Australia, 2014), respondents were asked to comment on a proposal to require reporting on engagements with social enterprises as part of the broader scheme reporting requirements. However, only some commercial organisations considered this a good idea, and social enterprises generally regarded it as a tokenistic acknowledgement of their activities in facilitating end-of-life materials recycling by commercial industry. NACRO was concerned that new product stewardship initiatives such as the NTCRS assume that the charity sector will undertake unprofitable activities, whilst the commercial sector performs profitable activities.

In government policy and legislation, there is an assumption that innovation in emerging recycling industries will be driven by the corporate sector based on profit motives. However, we found much evidence of innovation within social enterprises in the collection, sorting and disassembly/repair stages of the commodity chain. For example, workers at the Eaglehawk Eco Centre and Recycle Shop in Bendigo had designed and constructed a machine for degassing refrigerators and separating their different metal components. This was motivated by the desire to generate new employment opportunities rather than focusing on profits alone. The St Vincent de Paul Society had designed a trolley with a spring-loaded platform that reduced the risk of volunteer workers experiencing back strain. This was motivated by their desire to maintain a comfortable work environment that continued to attract volunteers. Much of the computer repair work for resale was unlikely to generate profits on a commercial scale, but nevertheless provided employment and training opportunities valued by those undertaking the work.

At the 2014 and 2015 NACRO annual conferences, there was significant discussion around the potential for charity organisations to both incorporate effective practices from the business sector, such as the strategic layout of shops, and to develop innovative partnership arrangements with commercial businesses that were mutually favorable. An existing example of a successful collaboration would be Outlook's relationship with MRI E-cycle Solutions for CRT disassembly.

An example of innovation through a charity-business relationship is Innoveq, a mobile mattress recycling plant able to be transported from one region to another to process large quantities of mattresses by separating out the metal springs to facilitate recycling and reduce landfill disposal charges. This was developed through a collaboration between the Salvation Army and an industrial engineering specialist with support from the NSW Environmental Protection Agency.⁸

Conclusion

In reviewing the role of social enterprises in an emerging circular economy, we have highlighted a number of important issues. Firstly, circular economy thinking should increase the focus on reuse and redistribution of products and materials as opposed to recycling. Whilst this issue has always been stressed by industrial ecologists (Allwood et al., 2011; Allwood & Cullen 2012), an overly market-oriented approach to a circular economy is likely to overlook such activities which may not be particularly significant in the generation of profits. This emerged as a key issue in a large study of international organisations involved in collecting IT for reuse (Kissling et al., 2013). These organisations listed the lack of regulatory requirements or incentives as the most significant barrier to their operations.

The problem is currently entrenched by the Australian Government's use of narrowly framed cost-benefit analysis in the regulatory impact analysis required for new regulated product stewardship schemes. Simplistic assumptions around economic efficiency that fail to account for environmental externalities will need to be reconsidered to support the principles of a circular economy that uses products and materials more efficiently and avoids waste (Stahel, 2013). We endorse the initiatives of some local governments to include requirements for contractors for waste transfer facilities to deliver social benefits. However, as the calculation of these can be a burden for social enterprises (Barraket & Yousefpour, 2013), support for a standard approach to this is needed.

Secondly, as social enterprises become more business-like and compete with commercial businesses, the issue of not-for-profit status is likely to become more problematic. We found very mixed responses to the new forms of competition between social enterprises and commercial businesses in the course of the research. Whilst all those interviewed acknowledged the need to become more business savvy, and some had taken significant initiatives to do so, others were concerned about the unequal leverage and resources of transnational waste management businesses, who could afford to lose money on a local government contract in order to secure market share in an emerging industry around regulated product stewardship collections.

Thirdly, more consideration is needed of the appropriate geographical scale for closing the loop in the circular economy. Social enterprises may be more significant than the commercial sector in closing the loop within the domestic economy, as they facilitate labour-intensive and low-profit activities within Australia that would otherwise be exported to low wage countries, often with lower environmental and health and safety standards (Lepawsky, Araujo, Davis, & Kahhat, 2017). In addition to co-regulated product stewardship focused on end

of life material recycling, other measures may be required to support repair and maintenance of working equipment and thereby extend product lifespans. These could take the form of changes to the taxation system along the lines argued for by Stahel (2013). In 2016, Sweden introduced new measures to remove the tax burden on repair and maintenance services, and it will be important to monitor the effectiveness of such measures to assess their potential use in Australia. Other options could include the development of certification schemes for repair and reuse that ensure uniform standards for quality and labour. However, for some forms of high-end electronic equipment, it may be more realistic to form relationships with repair and refurbishment businesses in other countries in the Asia region. As with end-of-life materials recycling under the NTCRS, repair and refurbishment of items such as mobile phones and tablets could be undertaken through collaborations with appropriately certified businesses outside of Australia.

It is clear that the circular economy facilitated by the charity sector has many nonmarket dimensions and could not exist without them. These include the broad-based social support for charity organisations through donations of goods and materials, cash donations and voluntary labour. However, whilst the charity sector benefits from various forms of government policy and regulation in recognition of their public good benefits in helping the needy and in providing job training opportunities, there is not yet sufficient recognition of the importance of their non-market activities in policy initiatives to promote a circular economy through greater levels of materials recycling. The recent Federal Government product stewardship initiatives, informed by import and sales data, have focussed upon increasing the role of conventional (for profit) private enterprises, whilst ignoring the very large economy in second-hand goods facilitated by not-for-profits. As a consequence, there is a risk that new policy initiatives focused only on market-based activities could generate barriers and perverse incentives in the nonmarket parts of commodity chains that could ultimately undermine the quantities of materials able to be reused or recycled.

Notes

1. Details available at <http://wealthfromwaste.net/>
2. We acknowledge the existence and growing significance of online swapping and give away sites such as Freecycle or Zilch but have not yet conducted research with any of these organisations.
3. Details available at <https://outlookvic.org.au/environmental/>
4. Details available at <https://www.endeavour.com.au/>
5. Details available at <http://www.communityrecycling.com.au/>. Accessed on February 25, 2015.
6. Details available at <http://www.computerbank.org.au/>
7. Details available at <http://www.greencollect.org/>
8. <http://innoveq.com.au/>

References

- Aitken, L. (1994). The abandonment and recaption of Chattels. *Australian Law Journal*, 68, 263–284.
- Allwood, J. M., Ashby, M. F., Gutowski, T. G., & Worrell, E. (2011). Material efficiency: A white paper, Resources. *Conservation and Recycling*, 55(3), 362–381.
- Allwood, J. M., & Cullen, J. M. (2012). *Sustainable materials with both eyes open*. Cambridge: UIT Cambridge Ltd.
- Australian Government. (2009). *National waste policy: Less waste, more resources*. Canberra: Department of Sustainability, Environment, Water, Population and Communities, Environment Heritage and Protection Council.
- Australian Government. (2014). *The Australian government guide to regulation*. Canberra: Commonwealth of Australia, Department of Prime Minister and Cabinet. Retrieved from https://www.pmc.gov.au/sites/default/files/publications/Australian_Government_Guide_to_Regulation.pdf
- Australian Taxation Office. (2014). *Tax basics for nonprofit organisations (NAT 7966–08.2014)*. Commonwealth of Australia, Canberra.
- Barraket, J., & Yousefpour, N. (2013). Evaluation and social impact measurement amongst small to medium social enterprises: Process, purpose and value. *Australian Journal of Public Administration*, 72(4), 447–458.
- Corder, G. D., Golev, A., & Giurco, D. (2015). Wealth from metal waste: Translating global knowledge on industrial ecology to metals recycling in Australia. *Minerals Engineering*, 76(15), 2–9.
- Commonwealth of Australia. (2011a). Product stewardship Act 2011, No. 76, 2011. Retrieved from <https://www.legislation.gov.au/Details/C2011A00076>
- Commonwealth of Australia. (2011b). Product stewardship (Televisions and Computers) Regulations 2011, Select Legislative Instrument No. 200, 2011. Retrieved from <https://www.legislation.gov.au/Details/F2011C00912>
- Commonwealth of Australia. (2014). *The national television and computer recycling scheme: Operational review.*, Canberra: Commonwealth of Australia. Retrieved from <https://www.environment.gov.au/system/files/pages/1de81785-ce48-4671-8182-9f1d9490b5ce/files/operational-review-national-television-and-computer-recycling-scheme.pdf>
- CRN Australia. (2015). Community recycling network Australia. Retrieved from <http://www.communityrecycling.com.au/>
- Edwards, F., & Mercer, D. (2012). Food waste in Australia: The freegan response. *The Sociological Review*, 60, 174–191.
- Ellen MacArthur Foundation. (2014). *Towards the circular economy: Accelerating the scale-up across global supply chains*. Cowes: Ellen MacArthur Foundation, Isle of Wight.
- Fraser, D. (2005, July 14). Patients sue doctor over discarded computer. *Canadian Privacy Law Blog*. Retrieved from <http://blog.privacylawyer.ca/2005/07/patients-sue-doctor-over-discarded.html>
- Ghisellini, P., Cialani, C., & Ulgiati, S. (2016). A review on circular economy: The expected transition to a balanced interplay of environmental and economic systems. *Journal of Cleaner Production*, 114, 11–32.
- Gibson-Graham, J. K. (2006). *A postcapitalist politics*. London: University of Minnesota Press.
- Giurco, D., Littleboy, A., Boyle, T., & Fyfe, J. (2014). Circular economy: Questions for responsible minerals, additive manufacturing and recycling of metals. *Resources*, 3, 432–453.
- Hobson, K. (2015). Closing the loop or squaring the circle? Locating generative spaces for the circular economy. *Progress in Human Geography*, 40(1), 88–104.

- Hobson, K., & Lynch, N. (2016). Diversifying and de-growing the circular economy: Radical social transformation in a resource-scarce world. *Futures*, 82, 15–25.
- Kissling, R., Coughlan, D., Fitzpatrick, C., Boeni, H., Luepschen, C., Andrew, S., & Dickenson, J. (2013). Success factors and barriers in re-use of electrical and electronic equipment. *Resources, Conservation and Recycling*, 80, 21–31.
- Lane, R. (2011). The waste commons in an emerging resource recovery waste regime: Contesting property and value in Melbourne's hard rubbish collections. *Geographical Research*, 49(4), 395–407.
- Lane, R. (2014). Understanding the dynamic character of value in recycling metals from Australia. *Resources*, 3(2), 416–431.
- Lane, R., Gumley, W., & Santos, D. (2015). *Mapping, Characterising and Evaluating Collection Systems and Organisations*. Retrieved from <http://artsonline.monash.edu.au/wfw/files/2016/03/WfWMonash-Mapping-Characterising-Evaluating-CollSystemsOrgs-Dec2015.pdf>
- Lane, R., & Watson, M. (2012). Stewardship of things: The radical potential of product stewardship for re-framing responsibilities and relationships to products and materials. *Geoforum*, 43(6), 1254–1265.
- Lepawsky, J., Araujo, E., Davis, J. M., & Kahhat, R. (2017). Best of two worlds? Towards ethical electronics repair, reuse, repurposing and recycling. *Geoforum*, 81, 87–99.
- LexisNexis, (2011). Halsbury's Laws of England, Vol 4, Bailment and Pledge, '101. Meaning of Bailment'.
- Norris, L. (2012). Trade and transformations of secondhand clothing: Introduction. *TEXTILE*, 10(2), 128–143.
- Pricewaterhouse Coopers in association with Hyder Consulting, (2009b). Decision Regulatory Impact Statement: Televisions and Computers, in: Environment Protection and Heritage Council (Ed.). Environment Protection and Heritage Council, Canberra.
- Shelat, A., & Garfinkel, S. L. (2003). Remembrance of data passed: A study of disk sanitization practices. *IEEE Security & Privacy*, 1, 17–27.
- Stahel, W. R. (2013). Policy for material efficiency: Sustainable taxation as a departure from the throwaway society. *Philosophical Transactions of the Royal Society A Mathematical, Physical and Engineering Sciences*, 371(1986), 20110567.
- Walther, G., Steinborn, J., Spengler, T., Luger, T., & Herrmann, C. (2010). Implementation of the WEEE-directive: Economic effects and improvement potentials for reuse and recycling in Germany. *The International Journal of Advanced Manufacturing Technology*, 47(5–8), 461–474.
- Wright Corporate Strategy Pty Limited, Rawtec Pty Limited, (2010). A Study of Australia's Current and Future E-Waste Recycling Infrastructure Capacity and Needs. DEWHA, Canberra.

