Setting Standards for a Circular Economy: A Challenge Too Far for Neoliberal Environmental Governance?

Abstract

National and regional governments around the world are steering actors in the waste and resources management industry towards a more circular economy (CE). Such a hoped-for transition is set against a backdrop of neoliberal environmental governance. The private sector increasingly delivers outcomes via public-private initiatives. Similarly, voluntary quality assurance standards covering flows of waste and resources around the globe are increasingly central to markets and trade. The role of standards in contemporary environmental governance is critically reassessed by examining how they are involved in the upscaling or down-scaling of markets. This analysis matters to understanding how the CE is conceptualised at a range of scales and how neoliberal environmental governance can help or hinder CE development. To overcome the paucity of data on how and why public and private sector actors set and use voluntary standards for material flows, twenty-eight key actor interviews with those involved in standard setting and the CE in Europe are drawn upon. Results suggest that proponents of standards and the CE see the raising of the quality of recycled material as central to building up confidence and trust in existing and emerging markets. However, others suggest markets will always privilege cost over quality and that standards are peripheral. For the CE transition to accelerate, this research suggests that policy instruments like standards need to challenge existing neoliberal market relations rather than simply follow them.

Keywords: Circular Economy, Standards, Waste, Resources, Neoliberalism, Governance

1.0 Introduction

A global crisis in waste and resources management has been steadily building over the last three decades (Tammemagi, 1999, Rhyner et al., 2017). Traditional options for waste disposal - landfilling and incineration - cannot keep pace with constantly rising volumes of waste production particularly in developing countries (Orlu et al., 2017). There are ever-increasing normative moves towards achieving a Circular Economy (CE) but in its early stages of development the understanding of a CE is highly contested (Kirchherr et al, 2017, Homrich et al, 2017, Velte et al, 2018). In their review of multiple definitions of the CE Kirchherr et al (2017 229) concluded that the term needed to encompass:

> "an economic system that replaces the 'end-of-life' concept with reducing, alternatively reusing, recycling and recovering materials in production/distribution and consumption processes. It [the CE] operates at [multiple levels] with the aim to accomplish sustainable development … It is enabled by novel business models and responsible consumers."

Much of the debate and interpretation of the CE therefore takes place within the parameters outlined by Kirchherr et al (2017). This inclusive approach is helpful because it enables an exploration of how and why CE may matter to key actors and of the leading narratives on the CE that emerge.

The drive for sustainable change has been accelerating at a range of scales from the local to the global (Ghisellini et al., 2016). However, achieving transitional change in waste and resources governance via CE principles involves more than finding ways to better quantify waste and resource flows. There is also a need to ask more fundamental questions about who is advocating the CE, which narratives they are using, and which factors will help and hinder its adoption (Gregson et al, 2015). The extent of the adoption of environmental standards, and hence their legitimacy, has important implications for normative moves towards developing a CE at a range of scales. Standards are typically understood as providing rules that govern behaviour, processes or practices in the market place. Standards are nominally voluntary but supply chain actors, or other key actors, can be insistent that others adopt them (Pellizzoni, 2011). However, the effective use of standards relies on actors being able to see beyond their professional and institutional silos (Velte et al, 2018). This is important because, to enable a sustainability transition towards a CE, at a range of scales, socio-technical pathways that would include standards as they help alignment, need to be found that can help push niche activity towards a new socio-technical regime (cf. Geels and Schot, 2007).

This study is set within the broad historical context of the co-evolutionary dynamics between niche CE process/technical advances and leading public and private CE actors. The willingness of key actors (or lack of it) to consider standards linked to material flows, the ways in which actors interpret standards, continually constructing, contesting and reconstructing inferences (Homrich et al, 2017, Velte et al, 2018), and the content of the standards themselves will directly impact on the ways in which the CE is realised. In transition terms, these actors operate at the niche, or micro level, and seek to establish new pathways which will eventually supplant the existing regime where institutional rules are established (at the meso level) all the while responding to broad shifts in the neoliberal economic and political landscape at the macro level (Geels and Schot, 2007). Throughout this study, neoliberalism is taken to mean the "awkward amalgamation" and "always problematic alliance between anti-statist libertarianism on the one hand and authoritarian interventionism on the other (Peck, 2004, 400) which has a "utopian vision of a free society and free economy [which] is ultimately unattainable" (Peck, 2010, 7). Related work in other sectors, especially medicine and biotechnology, is suggestive of the ways in which the framing of knowledge by institutions takes place. As Demortain (2017, 139) states, "It becomes crucial to ask where … standards come from and gain credibility … what valuations of technology and appreciations of their risks or benefits do they embed, and who controls them?" This research therefore asks what the role is of these public and private actors - governmental bodies, companies and trade/business associations and non-governmental organisations (NGOs), amongst others - regarding the political legitimation of standards linked to improved waste and resources sustainability.

Facilitating economic growth and development by using standards to assist in establishing a CE, is examined in terms of the creation and sustaining of materials' markets. There is a pressing need to better understand how and why private sector actors seek to maintain existing standards for material quality as well as developing new ones. Companies may subscribe to a wide variety of environmental standards. An environmental management system certified to the International Organisation for Standardisation, ISO 14001 for example, is an organization standard linked to top-down regulatory approaches which first appeared in the 1990s. Given increasing state reluctance to engage in environmental regulation (Heynen et al., 2007), the question of whether such neoliberal environmental governance via standards reassure governmental bodies about reductions in stricter state-led regulation requires examination.

Long-standing shifts away from significant state involvement in market and regulatory coordination from the 1980s onwards suggest a greater role for the private sector which, in a

neoliberal framework that seeks to use standards to underpin the flow of materials that are central to the CE. However, through the detailed empirical material presented here, it becomes possible to discern the nature of the claims made by key actors who are setting and using standards. In particular, it is possible to identify why some actors pursue standards and make claims for their use in certain ways whilst others contest their relevance in the market place as well as a form of governance. This empirical approach provides a framework for a richer theoretical understanding of the contemporary neoliberal state (Heynen et al 2007; Pellizzoni 2011). On the basis of the analysis here, a reassessment of the role of standards in contemporary environmental governance is advocated (Loconto. and Demortain, 2017). Standards align flows of materials and networks (e.g. supply chains, corporate actors, and standard-setting bodies) and they seek to create spaces of reduced uncertainty and for those spaces to keep unfolding because that creates larger markets. However, these spaces are continually created in a provisional way as are the standards themselves. They continually need to be constructed and reconstructed (cf. Cetina and Mulkay, 1983; Cetina, 2013). These spaces and the standards reinforce one another but also, when weakened, they undermine one another. In particular, the standards that support the CE, and the different notions of it, are much more contested than might have been expected. This critique also matters at the level of neoliberal environmental governance because standards offer a window into the ways in which the empirical evidence on the ground does not necessarily match what theory suggests should be occurring.

This paper is divided into four sections: Section 2.0 covers the methodology and methods used to achieve the aims and objectives. Section 3.0 covers theorising standards and the circular economy. Section 4.0 reports the research results regarding standards and the CE. In Section 5.0, there is a discussion with conclusions given.

2.0 Methodology and Methods

A mixed-methods approach was pursued with this research in order to benefit from the increased confidence levels that come from combining quantitative and qualitative data (Tashakkori and Teddlie, 2010, Plano Clark and Creswell, 2011). The time period of the study begins in 2001 with the first academic article mentioning the specific 'CE' concept (Ueno, 2001). Similar conceptual terms - such as 'Industrial Ecology' - were in use earlier in the 20th Century, but the specific focus of this study is the competing social constructions of the CE concept through standards and standard setting.

A sociology of knowledge approach was chosen to help identify contributors. These waste and resource actors are considered to be continuously engaged in inter-subjective sense-making

and learning around the adoption and use of standards within the context of normative moves towards the CE (cf. Vygotsky, 1934/1987). Sociology of knowledge studies highlight how the creation of concepts leads to reciprocal roles for actors. In time, these roles become institutionalised and meanings are embedded in society. New routines (or 'ways of doing things') are agreed via a politics of knowledge that reduces uncertainty. New realities in different places and at different scales are thus 'socially constructed' (Scheurich and McKenzie, 2008). Such studies emphasise how understandings are constructed (and co-constructed) by members of specific communities of practice. In order to legitimate their world views, individuals use particular mutually-agreed concepts and theoretical perspectives (cf. Latour and Woolgar, 2013, Cetina, 2013). Typically, this will involve researchers analysing narratives that appear in secondary source material such as policy documents, professional publications, the media and academic articles (see, for example, the policy analysis of McDowall et al 2017).

At present, debates on the CE are marked by competing constructions of the concept rather than mutual agreement. A sociology of knowledge approach also reveals how emergent strands of knowledge appear, are contested and evolve (cf. Berger and Luckmann, 1966, Cetina and Mulkay, 1983). In the case of CE, a wide range of publications from professional trade journals to academic publications have a major role in meaning making and therefore how waste and resources actors position themselves in relation to the use of standards (including in a future CE). Primary and secondary source data also shows these actors' broader perceptions about the nature of the relationship between industry and the state in terms of environmental regulation.

Analysis of the shifting nature of contested approaches to standards and a future CE is needed (Homrich et al. 2018). The mapping of rival perceptions is important because it helps forge an improved understanding of how and *why* certain actors use their power and influence in the public arena to promote these concepts. Such analysis suggests which interpretations of the utility (or otherwise) of standards' use in a future CE are starting to dominate and will be useful enablers of normative actor/organisational change.

Data from secondary-sourced publications was collected to analyse how CE actors are positioning themselves in terms of meaning making and the use of standards. The study period finished at the end of March, 2018. The following activity was undertaken:

1) An academic literature search was conducted in English-language publications via two online journal databases, Web of Science and Scopus. This search covered articles from 2001 up to the end of 2017[i].

2) An examination of key professional websites, e.g. British Standards Institute (BSI), International Organization for Standardization (ISO), the European Committee for Standardization and the European Committee for Electrotechnical Standardization (CEN-CENELEC), trade associations and professional institutes), was undertaken. Information on standards for material flows in the CE also helped identify key actor interviewees.

3) An exploration of specialist waste trade outputs, i.e. grey literature (e.g. from the Recycling Association), on standards and the CE was carried out. This search also helped to identify key actor interviewees.

4) Government department web sites dealing with standards and the CE were searched in the UK, EU, China, the US and the UN. This search provided information on policy-related material.

5) Web sites of non-governmental bodies and charities involved in promoting the CE were trawled for written material on standards, e.g. the Ellen MacArthur Foundation (EMF), the European Environmental Bureau, Recoup, and Waste and Resources Action Programme (WRAP).

6) Think tank and lobbyists' publications were examined from the web sites of the British Plastics Federation, the Institute of Scrap Recycling Industries, Inc. (US), and Policy Exchange.

7) CE and standards articles were also searched for in more general, popular press coverage including the *BBC*, *China Dialogue*, the *Guardian* and *Sky News*.

Primary-sourced interview data was then drawn from 28 individuals in the UK, continental Europe and China between 2017 and early 2018. Interviewees were with standard setters, standardisers and key private sector companies involved in the waste and resources management sector (Table 1). Standard setters represent actors involved in standard-setting bodies from the EU to national standards associations. Standardisers are actors who work with standards on a day-to-day basis and may be involved in further aligning and/or

maintaining standards taken up by others. Typically, this includes trade associations and larger companies. Finally, there are private sector companies of whom assumptions have not been made about how standards shapes their activities given the heterogeneous nature of their activity in the marketplace at present. The interviews were necessary to explore in greater depth how perceptions of the CE concept is developing, whether the professed role of standards is enabling flows of materials, the perceived challenges in the use of standards and standard setting in the future. Semi-structured telephone interviews were conducted using a question list. They typically lasted between 30 and 40 minutes and were transcribed and coded in terms of the emergent themes and responses and anonymised. The majority of the interviews were undertaken with very senior figures in the sector. Each interviewee was selected on the basis of their representativeness within the total range of public and private actors involved in CE developments (as identified from a mix of snowballing interviews and a review of secondary sources). Interviews were semi-structured based around themes relevant to the interviewee.

Table 1: Summary of Interviewee Themes and Responses

Actor	Core interview themes	Popular responses
Standard setters	• Standard setting Policy challenges • Barriers/enablers to change • Who to cooperate with • Political will • China • Markets and quality • Trade • Governance	• Policy context • Governance • Networks • Intergovernmental relations • Professional associations • Trade and tariffs
Standardisers	• Policy challenges • Standard setting • Barriers/enablers to change • Political will • Who to cooperate with • China • Markets and quality	• Policy context • Materials & quality • Governance • Networks • Professional associations • Trade and tariffs
Private sector companies	• Brexit & Standards • Policy challenges • Standard setting • Barriers/enablers to change • Markets and quality • Use of standards • China	• Limited nature of standards • Innovation • Materials & quality • Trade and tariffs • Regulation/red tape • Supply chains

In Table 1, the key actor groups that were interviewed are identified, the typical themes that were discussed with the interviewees and the most popular responses from each set of actors. The interviewees were often presenting complex points and summary Table 1 necessarily simplifies the responses. There were also a wide variety of responses to particular themes that were asked about but for clarity and brevity only the most popular are provided.

The next section outlines the theoretical context in which this research was undertaken.

3.0 Theorising Standards and the Circular Economy

Analysis of normative moves towards the CE typically pursues the effectiveness of three different process-driven approaches. One process approach to analysis uses Material Flow Analysis as a tool for gauging the effectiveness of attempts to meet CE and sustainable development goals (Ayres, 1978, Braungart et al., 2007, McDonough and Braungart, 2002). A second approach involves assessment of an evolving range of indicators to gauge eco-city performance in China (Wang et al., 2011, Du, 2016). These indicators work alongside or evolve into standards which can include, for example, pilot international standards, including LEED-ND, CASBEE-UD, and EEWH-EC. These standards are applied to monitor and evaluate the performance of an entire eco-city system in terms of resource inputs and outputs. A third approach involves evaluating indicators for comparing industrial symbiosis models worldwide (Boons et al., 2011, Jiao and Boons, 2014). Such important insights offered by this work, which involves legitimating particular quantitative tools in regard to standards and standard-setting when examined via a sociology of knowledge approach, nevertheless only reveal part of the much broader and more dynamic contested meanings of standards and the CE.

It is essential to draw out the differing and overlapping social constructions of the concepts of 'Circular Economy' and 'Standards'. This sociology of knowledge approach to standards and the CE is important because, in the context of a sustainability transition, 'buying-in' by key actors and institutions to a particular knowledge framework will shape how CE activity unfolds at a range of scales and over time. Standards matter for the CE because they help to coordinate flows of materials by ensuring the right quality arrives at the right place at the right time. In terms of the evolution of social constructions of standards, actors are involved in a continuing evolution and contestation over empirical evidence and its meaning (Korhonen et al., 2018). Academic journals (and other publications) have a major role in meaning making and academic positioning. Material submitted to journals comes back as printed positions which are then contested on the basis of scientific judgements, each with their own specific interest, but also based upon divergent moral and political doctrines (Owens and Cowell,

2011). In the case of CE publications, this process suggests that the shifting nature of contested approaches to knowledge production are as important as the motivations of CE proponents and critics, how they promote (or challenge) the concept, how and why certain individuals and groups have attracted such power and attention, and how certain interpretations of CE may (or may not) become anchored, i.e. 'sticky' or path dependent. In this sense, the configuration of knowledge in an emerging CE 'episteme', or rather epistemology, is often based on an opaque set of fundamental assumptions:

> "the episteme … [is] the strategic apparatus which permits of separating out from among all the statements which are possible those that will be acceptable within, I won't say a scientific theory, but a field of scientificity, and which it is possible to say are true or false. The episteme is the 'apparatus' which makes possible the separation, not of the true from the false, but of what may from what may not be characterised as scientific" (Foucault, 1980, 197).

Over time, key actors will use supporting evidence to legitimate their perspectives. Actors are likely to seek a mutually-agreed and politically-sanctioned structure to the knowledge divisions upon which practice is based, however, up until such agreements are made knowledge will be contested.

At the current juncture in the early evolution of the CE, there is a good deal of contestation of the term's meaning (Kirchherr et al., 2017) and of how standards may facilitate circular flows of materials (Tecchio et al., 2017, Vanegas et al., 2017). Within the literature, McDowall et al (2017) have drawn out the competing perspectives on the CE in China and Europe. The Chinese approach the CE is framed as a response to the environmental challenges created by rapid growth and industrialisation. CE debates are concerned with ways to reduce waste and promote resource efficiency. Within Europe, the CE is promoted from a narrower environmental agenda and is promoted as a way of businesses achieving a double dividend of improved efficiency through more economic use of resources. Meanwhile, Kirchherr et al. (2017) have undertaken a comprehensive review of CE definitions. Kirchherr et al. (2017) found that frequently CE is depicted as a combination of terms associated with waste hierarchy, namely reduce, reuse and recycle. Rather less attention is given to recognising that CE demands a systemic shift from a linear (waste) economy. Even less effort is made to link the CE to wider policy and academic debates such as that of sustainable development. There is, therefore, considerable contestation surrounding the interpretation of the CE. With a sociology of knowledge approach, insights are offered into the likely competing and uncertain versions of the CE that are to be found amongst policy makers and practitioners.

Overall, the standards and CE literatures suggests significant gaps in terms of understanding how private sector actors seek to maintain existing standards for materials and develop new ones which go beyond the evaluation of their effectiveness. A number of questions are thrown up by the literature which present significant challenges to the normative shift towards a CE.

- Why do standards and the hoped-for CE mean different things to different stakeholders?
- How are standards used to promote a CE by resource management actors?
- How can the sociology of knowledge and neoliberal environmental governance approaches help with insights into delivering a sustainable transition in waste and resource management, i.e. a shift to a CE?

Answering these questions helps us to advance notions of the role of standards in neoliberal environmental governance (Ponte and Cheyns, 2013; Guéneau, 2018).

The next two subsections outline the theoretical areas of relevance to the discussion in Section 5.0. The first sub-sections asks 'What are standards?' in terms of neoliberal environmental governance and explains why they matter. In this sub-section, the role of two key standards bodies, ISO and the BSI is explained. The second sub-section suggests an approach to a sustainability transition, such as that with the CE, where standards are shown to help a niche activity become mainstream.

3.1 Standards and Neoliberal Environmental Governance

There are several interpretations of what constitutes a standard (Loconto and Demortain, 2017; Loconto and Fouilleux, 2014). Standards "define normative rules. They prescribe what those who adopt these rules should do and hence enable and restrict behavior" (Brunsson et al., 2012, 616). According to Brunsson et al. (2012, 617) a standard is a *specific type of rule* with three characteristics. Firstly, they are: "Important tools for regulating individual as well as collective behaviour and achieving social order". Secondly, standards are *voluntary* for those who wish to use them. In this sense, the decision to comply with a standard is one for those who wish to use the standard. This means that if a standard is to be effective it must be seen to be legitimate by those who use it and further accentuate the legitimacy of an action. Thirdly, standards are meant to be widely used. For those who formulate standards, the so-called standardisers, are looking to:

> "[P]rovide rules for the many ... They offer standards - which could be described as pieces of general advice offered to a large number of potential adopters" (Brunsson and Jacobsson, 2000, 2).

Standards are an often little-noticed but nevertheless a significant feature of contemporary life (Timmermans and Epstein, 2010, Brunsson et al., 2012). Bowker and Star (1999, 319) suggest that an "incredible, interlocking set of categories, standards, and means for interoperating infrastructural technologies" has been constructed around us particularly in terms of the material flows that underpin markets and international trade. Studying standards therefore offers an understanding of the repercussions, arising from interactions with a growth fixated global economy, one that is based on neoliberal themes of trade, deregulation and a limited state.

In terms of the role of the state within an analysis of neoliberal approaches to governance, environmental policy has traditionally been dominated by governmental activities, and the private sector and NGOs have played a lesser role in delivering public policy (but see, for example, WWF's support for the Forest Stewardship Council). Standards, like other neoliberal practices, such as auditing and certification, are becoming more important policy instruments and a means to provide reassurance on quality when trading takes place (Bloomfield, 2012, Cashore, 2002; Guéneau, 2018; Marx and Wouters, 2014). Market and non-market actors "rely increasingly on standards to manage reputations, make claims credible, and rationalise competition, especially when traditional forms of regulation (e.g. governmental) have been politically delegitimised" (Timmermans and Epstein, 2010, 77). Standards have come to the fore in particular in food and agricultural policy (Busch, 2000, Henson and Humphrey, 2009) where corporate interests have a key role in securing food safety (Marsden et al., 2009).

Creating a standard provides an important window through which to examine states or private actors' authority to influence the quality and credibility of production and/or services (Cashore, 2002). This is because standards are rules that apply across space and at a range of overlapping scales which extend from extremely localised practice to the global activities of transnational corporations who are moving significant flows of materials. Reassessing the role of standards in contemporary environmental governance means that critical analysis can be made of the ways that they are involved in the upscaling or down-scaling of markets rather than treating materials and scale as unproblematic. This analysis matters to understanding how the CE is conceptualised at a range of scales and how neoliberal environmental governance can help or hinder CE development. The potential for national and regional transitions to a CE in a European context is also analysed.

In terms of the efficacy of standards, much depends upon the trust that these actors have in the standard and if it is perceived to be robust and reliable or otherwise (Loconto, 2017).. There is, therefore, an ongoing process of constructing and maintaining trust in standards to ensure their legitimacy and authority (Mueller et al., 2009; Loconto and Demortain, 2017. Brunsson et al. (2012, 619) point out that:

> "Standardization organizations face the challenge of endowing the rules they develop with legitimacy, especially since they do not possess any legal authority. Without legitimacy would-be adopters are unlikely to follow a standard. One way to achieve legitimacy is to try to include different actors and encourage consensus among them while developing a standard."

Two examples of bodies that do this are the International Organization for Standardization based in Geneva and the UK's national standards body, the British Standards Institute.

3.1.1 International Organization for Standardization (ISO)

ISO is an independent, non-governmental organisation formed in 1946 currently with 161 national standards bodies in its membership. ISO has published 22,063 international standards and related documents. These standards cover: "almost every industry, from technology, to food safety, to agriculture and healthcare. ISO International Standards impact everyone, everywhere" (ISO, 2018). ISO defines international standards as things that: "make things work. They give world-class specifications for products, services and systems, to ensure quality, safety and efficiency. They are instrumental in facilitating international trade" (ISO, 2018). ISO's legitimacy is therefore drawn from its long history, its wide national membership and its ability to bring actors together (via industry and national standards bodies) from a number of nations to define, set and renew standards in ways that are specifically designed. An organisation's formal accreditation of a standard – certification – provides a key indicator of the use of standards in market-based activities and therefore helps to chart the ever-increasing rise of neoliberalism. Figure 1 gives an indication of how popular a number of management standards have been since ISO9001 was introduced in 1993. By 2016 there were over 1.6 million certifications of all ISO standards.

3.1.2 British Standards Institute (BSI)

The BSI began its work in 1901. This London-based non-profit distributing company has Royal Charter status. As a national standards body, BSI works with over 11,000 experts to generate best practice for business and assesses whether companies' processes, procedures and

products meet recognized international standards, many of which BSI have been involved in developing. The company has a portfolio of more than 30,000 current standards. BSI defines a standard as:

> “an agreed way of doing something. It could be about making a product, managing a process, delivering a service or supplying materials … They are powerful tools that *can help drive innovation and increase productivity*. They *can make organizations more successful* and people’s everyday lives easier, safer and healthier.” (BSI, 2018b, italics added)

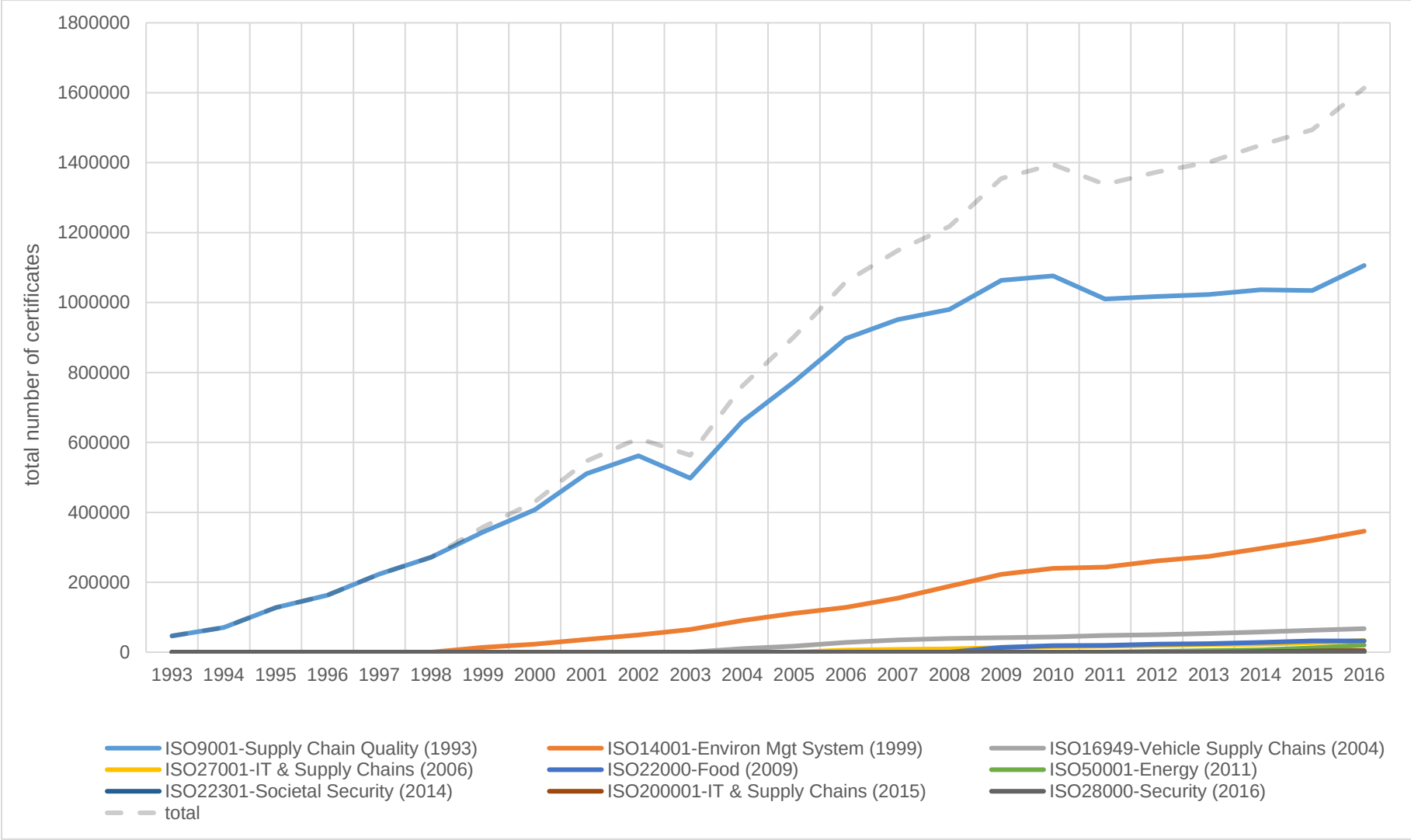


Figure 1: All Totals of Certifications for the Current Range of ISO Management Schemes

Organisations can choose standards that relate to regulatory requirements, e.g. for management processes; technical specifications which may relate to products; and/or guide standards such as BS8001, the new circular economy standard introduced in 2017 which acts as a guiding framework for the development of further and more detailed process and technical standards.

3.2 Contesting Standards

In terms of the contestation around standard setting involving the experts brought together by bodies like ISO and BSI, Timmermans and Epstein (2010, 70) note that:

> "[Standards] help regulate and calibrate social life by rendering the modern world equivalent across cultures, time, and geography. Standardization may seem to be politically neutral on the surface, but in fact it poses sharp questions for democracy: How do we hold the standard makers accountable? Whose benefits are served by standards? When standards conflict, which ones should prevail?"

One practice-based assumption has so far been that actors' understandings of what is happening in standard development is unproblematic. For these actors, standard setting is explicitly based around consensus seeking. However, nuanced analysis is needed that offers enhanced understanding of how and why competing actors gain authority through supporting a standard. Further than this, the context in which standards are used on an everyday basis can be shown to contribute to or undermines their legitimacy. So, for example, in the empirical material in Section 4.0 below, the extent of shared meanings around key themes are unravelled: 1) meanings and the CE, 2) markets and the CE and, 3) standards and governance. From a neoliberal environmental governance perspective, the lack of a powerful political authority, i.e. a central or regional state body, means that ambiguity and contestation can emerge with standard setting and adherence. Businesses, hampered by real-world considerations of economic advantage, may not ‘rationally’ cooperate and instead choose to use (or not use) standards only in a pragmatic way. Such outcomes would suggest that plans for upscaling and transitioning CE activities from niches to regimes may be more problematic than has so far been realised.

3.3 Theorising Transitional Change

The CE requires flows of materials. Its development is caught up with a neoliberal approach to environmental governance because of the speed and distance with which materials travel around the globe. Increasingly underpinning trade in materials are standards because they

provide a reassurance on quality of materials so that they can become an input to the next link in an ideally closed loop supply chain.

When examining the neoliberal environmental governance of material flows there are multiple actors and multiple scales. It is therefore necessary to have a theoretical approach for a multi-level sustainability transition with waste and resource management. One perspective involves 'transition pathways' which are identified from novel configurations of socio-technical activity in micro-level niches (Kemp, 1994). Innovative growth structures based around actors, sectors and/or firms are protected in niches thanks to subsidies and/or other regulatory measures. As a result of ongoing co-evolutionary activity between a range of societal actors promoting complimentary and/or competing technologies, novel niche activity is thought to replace a regime or regime(s) at the meso-level. The regime represents the 'rules of the game' set by institutions and this includes standards. Ultimately, as entire regimes are replaced, the 'system' shifts from a linear approach to waste and resources management to a circular one (cf. Kemp, 1994). This systems perspective on transitions has specific implications for standards, the CE and neoliberal environmental governance. Approaches to multi-level governance suggest that key actors use their power and influence to gain legitimacy for their specific positions with regard to how they are governed. While such debates occur within the public arena, much standard setting takes place away from the public gaze. The standards that emerge from such deliberations then have a degree of path dependence which impacts upon later deliberations and framings amongst all actors as to how they wish to be governed.

In the next section, the results of this investigation into standards and standard setting linked to the CE are presented. As one moves further from the core tenets of this neoliberal framework, so the ability to govern the CE through legitimating processes including standards becomes more contested. In the first section below, about standards and the CE, results are most contested because a novel policy area is tackled where agreed meaning is yet to emerge. In the following sub-section on markets and the CE, increasing coherence around practitioner-led perceptions of the CE's economic utility for actors is demonstrated. In the final sub-section on standards and governance, the greatest potential levels for shared meaning are found thanks to the overlapping institutional commitments to neoliberal environmental governance.

4.0 Results - Standards and the CE

Understanding neoliberal environmental governance and the implications for the transition of the current system of waste management to a CE critically depends upon how standards are being socially constructed and tested. It is the larger and more vertically- and horizontally-

integrated waste and resource companies in conjunction with other influential actors, including state bodies and NGOs, who are taking a lead and setting CE standards in response to regulatory and reputational pressures. While the comments below largely reflect the views of the larger companies, some input came from smaller operators keen to engage with standards.

4.1 CE Meanings

Key actors consider standards linked to material flows by continually constructing, contesting and reconstructing their own interpretations of CE activity. The transition to a CE has so far involved high-level ambitions from national and supranational governmental bodies. This action has come at a time of increased promotion of knowledge about the CE from think tanks, NGOs, charities, academics and private companies (see Appendix A for data on the rising numbers of academic publications). Together these actors have been setting out the content and meaning of the CE at a policy level. Key meanings of what CE activity is have been presented by several leading bodies. These include the Ellen MacArthur Foundation (EMF) which states that:

> "A circular economy is an industrial system that is restorative or regenerative by intention and design" (EMF, 2012, 7).

The EC picked up on this work of the EMF and went on to define a CE as:

> "[one] where the value of products, materials and resources is maintained in the economy for as long as possible, and the generation of waste minimised" (EC, 2015)

Both the EMF and EC's activities have in turn informed the CE definition proposed by the British Standards Institute in 2017 with the world's first CE standard (BS8001):

> "A more circular approach seeks to decouple economic growth from resource consumption" (BSI, 2018a).

What these evolving definitions have in common is a systems approach to the flows of materials, the suggestion of positive economic benefits for organisations engaging in CE activities and the coordination and design of new markets. However, it would be a mistake to assume that convergent understandings of CE are playing out in a straightforward fashion within the waste and resources sector (cf. Gregson et al, 2015; Homrich et al, 2018; Korhonen et al, 2018). Instead, an exploration of how the CE is understood by different standard users

gives an indication of the broader shifts in environmental governance in recent decades and the difficulties that may arise with an evolving CE in the future.

Other actors have indicated their scepticism of the CE and the activities it requires. From the UK, industry actors point to a lack of understanding as to what the CE might mean, highlighting a gulf between the thinking of larger companies and policy makers and much of the industry. One interviewee noted that: "the circular economy, is … essentially all things to all people" (Interviewee B1). Whilst for another:

> "[R]elatively few people in the waste management industry can honestly say they could even articulate what the circular economy [is]. I think people in the waste sector tend to use it as a euphemism for the waste hierarchy." (Interviewee A3)

Another industry actor suggested that key bodies were more interested in traditional waste management practices than promoting something novel:

> "[The Department for Environment, Food and Rural Affairs (DEFRA)] and the Environment Agency, for example, those kinds of organisations, are, really waste-y, so you know, unless and until they can look across the economy, they will tend to regulate the end of pipe and not think [of] ... the circular economy." (Interviewee A3)

These more sceptical comments indicate that the normative direction of change towards a CE is being led by EC policy. While the EC works with the larger industry actors, NGOs and the standard setting bodies, there are significant queries about the costs of moving to a CE via standards amongst a broader range of waste and resources actors. As with any transition, there is a fight for legitimacy over the likely costs and benefits. This normative shift requires broad realignment not just in terms of actor practice but also in terms of knowledge resources and thinking (cf. Homrich et al, 2018). Actors want tangible evidence of the financial benefits of the CE, and using standards to get there, before committing to change (Velte et al, 2018). This activity suggests that the future evolution of CE secondary markets will depend in large part on enrolling some very sceptical actors hesitant to realign their business practices. A sociology of knowledge approach allows researchers to discern the diversity of meanings around the CE. This matters because, without a dominant narrative or a shared consensus emerging, then CE debates will be riven by conflicting meanings and rival coalitions of interest (cf. Latour and Woolgar, 2013). CE activity is then reflected in the ways in which key actors perceive relationships in the marketplace.

4.2 Markets and the CE

The relationship between standard setting and increasing global trade is one of the main outcomes of a neoliberal system. With increased global, Pan-European and regional trade multi-faceted environmental impacts and goal conflicts are becoming more apparent, particularly in terms of barriers that may emerge to the development of the CE and hence moving towards more sustainable development. How these issues are taking hold at a range of scales is briefly explored below.

4.2.1 Global trade, markets and standards

The burgeoning growth in the trade of materials worldwide is in part facilitated by the growth in standards (see Figure 1). The global trade in materials represents an upscaling of the CE. It depends upon materials being able to flow to markets for reuse and recycling so that they can be drawn back into productive use. Standards and neoliberal environmental governance are, though, subject to periodic contestation and challenge, sometimes using their own instruments. For example, China which has been a key destination in the international trade in waste has become increasingly concerned at the poor quality material that it imports and that this has detrimental effects on local environments. In 2017 and 2018 the Chinese government decided to strengthen the supervision of solid waste from source by raising further the quality standards for the importing of waste and applying them to a wider range of materials (Moore, 2017a, 2017b). This has significant consequences for European, North American and Australasian companies engaged in the waste trade who find it much less easy to access a key market as their materials will often fall below the quality threshold of the Chinese standard. According to one Chinese interviewee who is involved in standard setting:

> "When the Chinese raised the quality standards it would surely affect other countries' [standards and waste] systems. Why do foreign countries complain a lot about Chinese standards raising? It is because they need to adjust their standards and waste systems to the new demands of the new Chinese standards. … [M]ainly the packaging and recycling facilities would have to be upgraded to fit the new 0.5% quality threshold." (Interviewee CH2)

The introduction of higher waste quality standards in China has had three key consequences. For some, waste companies and traders it has led to a search for new, cheap markets in which waste can be disposed of, for example, in Malaysia and Indonesia (*Sky News*, 2017; *Economist*, 2017); for some countries, such as Thailand and Vietnam that feel they have become the targets for the exporting of waste displaced from China it has led to a ratcheting up of their own standards (*Reuters*, 2018); and for some companies it has resulted in greater

efforts to improve the quality of waste materials as this will be where the greatest market opportunities can be gained (see 4.3.3). Nevertheless, China's actions, suggest that normally voluntary measures can effectively become regulatory. They also make it clear that the use of standards is not politically neutral as some proponents profess and it becomes clear that the Chinese state is not holding back in its desire to protect its own niche CE activity and so make its transition as rapid as possible.

In terms of the sociology of knowledge approach pursued here, this market evidence suggests that standards, in the context of CE activity, can be used in different ways. Western standards are voluntary and gain strength through actor enrolment whereas in China standards are being interpreted highly politically as an alternative tool to help avoid poor quality imports.

4.2.2 Europe, standards and markets

Standards are central to the activity of markets in terms of trust-building and quality control. From a policy perspective, the role of standards in the CE is very clear at the moment for those working on circular practices in Europe:

> "[Standards] facilitate trade … When you adopt European standards … it means that these standards are going across the trade routes … and that helps to remove the trade barriers in Europe. If these standards are adopted abroad … then they will have more of a relevance, which helps the European industry." (Interviewee F2)

Facilitating the growth of markets in Europe requires borderless movements and the development of new secondary markets in recycled materials. A European policymaker suggests that standards are central to growing secondary raw materials markets in a CE:

> "[Y]ou cannot have a secondary market for raw materials if you do not have a set of interlinking standards. You need a quality standard for recycled material, which is linked to very clear quality standards for the products that incorporate those materials, which is linked to quality standards for virgin materials." (Interviewee A2)

Companies therefore are prepared to regard standards as part of the currency of trade:

> "[I]f you like ... standards are sort of [the] ... formalisation of the market supply chain message." (Interviewee B1)

However, striking an agreed balance between regulatory and voluntary activity within an evolving CE is key to hoped-for growth and development. Where that line should be drawn is currently disputed depending upon the specific industrial activity. For example, "[T]he paper industry continues to believe that it should be the arbiter of the quality of the material it receives, and not other elements of the supply chain" (Interviewee C2). Another interviewee suggested that while standards have a place, it is the markets that decide what is traded and what is not:

> "Ultimately the market will dictate … As long as you're supplying material that is legally compliant, then the [company] has a choice of whether to buy it or not. You know if they don't like the material, they don't buy it, if they do like it, they do buy it. If it's not the greatest material then they might pay less for it, if it's great material they might pay a premium for it. But the market sort of tends to regulate itself." (Interviewee C3)

Without state-led buy-in and political champions of CE, sceptics can continue to suggest that little realignment of actors' thinking and practice (i.e. a new transition pathway from niche to regime) will occur. Standards, they say, will support a transition – but cannot challenge the fundamental operation of the marketplace in deciding change.

4.2.3 UK standards, markets and trade

In the context of increasingly neoliberal environmental governance, the UK based BSI have tried to use a new CE standard in order to facilitate a realignment of waste management practices which includes the creation of new markets for materials. The initiative was supported in part by the Department for Business Energy and Industrial Strategy and a BSI-led group of actors including, for example, the EMF and the Chartered Institute of Wastes Management (CIWM). Unlike previous product and process standards, this new framework was intended to encourage broad industrial participation in a principles-based standard. After an 18-month stakeholder consultation, BS8001 appeared in July 2017. It claimed to be:

> "[the] first practical framework and guidance of its kind for organizations to implement the principles of the circular economy … It is intended to apply to any organization … It provides practical ways to secure smaller 'quick-wins', right through to helping organizations re-think holistically how their resources are managed to enhance financial, environmental and social benefits." (BSI, 2018a)

Whilst one argument is that this guidance standard comes too early to be useful given the early development of the CE, others have praised the enabling potential of this flexible

approach. One interviewee, for example, suggesting that BS8001 as a voluntary framework should not be pursued without broader regulatory provisions in place: "I think … 8001 will be important, [but] it needs underpinning … with proper legislation" (Interviewee C2).

Tensions between the role of government and markets is developed further in the next sub-section.

4.3 Standards and Neoliberal Environmental Governance

Amongst the interviewees there was an overwhelming, and largely uncritical, acceptance – a shared interpretation - of a neoliberal approach to environmental governance of waste and resources. This is reflected in their comments below which are organised around three themes: setting standards, business and government, and power and legitimacy.

4.3.1 Setting Standards

There was common agreement amongst the interviewees that business interests were to the fore in the setting of standards (Interviewees A2, F1, F2). This important point was made in the knowledge that a wide range of others actors (such as NGOs and academics, for example) might be involved in deliberations on standards. And, not surprisingly, therefore, standards tend to support the market strategies of those bigger corporate actors with the resources to participate in standard-setting exercises. This degree of self-interest in standard setting has important implications well beyond a product, a process or a principle. As one interviewee noted: "I think that there is a growing population of economic actors that sees standards … as a policy tool" (Interviewee A2). This interviewee went on to point out that even when efforts are made to make standard setting inclusive industry voices dominate:

> "[O]n the civil society's side, there are serious resource constraints for getting involved in standardisation discussions … [T]he level of technical knowledge and know-how is very ... high, and very often civil society doesn't have the resources to really engage … [T]here is … quite an imbalance in the standardisation work between the amount of resources that industry … can and will put into it, and what other actors can put into it" (Interviewee A2)

With industry to the fore in identifying topics for new standards and the content of those standards, government can often appear to be lagging. Standards instead appear to be being used by both the state and industry as a way of providing public policy through private means, as examined in the next sub-section.

4.3.2 Business and Government

Three leading European CE actors cited here – the BSI, the EC, and the EMF – all promote a win-win partnership between the state and industry (BSI, 2018a, EC, 2015, EMF, 2012). Delivery of the desired outcomes for a sustainability transition towards a CE increasingly has to rely on voluntary standards. This is demonstrated by the BSI's promotion of the CE principle-led standard. For these and other key CE actors, there is implicitly and/or explicitly a subscription to a neoliberal environmental governance approach:

> "[I]n a political situation where we want to only have public policy intervention if this is an added value and where we want to focus as much as possible on allowing for dynamic standard setting by collaborative action, I think there is a clear coming together between public policy and economic actors, to try to see how much we, how can we achieve things through standards. I think that's an obvious area of common interest." (Interviewee A2)

The EU, meanwhile, is even more explicit about the roles of state and non-state actors in a CE transition (Gregson et al, 2015). They are key to the process:

> "Economic actors, such as business and consumers, are key in driving this process. Local, regional and national authorities are enabling the transition, but the EU also has a fundamental role to play in supporting it." (EC, 2015)

The BSI with its practical guidance aimed specifically at the private sector suggests that:

> "[The CE] enables [companies] to *capitalize on cost savings; unlock new revenue streams; and make themselves more resilient* to external shocks and disruption" (BSI, 2018a, italics added)

This sort of language and these sorts of messages have appeal to most corporate actors when interviewed about the prospects for the transition to a future CE, for example:

> "[O]ne of the things that we recommended … was that Government back off even further and leave even more of this policing to formal standards … there is very much ... an opportunity in that space for the state to have to do less." (Interviewee B1)

However, there were some dissenting voices that argue for more government intervention to help get novel CE practices out of their niches and into the mainstream:

> “[I]f we're talking about implementing a circular economy, you know proper circular closed loop sort of resource base, then I think the Government needs to take a strong hand” (Interviewee C2)

These mutually-reinforcing exchanges suggest a shared perspective and mutuality of benefits of a CE from the interviewees. The state appreciates the lighter administrative costs while industry appreciates lighter touch regulation. However, an effective transition to a CE, at whatever scale, does require governmental intervention in order to support, protect and align – at least to some degree - the new CE activities as they emerge from niches and ideally move towards supplanting the current linear waste and resources regime. This suggests that the role of standards in this hoped-for transition may yet be more problematic than anticipated because of the way that markets – and not the state - are broadly perceived by actors to dominate the way the CE may develop. In this sense, quality assurance of material flows will be central to CE market development given the way several interviewees suggest that it currently matters less than cost. However, such CE activity is unlikely to take place at all if a dominant narrative does emerge from early contested perspectives.

4.3.3 Materials, Quality and Standards

Part of the claims for the effectiveness of standards is that they work with the grain of the market as they help to foster trading relations. Within a CE framework trade and standards should therefore also be improving the quality of materials. For some of the interviewees, though, standards were perceived to be marginal in improving quality and securing markets. In part, interviewees’ perceptions depended on the markets that they operate in and their positions within supply chains. For example, there was a general view that the closer businesses were to the consumer, then the more standards were likely to matter. So, for one business leader, market conditions matter more than standards when it comes to the quality of materials that they trade in. The interviewee pointed out that: “[I]t's no coincidence that you get more [quality] rejections in an over-supplied market than you do in an under-supplied market." This interviewee continued to say that quality: “is generally more of a commercial decision rather than a standard decision." (Interviewee C3)

There is increasing attention being given to how the quality of recycled materials can be improved to further stimulate domestic and European market development. In the UK, unlike Germany, for example, there has traditionally been little interest in the sorting of waste as this has been regarded as costly and unnecessary since markets were available for low value waste (e.g. China). Now, though, there is much greater interest in the quality and homogeneity of plastic materials as this will provide more market opportunities (Neidel and Jakobsen, 2013,

10). Many plastic recycling companies are dependent on the materials provided from Municipal Solid Waste, that is household and commercial waste. Once it has been collected plastic waste can be sorted into different types, such as film, rigid plastic or PVC. There are also efforts to refine waste sorting, particularly into polymer type (e.g. PET). For one small plastic recycling company in Wales, UK, Polymer Extrusions, the quality of the material that they receive is essential: “Separation [of different types of plastic] is key to the value of recylates” (Polymer Extrusions’ presentation to CIWM Annual Conference, 23 March, 2017). This is because the company is able to take plastic waste and reprocess it into reusable compound pellets. For a product to be reusable it has to meet the specifications of customers. This happens in two ways: individual customers can specify the quality of the product or they can work to international standards. There are about 12 European standards for waste plastic quality and they either specify the quality of material that is used in reprocessing (i.e. the input) or the output (e.g. pellets/flakes) (Neidel and Jakobsen, 2013 12) for product that can then be used by those who wish to convert the plastic into an end product. Increasingly plastic recyclers are concerned with the quality of their input as that directly influences the quality of the output and market opportunities.

Addressing both quality of product and market opportunities can be problematic for particular materials. For example, one interviewee reflecting on the challenges of introducing recycled plastic to milk cartons in the UK, noted that:

> “there were difficulties in raising the quantity of recycled HDPE [High-Density Polyethylene] going into new milk cartons because if you increased the recycled content of our HDPE, recovered from really advanced recycling plants, there was a point where the milk started to look a tinge of greeny-blue because the little bit of cap plastic getting into the separated clear HDPE was enough to give it a slightly green tinge, and that was a blocker for transitioning to higher levels of recycled content.” (Interviewee E1)

The problem was overcome by using an ink type that was much easier to wash out when plastics were recycled. This meant that the HDPE plastic no longer tinged the other plastics thus reassuring consumers that milk was fresh.

Other recycling and reuse organisations based in the UK were rather more sceptical that standards were having a positive influence on material quality: “I think what you see happening is that the market has grown, and enabled recycling to grow in the UK without quality improving” (Interviewee B1). Another suggested that: “[P]eople who would like to do

reprocessing in the UK have been arguing for a while that quality is too low and it needs to be raised … [D]o we actually adhere to [standards] and refer to them on a day to day basis? No we don't." (Interviewee C3)

For proponents of standards, raising quality with waste and resources matters. Standards help to increase the confidence and trust that actors can place in existing and new markets which aids economic growth and development as well and this underpins the hoped-for transition to a CE. This optimism is currently not being more fully reflected in all quarters because the markets privilege cost over quality. In this context, standards can often appear to be peripheral.

5.0 Discussion and Conclusions

The application of the sociology of knowledge approach to neoliberalism that is adopted in this study to analyse the CE and the part that standards play in the development of the CE has shown considerable value. The CE, as currently configured in its emerging evolution, is inextricably entangled with a range of institutions which are claiming legitimacy via the framing of knowledge and formation of standards. This analysis has enabled an understanding that delves beneath the surface of thinking and practice on the CE to show where there is a shared understanding and where there is contestation. Unpicking areas of consensus and disagreement matters both for the immediate future of the development of the CE and also for an understanding of neoliberal environmental governance. A reassessment of the role of standards in environmental governance shows rather than treating materials and scale as unproblematic, the ways that they are involved in the upscaling or down-scaling of markets, needs detailed analysis. In the context of understanding how the CE is conceptualised at a range of scales - and how neoliberal environmental governance can help or hinder CE development – the analysis here matters to the emerging epistemological mapping of this area of new knowledge (cf. Homrich et al, 2018).

A key feature of standards is that they create spaces that reduce uncertainty. For markets, where there is clearly a temptation to continually expand spaces, standards help create new business opportunities and to underpin trade (Guéneau, 2018). This matters for the flow of materials and, therefore, the scales at which the CE might be realised. The greater the flows of materials and the more they involve distant partners in a CE network, then the more globalised the notion of the CE that emerges. Standards, though, are also about a sharing of knowledge. To be useful in practice, standards users must have common understandings and practices. The day-to-day business of neoliberal environmental governance requires the ongoing acceptance of an established repertoire of practices, such as the use and diffusion of

standards. More than this, though, the continuing validation of neoliberalism requires that it can demonstrate its authority in tackling public policy challenges. Widespread concerns over the production and disposal of waste raise a challenge to the further legitimation of neoliberalism (Heynen et al, 2007; Pellizzoni, 2011).

In this study, how a neoliberal approach to the governance of the CE seeks to gain legitimacy and the challenges that it faces has been scrutinised. At the core of the neoliberal project, considerable shared meaning is found amongst key actors as to the role of government, markets and standards (Section 4.3). Industry is to the fore in standard setting and have considerable self-interest in ensuring that standards are perceived to succeed. Government too, is keen to promote a win-win relationship with the private sector in the promotion of the CE: governments can justify their reluctance to intervene in markets, and businesses can repay the faith in light-touch regulation by seeming to deliver on public policy goals (in this case a more circular economy). Perhaps the one challenge to a core element of standards and neoliberalism is in relation to the potential to raise the quality of materials that are being used and reused and which are essential. Here there is a strong feeling that markets for materials are more concerned with cost than quality. This is an indication of the messy world in which standards operate, on a day-to-day basis their value can be much more contested than is often appreciated. That contestation over standards and the CE increases as one moves further from the core elements of neoliberal environmental governance and into CE practice.

The second theme that was scrutinised was Markets and the CE (Section 4.2). Here the interviewees recognised how standards could help to promote trade. Standards are increasingly prevalent in the global economy. They are seen as a key means of making a transition to a CE. In this context of neoliberal environmental governance, the analysis presented here suggests that the delivery of such a transition in waste and resource management will be problematic at a range of scales. In practice, the use of standards is complex and contested. For example, China utilises standards as part of its regulatory armoury, in Europe standards are part of borderless trade, while within the UK, the formulation of a standard to promote the CE is to assist market development. The case of China apart, though, there is a tension at the heart of Western approaches over what role government should play in nurturing a CE: the EU, for example, is seeking to steer development of the CE, while the UK is more sympathetic to business-led initiatives such as from BSI and the EMF.

Standards only remain legitimate, they only work while key actors recognise their value (Loconto, 2017). As was shown in the analysis of how key practitioners understand the CE

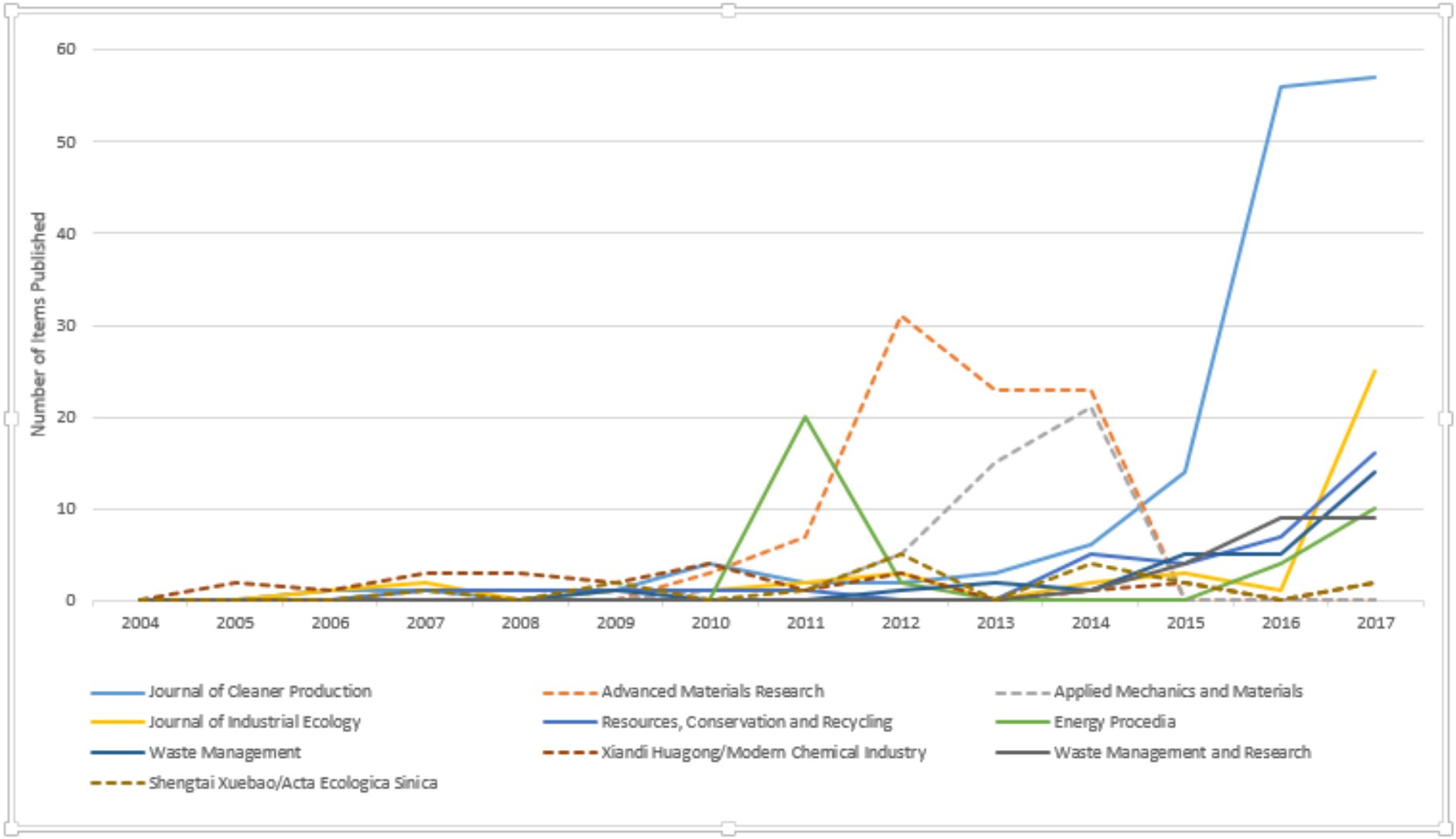
(see Section 4.1; see also Kirchherr et al, 2017), there is considerable controversy surrounding the meaning of a CE in practice. The high level rhetoric of policy makers, NGOs and some corporate actors is not wholly shared by those working within the waste and resources and sector. For the latter, there is a belief that at present the CE involves little or no change to current practices or thinking. On this view, standards contribute to the smoother working of a waste economy but do not help in a transition to a CE. The use of standards is complex and contested. Shared meaning making in the standard setting process and in CE practices can create and recreate co-construct and reproduce a legitimated framework for neoliberal environmental governance. The further one moves from the core beliefs of neoliberal environmental governance and the closer one gets to (emerging) CE practices, so contestation amongst key actors over becomes more noticeable. A voluntary approach to environmental regulation does not mean – and cannot impose – uniformity or consensus amongst key actors. That shared meaning has to be constructed over time. Without the authority of government to the fore, standards and the practices associated with them are continually being constructed and reconstructed by more powerful actors as they seek to move towards a sharing of knowledge amongst a wider community. At a time when transition to a more resource-efficient economy may be on the cusp, there is currently a degree of contestation around the meaning and utility of standards. Their practical application and voluntary nature can run up against market rules and the self-interest of market actors.

Studying standards when flows of traded materials are moving from a predominantly linear model to a more circular one, provides insights into the challenges of public policy delivery in the neoliberal model. Analysis suggests that there is a lack of legitimacy for the activities of many private waste and resources actors. One contributor suggested that: “[T]here can only be a level playing field if there is some degree of public support for the input provided by civil society into that process." (Interviewee A2). In this way, as public policy becomes increasingly private, so questions of trust and legitimacy come more to the fore for civil society activists. This matters for the CE because, as a system-level change, it cannot be realised by private actors working in isolation.

Ultimately, there is a strong challenge to neoliberalism as it seeks to promote a transition to a CE. The role of the state in seeking to coordinate but not necessarily manage transitional change from novel niche practices to mainstream regimes is problematic. There is evident tension between those actors professing high ambitions for normative change and the reality of those involved in the actual work of aligning and realigning corporate interests and activities. This analysis suggests that if the CE is to happen with the pace and ambition that its advocates hope for, then it needs to challenge the orthodoxy of neoliberal environmental governance in

the early shift from niches to new regime. This challenge involves a rethinking of how policy instruments, such as standards, operate so that they can be used to challenge existing market relations rather than simply follow them.

Appendix A: Academic Publications Citing the term 'Circular Economy' (note Chinese publications' data is dashed)



sources: Scopus/Web of Science

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[i] Web of Science specialises in social science. Scopus is more comprehensive with the natural sciences. Google Scholar data was not considered reliable enough for this study.