Transitioning towards circular systems: property rights in waste

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TRANSITIONING TOWARDS CIRCULAR SYSTEMS: PROPERTY RIGHTS IN WASTE

Abstract

Purpose

The purpose of this paper is to explore the impact that property rights can have on the implementation of circular waste economies, in which waste is reused, recycled or recovered, within the European Union's Waste Framework Directive.

Design/methodology/approach

A theoretical lens is applied to the legal definition as well as production and treatment cycle of waste to understand the property rights that can exist in waste.

Findings

This paper argues that even though different property rights regimes can apply to waste during its creation, disposal, and recovery, the waste management regulatory and legal system is currently predominantly set up to support waste within classic forms of private property ownership. This tends towards commodification and linear systems, which are at odds with an approach that treats waste as a primary wanted resource rather than an unwanted by-product. It is recommended that adopting state or communal property approaches instead could effect systemic transformative change by facilitating the reconceptualisation of waste as a resource for everyone to use.

Research limitations/implications

The property rights issues are only one dimension of a bigger puzzle. The roles of social conceptualisation, norms, regulations, and policies in pursuing circular strategies are only touched upon, but not fully explored in this paper. These provide other avenues that can be underpinned by certain property regimes to transition to circular economies.

Originality/value

The literature focused on property rights in waste has been very limited to date. This paper is the first to consider this question in detail from a legal perspective.

Keywords: circular economy – waste – property rights – European Union

1. Introduction

The circular economy concept promotes measures to reconceive would-be-wasted materials as resources rather than unwanted goods. In essence, it is an economic system based on the reuse, recycling, and recovery of materials to achieve economic prosperity, environmental protection, and social equity (Kirchherr *et al.*, 2017). The cited environmental, social, and economic benefits of the circular economy include the creation of local jobs, opportunities for social integration, reduced carbon dioxide levels, and simultaneously the minimisation of the use of virgin materials and of the environment as a sink for waste (European Commission, 2014). The concept has therefore gained momentum in academia and industry (Geissdoerfer *et al.*, 2017; Kircherr *et al.*, 2017), and has been implemented and integrated in European Union (EU) laws and policies such as the Waste Framework Directive (WFD) and Circular Economy Package (European Commission, 2020).

Despite their promotion and the often-celebrated benefits, the actual implementation of circular approaches is "limited and fragile" (Gregson *et al.*, 2015: 218). Environmental legal initiatives for dealing with waste tend towards an 'end-of-life' approach (Technopolis Group *et al.*, 2016), which is linear and horizontal. The legal objective of preventing waste in laws occurring

through design initiatives (such as in the WFD), while growing stronger, is still in its infancy and, with supply chains girdling the earth, this will continue to present a significant challenge for the foreseeable future. It becomes necessary therefore to consider how the law can be used to drive this approach and in this paper we present one approach which we argue is capable of changing perceptions and therefore responsibilities and obligations towards that thing called 'waste'. We argue that a changed perception of property rights in waste is one component which can underpin incentives for circular approaches; property rights in waste can reinforce and influence the management of waste. We base this argument on the notion that with ownership, whether private or public, comes obligation.

This discussion is not only timely in relation to the growing traction of the circular economy concept, but also because of the continuing discussions on property rights for the efficient environmental management of resources (e.g. Johnson, 2007; Barnes, 2009; France-Hudson, 2017). A key pivot in this debate was Hardin's (1968; 1981) original argument that privatisation or government intervention is needed to prevent the tragedy of the unmanaged commons. It stipulates that every individual, acting independently and rationally according to their own self-interests, will try and reap the greatest benefit from a resource, thereby depleting the resource and behaving contrary to the best interests of the whole group (Hardin, 1968). Hardin (1968: 1245) applied this tragedy within the context of waste: "The rational man finds that his share of the cost of the wastes he discharges into the commons is less than the cost of purifying his wastes before releasing them". Even though many scholars have echoed the need for individual private or state property based on arguments of incentives (Burger and Gochfeld, 1998), there are also many critics who argue that other successful institutions exist that manage the commons and fall between these types of property (e.g. Feeney *et al.*, 1996; Ostrom, 1999). Indeed, Hardin (1991) himself later acknowledged that his approach was overly simplistic. These debates and discussions have been applied within numerous contexts – for example, in relation to water (Lange and Shepheard, 2014; Malcolm and Clarke, 2018) and fisheries (Berkes, 1987). Similar discussions concerning the appropriate nature of property rights are warranted within the context of waste because of its current negative economic, environmental, and social impacts and the opportunity for positive impacts within circular economies (Steenmans *et al.*, 2017). These have so far been given "little consideration" in the literature (Hobson, 2016: 96), though some notable exceptions exist (e.g. Steenmans *et al.*, 2017; Thomas, 2019).

Thus, the particular question we investigate is: what impact can property rights have on the implementation of circular waste economies? We address this question within the context of European Union (EU) waste law and using some examples from England to demonstrate national implementation.[1] First, Section 2 sets out how we understand property rights, although a detailed exposition of different conceptual lenses of property rights is outside the scope of this article. In Section 3 we consider the current property rights in waste within EU waste law. Section 4 discusses the implications of these property rights for facilitating transitions towards circular economies. Section 5 concludes.

2. Conceptual characterisation of property rights in waste

[1] The United Kingdom left the EU in January 2020 (termed 'Brexit'). This research was undertaken before Brexit and currently the United Kingdom remains subject to the WFD until at least 31 December 2020.

Property is an abstract man-made concept (e.g. Macpherson, 1978), which is perceived in different ways. Here we focus on property to describe the nature of the rights in waste to facilitate understanding of different use and management rights and responsibilities (e.g. Clarke and Kohler, 2005). We further view the concept of ownership as a useful mechanism to impose obligations on named groups in respect of the resource that is currently viewed as waste to transition to a circular economy, and adopt Waldron's argument that ownership "expresses the abstract idea of an object being correlated with the name of an individual" (Waldron, 1988: 47). On this basis, we go on later to argue that ownership of waste should be in the hands of the community rather than following the liberal tradition which tends to focus on private property. To support our argument we start by viewing waste through the conceptual lens of property rights and use the 'bundle of rights' approach (e.g. Becker, 1977; Munzer, 1990).

Many property scholars' histories and descriptions of the bundle of rights begin with Hohfeld and his analysis of rights, even though it is acknowledged that he neither originated nor used the metaphor (Heller, 1999; Baron, 2014). Hohfeld distinguished between four kinds of entitlement that are commonly and indiscriminately subsumed under right (claim-right, privilege, power, immunity) and expresses these in a scheme of opposites (no-right, duty, disability, and liability respectively) and correlatives (duty, no-right, liability, and disability respectively) (Hohfeld, 1913). Hohfeldian rights are often combined with Honoré's analysis of ownership to help further shape the concept of ownership and bundle of property rights (Heller, 1998; Munzer, 1990; Hubin, 2013). The incidents listed by Honoré in terms of the Hohfeldian cluster of rights are: the claim-right to possess, manage, or receive income; privilege to consume or destroy; powers to waive, exclude, abandon, or transfer; immunity from expropriation; duty not to use harmfully; liability for execution (Honoré, 1961; Munzer, 1990; Barbanell, 2001). The bundle of rights metaphor is open and flexible (Quigley, 2007), but simultaneously can be vague (e.g. Becker, 1977; Hubin, 2013). It has therefore been criticised (e.g. Gray, 1991; Merrill and Smith, 2011), but it is generally accepted (even by its critics) that it can be a useful analytical tool (Ellickson, 2011; Smith, 2012). We use this tool to facilitate analysis and understanding of the nature of rights in waste throughout this article, as well as ensure linguistic precision when describing rights.

The bundle of rights can exist in different combinations. We apply the property rights regimes: private, communal, state, and no property, and use some of the rights introduced above to distinguish between these regimes. Other property theorists have also adopted these (or similar) categories (e.g. Clarke and Kohler, 2005; Waldron, 1988). This characterisation is not without its limits as it arguably "renders invisible many new forms of property" (Heller, 2000: 417), but again it can provide a useful analytical device as long as it is acknowledged that the boundaries "fray at the edges" (Heller, 2000: 418). The four categories of communal, private, no, and state property are described below in relation to waste using Hohfeld's terminology (Clarke and Kohler, 2005; Resta 2017).

Communal: The concept of communal property can be traced back to the Roman law category of *res communis* (or *res communes omnium*) (Schermaier, 2009). This concept had disappeared in some civil law systems, including in Germany and Italy, but has recently experienced a resurgence and has been re-introduced in some systems (Resta, 2017). For example, in Italy the Rodotà Commission introduced *beni communi* (common goods) as a category of property to sit between private and state goods (Marella, 2017). In England communal property is an established, ancient institution (Hoskins as cited in HL Deb, 1959).

Res communis is often considered in, for example, the context of the open seas (or space) where it can be linked to natural law (Mickelson, 2014). Here we are focussing on property rights in and ownership of a chattel which arguably sits in a different context to arguments about the location of natural ecosystems such as the open seas or air. Waste is a commodity which is most commonly unwanted. If viewed as communal property, then, in applying the bundle of rights metaphor, every member of the community would have (1) the privilege to use the waste and (2) a claim-right not to be excluded from it. Consequently, those not a member of the community have a correlative duty not to interfere with their access to waste. Communal property in waste could be open access (where everyone is a member of the community) or limited access communal property (where there is closed or restricted access to a limited community). Communal property comes about in different ways – some have historical origins, such as communal land in the Norman era in England (Juergensmeyer and Wadley, 1974), while others may come about through agreement, such as open access agreements between publishers and institutions to provide access to content. In respect of waste, we argue for the recognition of a new form of property right which we develop below.

No property: No property, or 'res nullius' or 'open access', is similar to *res communis*, in that it has its genesis in Roman law, when property belonging to strangers of the Roman Empire was considered to be no one's property (Phillipson, 1911; Ruddy, 1968). Everyone is at liberty to use the waste but has no enforceable claim-right to the use of it against others or the state. No property in waste can occur, for example, as a result of the nature of its physical properties when it leaves premises in the form of an atmospheric or aqueous emission, or is flushed into a watercourse. In such cases, waste is the ultimate externality, as the consequence (cost or benefit) of an (economic) activity affects other parties without this being reflected in market prices. There may be regulation that controls these types of emissions, such as carbon taxes, forcing the transactional cost of disposal on the manufacturer (e.g. Pigou, 1920; Libecap, 2009). The problem with such waste is not that *everyone* wants it when it is floating in the air or the river but that *no one* wants it, so the challenge is to persuade others of its value and to create a desire for ownership and/or control. Property rights are creatures of law so no property exists where there are no laws (Bentham, 1908).

Private: The liberal western model of private property ownership is the Blackstonian absolute dominion perspective where property is "that sole and despotic dominion which one man claims and exercises over the external things of the world, in total exclusion of the right of any other individual in the universe" (Blackstone, 1765-1769: ch 1, 2). The Blackstonian legal conception of property is thus concerned with rights in rem, property belonging to a single individual, and the power to exclude other individuals (e.g. Bell and Parchomovsky, 2005). One understanding of how private property comes about is Locke's labour theory. The Lockean perspective provides a good jumping off point as a sense-making device. But, we do not advocate that Locke's theory of property provides a complete solution to each of the issues identified in this article due to its contestability (Waldron, 1979; Sreenivasan, 1995).

Locke's starting point is that the earth and everything on it has been given "to mankind in common", and there must "of necessity be a means to appropriate them" (Locke, 1980: ch 5, s 25 and 26). The means identified by Locke is a person's labour. Locke (1980) says that by mixing our labour with the elements of the natural world it becomes that person's property. Locke's focus is the original acquisition of property rights from the stock of goods held in common (Judge, 2002), rather than the transfer or redistribution of existing property. In broad terms, therefore, the idea is that applying labour to 'unowned' (i.e. no property) or open-access communal property transforms what is unowned or communal into private property, enabling

the acquisition of property and forming a legitimate right to it (Locke, 1980). The idea of labour is, thus, essential to the establishment of ownership since it is a means of exploiting a resource, adding to its value and, ultimately, taking ownership of it. If waste is unowned (no-property), then recycling it would be an act of added labour transforming it into private property (see Section 3).

State: Waste as state property means that the waste is provided by or owned by the state (or any other public body). The power to exclude is therefore exercised by a state entity (Merrill, 1998). In such a property structure individuals can still be allocated use rights of various types, or even limited management or control rights, but not property rights in the sense that such rights would be personal to holders and not transmissible. State property in waste is common and occurs as a result of private waste being transferred into state ownership. This is largely facilitated by the conception of waste as an unwanted good.

3. Property rights in waste

Our arguments in this article concern materials at the end-of-life point as well as waste which is a by-product of an industrial process or created during use of the object – i.e. a fugitive emission. In order to understand how property rights in such waste operate in practice and their impacts, the waste cycle is depicted as a two-stage process illustrated in Figure 1 using terms from the EU WFD. First, waste is produced or created if an object ceases to be useful or if it cannot be prevented in a process. Second, waste is transferred to and managed through treatment operations: disposal (e.g. landfill, incinerations) or recovery (e.g. recycling, re-use). The former, disposal, is an undesirable option within circular economies. There is an (unlawful) alternative to these second stage operations, which is the abandonment of waste. The property rights in these stages are unpacked in the following subsections, using examples to illustrate that different property regimes and rights can and do apply at different stages.

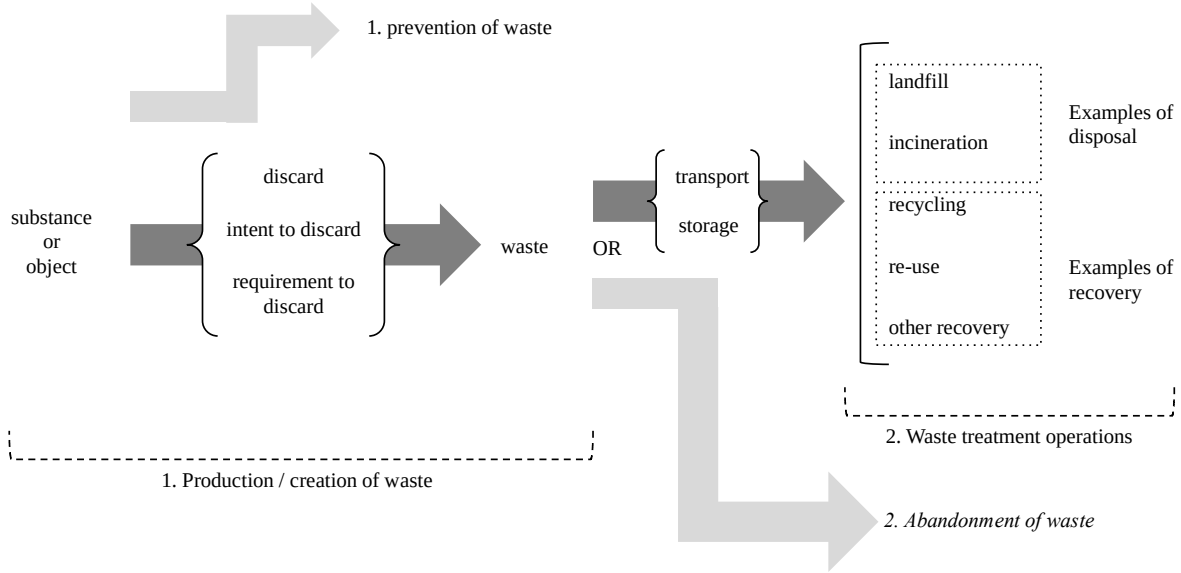

Figure 1. Simplified overview of the waste production and treatment cycle.

Before discussing the property rights in waste, waste needs to be defined. Waste is defined in Article 3(1) of the WFD, the cornerstone of EU waste law, as "any substance or object which the holder discards or intends or is required to discard". The number of cases (e.g. *Vessoso and Zanetti*; *Euro Tombesi*; *ARCO Chemie*; *Shell*) on the definition of waste together with the

discussion of their implications in the literature (e.g. Cheyne and Purdue, 1995; Van Calster, 1997; Scotford, 2007; Steenmans *et al.*, 2017) indicate the complexity of the definition. There is consensus across EU case law that waste should be interpreted widely rather than restrictively – for example, a precautionary approach is adopted when considering whether a substance is waste (*Shell*), the possible financial advantage of re-using the substance is irrelevant (*ARCO Chemie*), and a reusable residue can still be considered waste (*Euro Tombesi*). There is, however, some discrepancy in the understanding and impact of 'intent' in the definition. A wide reading of the Court of Justice of the EU (CJEU) judgment in *Vessoso and Zanetti* indicates that recourse to the subjective elements of the holder's intent appears to be excluded (Chalmers, 1995). The Commission nonetheless acknowledges that the concept of waste retains some degree of subjectiveness, which is likely to result in some ambiguity (European Commission, 2003). This has been evidenced in the *Shell* case where, in contrast to *Vessoso and Zanetti*, the CJEU took into account the subjective element of 'intent' in the consideration of the circumstances. This together with the lack of clear and definitive characteristics underpinning 'discard' results in some remaining ambiguity as to what waste is and when exactly it becomes waste. The impact is however limited as the definition is generally cast broadly (e.g. *Saetti and Frediani*; *Commune de Mesquer*), so if there is any uncertainty whether a substance or material is waste, it should be treated as waste. However, in order to determine property rights as part of our argument, it is important to be clear when the substance become waste.

The primary objective of the WFD supported by this definition is "to protect the environment and human health by preventing or reducing the generation of waste, [its] adverse impacts" (WFD, Article 1). There is thus a duty not to use waste harmfully in Hohfeldian-Honoré terms. This duty is explicitly linked to the circular economy in the objective; "and improving the efficiency of such use, which are crucial for the transition to a circular economy and for guaranteeing the Union's long-term competitiveness" (WFD, Article 1).

3. 1. Production of waste

To understand the property rights in waste, we need to first consider whether the WFD definition of waste and its objective facilitate understanding of the property rights in waste: does its definition identify who owns waste upon creation? The definition of waste refers to a waste holder, which is defined in Article 3(6) of the WFD as "the waste producer or the natural or legal person who is in possession of the waste". The claim-right to possess means to have exclusive physical control, or such control as the nature of the thing admits, of a thing. Possession is both "mundane and mysterious" (Smith, 2015: 65), with a variety of manifestations of possession existing across local jurisdictions (Smith, 2015). English law is, for example, procedurally more concerned with possession than ownership according to Clarke and Kohler (2005) – anyone who is in possession can seek redress from the courts if that possession is unlawfully threatened or invaded – because possession seen as mental and physical control (e.g. Douglas, 2014) is easier to demonstrate and prove than ownership (though this does not help inform or clarify the intention of the waste holder).

Waste producer is also defined in Article 3(5) of the WFD as "anyone whose activities produce waste (original waste producer) or anyone who carries out pre-processing, mixing or other operations resulting in a change in the nature or composition of this waste". Waste is thus either produced as a result of a process, or as a result of a pre-existing material transitioning into waste because of the holder's intent, action, or requirement of discarding (though note the effect of case law discussed above that it is not always the holder or owner that decides when a substance becomes waste). As stipulated in Article 16(3) of the WFD, the waste holder and

producer both have the duty to manage waste in a way that guarantees high levels of protection of human health and environment, and a duty to pay waste management costs in accordance with the polluter-pays principle (Article 14(1) of the WFD). Neither of these are defining characteristics of any of the communal, no, private, and state property regimes, so all four may apply, though in practice most household and commercial wastes are private property and no property in waste is unlikely to exist (except in nature), even though it may be perceived as possible, as a result of the prohibition of the abandonment of waste (see Section 3.3).

3.2. Waste treatment operations following discarding of waste

The discarding of waste will usually lead to waste treatment operations, defined as any "recovery or disposal operations" (WFD, Article 3(14)). Recovery operations are where waste replaces other materials (WFD, Article 3(15)), and include re-use, recycle, or other recovery processes such as waste-to-energy, where re-use "means any operation by which products or components that are not waste are used again for the same purpose for which they were conceived" (WFD, Article 3(13)). If it is reusable it cannot be waste according to the definition; re-use of a material is arguably a form of prevention because re-use means no waste is created. Waste can be recycled, i.e. "reprocessed into products, materials or substances whether for the original or other purposes" (WFD, Article 3(17)). The last resort for waste treatment operations should be disposal according to the waste hierarchy, which sets out the priority order for waste prevention and management (WFD, Article 4(1)). Disposal covers "any operation which is not recovery" (WFD, Article 3(19)), including landfill, incineration, and other operations listed non-exhaustively in Annex I WFD (WFD, Article 3(19)).

In most instances, treatment operations will often involve (contracted) dealers, brokers, collectors, and transporters to transport waste from where produced to place of treatment. For example, in England, the contexts may vary, but the principles stay the same: the property owner (e.g. household owner / property manager) is responsible for the waste until it is collected (*Williams and Others v Phillips* and *Roberts and Others v Phillips*) – for example, in an office building the owned by a property manager, the property manager is responsible for the waste and owns the waste until collected. Another common form of discarding waste is into public dustbins on streets. In England, the waste in public receptacles belongs to local or waste collection authority, as they have the claim-right to possess and manage, privilege to destroy, powers to exclude, and a duty not to use harmfully (Environmental Protection Act 1990, s 60(1)). So, the waste producer or holder often transfers (usually private) ownership of waste to the institution responsible for treatment operations, and it remains private waste.

But despite this stricture in the law, there remains a dichotomous tension between the law and social norms. Even though waste placed on the kerb still belongs to the household, many would find it socially acceptable (and even desirable in certain instances) if this waste, such as furniture or white goods, is removed by another entity besides the local or waste management authority. Or, local or waste management authorities do not object to homeless individuals going through and 'disturbing' bins for food waste. Simultaneously, there are contexts where there have been cases where individuals have faced or been threatened with prosecution for such activities, particularly in relation to individuals recovering food waste from bins outside food stores (e.g. The Guardian, 2014; BBC, 2011). Taking another's waste without permission seems to be an issue when there is an associated economic value or even in some cases where there is none, as further discussed in the following section.

3.3. Abandonment of waste

If waste is not collected or treated, and its owner no longer wants their waste, can they sever ties of ownership that previously bound them to waste? That is, are there circumstances where the discarding of waste can be understood as the cessation of ownership by its current owner (Prongrácz and Pohjola, 2004)? The response ties in with wider discussions in extant literature on the existence of a claim-right to abandon. The scholarly consensus is that property cannot be abandoned (e.g. Griffiths-Baker, 2007; Hickey, 2016). Similarly, the abandonment of waste, such as litter, is explicitly not permitted under Article 36(1) WFD: "Member States shall take the necessary measures to *prohibit the abandonment … of waste*" (emphasis added). There are nonetheless examples of attempts to abandon waste. Understanding English cases on these further clarifies the possible transfer of property rights.

In *Williams* and *Roberts* abandonment was used to understand property rights. Lord Goddard CJ stated that "[a]s long as the property remains on the owner's premises, it cannot be abandoned property" (para 8). If waste is 'abandoned' on other premises, then the principles applied in *R (on the application of Ricketts) v Basildon Magistrates' Court* can apply. In this case, the claimant was charged with theft of items that had been placed outside charity shops. It was held that the property had not been abandoned, but that it was intended as a gift to charity and considered under control of charity. These principles can apply to littering and placing waste ready for collection. These acts are 'gifting' waste to our local authority, though this "puts strain on the idea of gift as, in general, the person disposing of the waste has no interest in the identity of the person who takes the rubbish away" (Griffiths-Baker, 2007: 17). Moreover, the 'gifting' of waste would be unwelcome as in most instances it is still conceived as an unwanted good. This resonates with the social norms argument where it is context dependent and in some circumstances the sole concern is that the waste is removed. Property is not abandoned just because the owner is not able to recover it (Ormerod and Perry, 2017). In *R v Terry Rostron, John Mark Collinson* two men were charged with theft because they had been recovering golf balls from a lake on a local golf course. Mantell LJ said: "No doubt they had been abandoned by their original owner, but … the owners of a golf course are regarded as having the property and control of lost balls for their own purposes" (para 16). If the avenues in law to pursue the unlawful abandonment of waste are put to one side, it can be argued that the owners of premises on which waste has been abandoned have a claim-right to that waste.

Abandonment of waste can be beneficial for circular approaches. In Rotterdam, littered plastic bottles are removed from the Nieuwe Maas river by Recycled Park and used to build a floating island for communal use (Recycled Park, 2018). Even though this waste is still owned by the 'abandonner', the littered plastic is the perceived as no property. Through the (Lockean) labour of collecting and transforming perceived res nullius plastic waste into an island, Recycled Park becomes the owner (Steenmans, n.d.). Allowing abandonment would also facilitate dumpster-diving and freeganism, which could prevent waste being incinerated or landfilled. Freeganism "is an alternative consumption strategy which involves taking goods that appear abandoned, without paying for them" (Thomas, 2010: 98).

On the other hand, there are possible detrimental environmental effects if abandoned waste is not looped back into the economy, by contributing to, for example, floating plastic waste islands in the ocean and soil waste. For these reasons, permitting abandonment of waste is argued to be unnecessary and unwarranted to ensure responsibility and accountability (Griffiths-Baker, 2007; Hickey, 2016). Even though those responsible for abandoned waste retain legal entitlement to (and responsibility of) waste despite relinquishing possession (de Silva, 2014), they are often hard to identify and cannot be held responsible or accountable.

Perhaps the best way is to adopt a Canadian approach where it is a grey area where individual cases are treated differently (Passi, 2010), so that its acceptance depends on the implications for circular economies (though this raises questions of who and how this would be assessed).

4. Using property rights to facilitate circular economies

It has been shown that waste is currently treated predominantly within classic forms of private property ownership by the waste holder or producer (see Section 3.1; see also Steenmans, 2018; n.d. for examples in practice). The basis of this notion of property tends to commodification and is designed to aid trade and transactions by providing 'secure' property rights with less risk of expropriation in a linear economy (e.g. Besley and Ghatak, 2015; Locke, 2013). This does not necessarily exclude private property rights from enabling circular approaches as they can be beneficial by creating strong incentives to protect the environment (Meiners *et al.*, 2000). Devlin and Graffon identify private property rights as being able to "'solve' the pollution problem" (Devlin and Grafton, 1999: 35), and Desrochers (2008: 519) suggests that "perhaps the best way to craft "well-designed" environmental regulations is to return to a private property rights approach to mitigating pollution problems whenever possible". France-Hudson (2017: 101) cautions that it should be "recognise[d] that the function of private property is intrinsically social and therefore private property requires both entitlements and obligations". The question is therefore what entitlements and obligations need to be linked to private property rights in waste to facilitate transitions to circular economies?

As discussed previously, there is a duty to manage waste in a manner that protects human health and the environment, but what this duty exactly entails is unclear. This duty is accompanied by required and voluntary legal and regulatory mechanisms that require or nudge waste producers or holders and other institutions to manage waste in a particular manner. Such mechanisms exist within the WFD – for example, establishments or undertakings need a permit or must be registered to carry out waste management operations (Article 23); extended producer responsibility (Article 8), which shifts responsibility from consumers and authorities, the traditional assignees, to the producer of the product (comparable to a lease) (Lindhqvist, 2000), is a recommended mechanism and has been identified as a valuable tool for circular approaches (Steenmans, 2019); and waste management plans have to be drawn up by Member States (Article 28) – as well as in other law and policy documents, such as the Landfill Directive or the 2018 EU Strategy for Plastics in the Circular Economy (European Commission, 2018). Indeed, Steenmans (2018) identifies examples where private property rights, together with legislation and policies, enable micro-circular economies. In Kalundborg (Denmark), Linköping (Sweden), Peterborough (the UK) and Rotterdam (the Netherlands), private property rights facilitate many of the waste exchanges in existing micro-manifestations of circular economy systems. Such manifestations are however not yet widely implemented.

The current dominant private property regimes, and relevant duties, legal and regulatory instruments have thus far been insufficient in causing a systemic shift to circular economies. One option is to develop a taxonomy of possible instruments triggering such transitions, which is beyond the scope of this article. Another option is that a Blackstonian reading of waste as private property, albeit culturally embedded in a liberal Western legal culture, arguably lacks the transformative power to envisage waste as a resource and not merely an asset. The resource conception must be readily adaptable to the mutuality of circular systems and flexible enough to accommodate the uncertainty present in current regulatory definitions and interpretations of waste and the activities associations with it. A Blackstonian legal conception of property is

instead suggestive of rigid norms articulating property rights that are, in the modern context, designed to be exercised in support of a well-functioning market aimed at economic growth. That is not, necessarily (and at the very least not exclusively), what circular economies drive at. As such, it may be argued that a Blackstonian property is too narrowly tailored for the purposes of this research since those traditionally posited and understood facets of the legal ownership of property – the powers to exclude, transfer, and alienate – aim more squarely at wealth maximisation (Xu and Allain, 2016) than at preservation, augmentation and recycling of resources undertaken in circular approaches/resource loops. In circular economies, wealth maximisation might be a consequence of those activities but is not a reason for them.

Fortunately, the widely accepted view amongst property theorists is that 'property' should not be limited to absolute exclusionary private ownership and private use rights (Hamilton and Bankes, 2000; von Benda-Beckmann *et al.*, 2006). For waste, limited access communal property may be more appropriate to apply more widely in that members of a network or group can pool their waste and have shared responsibility for its management, while also having the opportunity and privilege to consume it. If waste was open-access, well-intentioned and environmentally responsible individuals could interfere with others' waste to ensure that it was managed properly, with the others having no right to complain. However, the downside of this approach is that others could use or manage waste in an environmentally detrimental fashion, whether intentionally or negligently. As with no-property, open access communal property can leave valuable resources to be abandoned or squandered with consequent environmental degradation (Mickelson, 2014).

Transitioning towards circular economies facilitated by limited access communal property will only work if waste is perceived to have value as the conception of property tends to rest upon notions of value. Simultaneously, communal property can result in a heightened sense of value: "We abuse land because we regard it as a commodity belonging to us. When we see land as a community to which we belong, we may begin to use it with love and respect. There is no other way for land to survive the impact of mechanized man" (Leopold, 1968: viii-ix). The shared opportunities and responsibilities of communal property and the reconceptualisation of waste as a valuable resource are thus mutually reinforcing. These can shape environmental norms, which in turn play a significant role in encouraging recycling behaviours (Barr, 2007). With this type of property there is therefore again the need to drive waste re-use and recovery, which may be achieved through legislative and regulatory instruments similarly to private property. The result is that limited access communal property will often entail a multi-level multi-actor approach; there is a combined bottom-up and top-down approach with communities taking responsibility and actions, which are in part regulated top-down. Communal property also has the additional benefit that it may be less costly to operate than private property (Eggertson, 2003).

Another conception could be waste as state property (usually in municipal form) in a structure where individuals are allocated privileges to consume and duties not to use harmfully supported by and as stipulated in legislative and regulatory instruments. These property rights would neither be transmissible nor personal to holders.

The fourth property regime set out in this article, no property, has not been discussed as an alternative, because even though no property has liberty to use which provides opportunities, it does not impose duties. If duties are imposed, then it is open-access communal property rather than no-property.

The different property regimes have different strengths: private property in waste tends to commodification which can assign value to waste; limited access communal property in waste can support the re-conceptualisation of waste as a resource; and state property in waste can allocate duties and privileges to identified individuals to incentivise transitions to circular economies. An effective approach to circular economies will therefore likely require a combination of these different regimes. The most appropriate property regime will have to be considered on a case-by-case basis taking into account the type and characteristics of waste (eg hazardous, solid) and context.

5. Conclusion

The wider contribution of this article has been to argue that property rights in waste need careful thought and consideration in different legal and socio-economic contexts, as they can affect how waste is conceived and treated. This article has demonstrated that different property rights regimes can apply to waste, and that there is no one-size-fits-all property regime to overcome the notion of waste as a burden and for waste management to support circular approaches. A Blackstonian reading of waste as private property remains the dominant current approach and there are examples of it supporting circular economy manifestations, but it is argued that this regime does not have the systemic transformative power to achieve what is required to transition to circular economies: namely a conception of property that is capable of envisaging waste as both a resource and asset. A possible avenue to achieve such a conception, which requires investigation in further research, is to normatively treat waste as a common treasury (Malcolm and Clarke, 2018). Using public (whether communal or state) ownership approaches remain feasible ways forward. One conception could be waste as communal property where waste resources are pooled which may then be used by others in the community. This could be limited or open access, with limited access likely to be more appropriate so that the community is limited to well-intentioned and environmentally responsible individuals. Another conception could be state ownership in a structure where individuals are allocated privileges to consume and duties not to use harmfully but not property rights in the sense that such rights would be personal to holders and not transmissible. An effective approach to circular economies will likely require a combination of these different property regimes. Further research is required to assess the arguments presented in this article using examples in practice.

The property rights issues are only one dimension of a bigger puzzle. The roles of social conceptualisation, norms, regulations, and policies in pursuing circular strategies have only been touched upon, but not fully explored. These provide other avenues that can be underpinned by certain property regimes to transition to circular economies, such as the concept of extended producer responsibility. There are thus many opportunities remaining that should be further explored to support property rights as a means of combating the waste and resource crises.

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