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Considering the user in the circular economy

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Abstract
This paper reflects on how much of the dialogue and literature regarding a move towards a circular economy tends to focus on production and that this language reflects a technological narrative around innovation for a future circular economy. The authors argue that there is a need for a more profound consideration of users in both the research activity and practical implementation of the circular economy, where the real needs, desires and values of the end user are incorporated from the outset, whether as part of research agendas, theories, frameworks or business models. The paper concludes by arguing that changing the way that the circular economy is framed so that it is more inclusive of the consumption side of the development process would open up greater opportunities for success.

Introduction

Much of the dialogue and literature regarding innovation for a circular economy (CE) focuses on potential innovations in our production system (Ellen MacArthur Foundation, 2013). This reflects a technological/ infrastructural narrative of innovation (e.g. 'biocycle', 'technocycle') and is represented in a number of innovation frameworks (Ghisellini, Cialani, & Ulgiati, 2015; Lieder & Rashid, 2016). This techno-centric focus is reminiscent of the early days of 'ecodesign', which primarily focused on (material and energy) resource efficiency. However, within the field of ecodesign it has become widely recognised that a systems approach is needed and focusing on production alone will not solve today's societal challenges (Dewberry & Monteiro de Barros, 2009; Meadows, 1999). In addition to this it is now understood that user choices are not wholly rational and are influenced by a multitude of diverse and complex factors such as socialisation, living conditions, alternatives on offer and the cumulative effects of past choices (Vezzoli & Manzini, 2008). A move towards a CE will require fundamental changes in how businesses sell goods as well as how people buy them (Gregson, Crang, Fuller, & Holmes, 2015), as such an emphasis on understanding user expectations and levels of acceptability will be key to the success of many CE propositions.

While some studies consider elements of consumption (De Los Rios & Charnley, 2016; Murray, Skene, & Haynes, 2015; Van Weelden, Mugge, & Bakker, 2016) and recognise its importance (De Los Rios & Charnley, 2016) this area is currently under-addressed. Studies such as those by Lofthouse & Bhamra (2006) and Van Weelden et al., (2016) have started to investigate specific consumer-related aspects of the CE, such as identifying factors that influence consumer acceptance of refillable packaging systems and refurbished mobile phones, respectively. However, these types of studies are not numerous. Bakker et al. (2014) have made developments in recognising the need for innovation through a combination of technical product design and business model innovation strategies, they also call for consideration of 'new experiences and relationships with products'. This work illustrates theoretical progress in this area, however there is still considerable lack of progress regarding consumption in terms of practical application (Ellen MacArthur Foundation, 2015), which comes up against many challenges. For example, Hobson and Lynch (2016) state that if we are to truly achieve the transformative agenda set out by the CE it needs to acknowledge and address the 'deeply embedded' societal issue of overconsumption. This is all the more prescient in an age of substantial and rapid changes in how products are brought to market, such as through co-design activities, prosumption, peer-to-peer platforms and collaborative and sharing economy initiatives.

It has long been recognised that taking a user-centred approach to innovation can create radical change. For instance, amongst other studies, Von Hippel (1976) found that three out of four successful cases of commercial product innovations were based on responding to genuine user needs rather than a 'technological opportunity'. It is at this intersection with the user, that industrial design is predominantly oriented. Industrial designers are recognised as being very skilled at understanding the user, influencing values (Vezzoli & Manzini, 2008), attitudes and perceived consumer/user needs, which means they are well positioned to help change culturally dominant

value systems (Wahl & Baxter, 2008). This suggests there is a more strategic role for industrial designers to influence user-led innovation for a future CE, than is currently being acknowledged. It is important to recognise this more fundamental role of design, to encourage companies to draw on design skills in the development of products and services for the CE.

This paper uses illustrative case studies from the literature to consider the opportunities and challenges of taking a user-centred approach to innovation within CE contexts. Many published CE examples showcase business-to-business (B2B) case studies that focus on supply chain innovation and reverse logistics (such as Prendeville et al., 2017). The user-centered focus of this paper means that we are predominantly interested in business-to-consumer (B2C) models where there are distinctly fewer examples.

Recognising the consumer in business model innovation

Many B2C approaches require considerable behaviour change on the part of the user and we know that this is complex (Lilley, 2009; Wilson, Bhamra, & Lilley, 2016). Depending on how involved the user is required to be, circular business models typically require some form of behaviour change. The scale of user involvement and therein potential behaviour change required may vary depending on different models (e.g. take-back scheme, rental model). In particular, the way in which a service or system responds to genuine user needs, how it is delivered and also the user's experience of using the service and any new financial models are important. If we do not understand users, how can we expect to design business models that they aspire to?

Business strategies can fail due to nuances in individual preferences such as desire for 'behavioural control' in the context of product- service- systems (Tukker, 2015). Alternatively, consumers may adjust their behaviour in unanticipated responses to the new offering (Scott, Bakker, & Quist, 2012). Added to this, Edbring, Lehner, & Mont, (2016) found that while users may respond positively to short-term leasing, in the case of hardware tools for example, buying second hand furniture and buying products that retain their value on the second-hand market (e.g. high end kitchenware brand Le Creuset[1]), this is not the case for all products/markets. Therefore, by better understanding levels of acceptability in use against different business models, industry will be better equipped for successful innovation.

Reflecting on existing approaches to the circular economy

There are many reasons why businesses may explore new circular business models in the B2C sector, including: opportunities for innovation; it being the overarching motivation of the organisation; foreseeing future regulatory changes; recognition of threats to future business within a linear economy. There are also a number of different strategies that are regularly drawn upon to facilitate a more circular approach.

A common approach in the apparel sector is to extend product lifetimes by offering a range of repair services (e.g. Nudie jeans and Patagonia). Such approaches tap into a growing consumer awareness and propensity towards repairing products rather than replacing them. Rentez Vous (2017) by contrast, focus on increasing resource intensity through a user-oriented service that facilitates the short-term rent of high-end clothing to consumers, who would otherwise be unable to afford them.

Mud jeans have adopted a rental model where consumers can "wear new, up-to-date jeans without owning them". Via the rental model *"users can… lease Mud Jeans for €5 / month. After one year, the user... can swap their jeans for a new pair, and continue leasing for another year, pay for four extra months at €5 each as a 'deposit', after which the user can wear the Jeans as long as he likes, or end the relationship by returning the jeans to Mud. Free repairs are included in the offering. For those who... keep the jeans, the company offers financial incentives to return items, to encourage recovery." ("Mud Jeans," 2017)* When you consider that it is not unusual for a westerner to own around 10 pairs of jeans at any one time, there are a number of challenges to a model which requires such commitment to one brand.

"Open Desk" (2017) connect consumers to local makers by contracting designers to develop designs that can be hosted on platforms and produced with local materials in makerspaces. This approach is entirely predicated on a contemporary trend towards personal-making and distributed production. Such practices have the potential to support the CE, insofar as it represents a significant shift in how people engage with products and have genuine potential to revolutionise 'prosumer' behaviour (Prendeville, Hartung, Brass, Purvis, & Hall, 2017). However, at present such approaches are niche and require direction and leadership (ibid).

Take back schemes, where there is minimal user interaction are relatively low risk for all involved. For example, HP's Instant Ink ("HP," 2017) service uses Wifi technology to anticipate when new printer cartridges are required and posts them to the user for a low monthly fee (based on number of sheets printed). HP can benefit from economies of scale by using much larger, refillable ink cartridges that are returned to them by pre-paid envelope as part of the service whilst the consumer has an uninterrupted supply of ink at a significantly lower price to traditional cartridges. Similarly, flexible leasing of products such as pushchairs (e.g. Bugaboo) where users only need the product for a short period of time, can be very desirable to users/consumers if the price point is well defined and the design of the product can sustain multiple use cycles.

[1] https://www.lecreuset.co.uk/

Islabikes are an interesting example of a company exploring the principles of the circular economy. The company (which manufactures and sells high quality children's bikes) recognised that the increasing cost of the natural resources needed to manufacture bikes was a potential threat to the affordability of their bikes ("Isla Bikes," 2017). They responded by undertaking new product development (alongside their current product lines) to develop durable products which will perform in line with brand expectations, in the rental market. The innovations in bike manufacture required as part of their Imagine 20 project have forced them to think differently about their bike design, leading to innovations in frame construction, the materials used, the pedals and the handle bars (Islabikes, 2017). This example is also illustrative of a threat being turned into an opportunity for innovation.

Understanding the user to inform business model success

Circular business model innovation needs to be informed by a detailed understanding of what consumers will accept, what they expect and what they desire.

A challenge for Islabikes is that their products are widely recognised as holding their value in the second-hand market. For some consumer demographics, this is an attractive proposition that influences their purchasing behaviour, making them more willing to make the initial high investment in the knowledge that the product will retain up to 80% of its value on resale. New service models will need to take this into consideration, as if ignored the circular economy model could fail.

While some consumers may be, realistic and project their financial scenarios into the future, other consumer demographics struggle to rationalise the complex relationship between value, quality and cost. Furthermore, socialisation towards higher levels of consumption, the interdependent relationship between purchases and the residual influence of past consumption behaviours all coalesce to inform consumer behaviour in the present (Douglas & Isherwood, 2009). Therefore, given that consumer purchasing behaviour is tied to past experience, it can be difficult to adjust, and this would affect the potential success of circular business models. This includes (for example) 'sufficiency' approaches that ask for a higher upfront cost (such as Vitsoe's range of durable furniture) or 'Buy Me Once'[2] propositions such as 'The 30 Year Collection'[3] where every garment is built to last a lifetime.

Edbring et al., (2016), found that consumers are not likely to respond positively to long-term leasing contracts for certain items. Consumers who are on a monthly budget, for instance, might see a substantial difference between committing to a one-off purchase that can be saved for (or put on credit) and having to find (and justify) a rolling monthly fee. Leasing of products, which one might expect to own for a number of years, such as jeans, can drive prices above that of a once-off purchase.

New service contracts that companies might offer, also need to consider the realities of people managing multiple service contracts for everything from pushchairs, to mobile phones, fridges and drills. The authors suggest that there is a need for a more realistic understanding of how people prioritise purchasing decisions in order to avoid developing naive business models which may not progress beyond pilot schemes, single line products or products that have poorly thought out requirements of users. While effective service design can begin to respond to this need, further investigation is required to better understand what types of services and financial models different group of users/consumers find acceptable and which models suit which product categories. Design approaches can play an important role in understanding these types of users and conceiving ways to respond to their identities.

Conclusions

Research has shown that designers do not typically associate themselves with techno-centric approaches, which is seen as the domain of engineers and scientists (Lofthouse, 2004). Through greater consideration of user needs and values, the field will become more inclusive, as managers and designers alike realise that, as with ecodesign, design teams have a valuable role to play regarding understanding users' values etc.

The EMF states that CE principles can be applied to everything. However, research so far (Edbring et al., 2016; Lofthouse & Bhamra, 2006; Tukker, 2015) suggests that this is contextual and subject to delivery. In reality a CE approach may be more suited to some B2C offers than others. To facilitate a successful transition to a future CE and encourage uptake of these types of business solutions, there is a need to know more about user/consumer attitudes towards alternative consumption models, to recognise the challenges of behaviour change and to understand what approaches are acceptable and even desirable.

Outside the scope of this paper are additional and substantial issues relating to how the circular economy paradigm addresses overconsumption, user/consumer relationships to circular business model conceptions, the legitimacy of the needs being fulfilled by propositions so far (medium-to-high-end Western consumer markets), as well as privacy and consumer rights related issues. Furthermore, the emergence of Industry 4.0, the evolution of production and consumption systems enabled by digitisation, requires a more progressive and ambitious exploration of relevant business models for a future circular economy, which at present appear to be linked to more traditional approaches.

[2] http://www.buymeonce.com/clothes

[3] https://www.tomcridland.com/collections/30yearcollection

This paper concludes by arguing that changing the way that the circular economy is framed so that it is more inclusive of user/consumer needs and behaviours would open up greater opportunities for success. Moreover, by starting with genuine needs there is arguably more opportunity to respond to very real societal issues that we face, that would have a very positive contribution to society beyond consumerism.

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