Waste Management Techniques and Environmental Solutions – A Significant Association

By Purva Tavri (PhD researcher at Kingston University & Senior Project Manager at Keep Britain Tidy)

Introduction

This paper forms part of a larger PhD research investigation into reuse behaviour at organisational level in the UK. The paper presents a significant association between waste management techniques and environmental solutions, while acknowledges complexity surrounding it. For the purpose of this paper (and research) waste management techniques are regarded as the elements of waste hierarchy. And, environmental solutions are analysed and narrowed down into two categories - relative decoupling and absolute decoupling.

Literature review

The UK waste history indicates that transitioning of economy from capitalism to natural capitalism started long after the industrial revolution. It was when, rise in production of waste and consumption of resources were first recognised as concerns leading to environmental issues. It was in the year 1999 when Hawken et al. introduced natural capitalism, a step towards facilitating sustainable economic progress. Following this, in the year 2000, Pearce and Barbier differentiated between human capital and natural capital, which they further explained by associating them with

weak sustainability and strong sustainability respectively. It was during the same period of time, when the UK government introduced the first waste hierarchy, with the aim of reducing the volume of waste disposal to landfill.

The research acknowledges significance of the similar time period of these developments – in the field of sustainability and, in the area of waste management. The research analyses definitions and arguments regarding weak and strong sustainability, and integrates these theories with the waste management techniques. In so doing, the research reveals that the recent dominant waste management techniques, namely: recycling, recovery and disposal; could potentially be categorised under the area of weak sustainability. This is owing to the fact that these waste management techniques use technological solutions, which although reduce the volume of waste going to landfill, they are, however, unable to balance the decrease in waste production while simultaneously maintaining the economic growth.

Recognising the complexity for creating a balance between economic and environmental growth, it was in 2010 and 2011, when Urry suggested two approaches to tackle the problems presented by climate change. These approaches are: the science first model and the human action model. Of these two, the science first model represents the engineering of cleaner and cleverer technologies to combat the negative environmental impact of climate change, while facilitating economic growth.

Within the waste management techniques, some of the examples of these technological solutions are: recycling, recovery, remanufacturing, reverse logistics, Product Service System (PSS), and Closed Loop Supply Chain (CLSC). These technologies are clearly important; however the complexity surrounding the issues associated with cost of these processes could be considered as a disincentive (Atasu et al. 2008; Feldmann *et al.*, 1999; Kumar & Malegeant, 2006; Kumar & Tan, 2006). Furthermore, despite use of these science first model solutions, there is a continuous rise in consumption (a 15% increase between the years 2000 and 2012) (ONS, 2013) and an increase in

waste production at organisational level in the UK (a 4.85% rise between the years 2010 to 2012) (DEFRA, 2015).

Given the current unsustainable situation and the alarming rate of environmental degradation, several studies (some of which are illustrated below) demonstrate this problem, and their conclusions present the unequivocal necessity of recognising a balanced and strong sustainable solutions. For instance:

- Jackson (2009, p. 13) indicates that *"...in the waste market, since technological developments have allowed recycling and recovery activities, the global economy has grown more than 5 times."* However, the continuing environmental degradation shows that *"... if current population and consumption trends continue, by the 2030s, we will need the equivalent of two Earths to support us"* (GFN, 2015).

- Atasu et al. (2008) argue in their study on CLSC, that purely technological approaches are insufficient: they fall short because they do nothing to change what amounts to unsustainable consumption behaviour.

- Mark Lynas' (2008) book named *Six Degrees* indicates that there is reasonable stability in the science first model of climate change; however, solutions through human action have not been at all well established.

While recognising the insufficiencies of technological advancements, the Organisation for Economic Co-operation and Development (OECD) introduced the concept of decoupling as *"...breaking the link between 'environmental bads' and 'economic goods'"* (UNEP, 2011, p.4). This concept is further divided into relative decoupling and absolute decoupling. Technological processes progressing towards early carbon reduction are considered of achieving relative decoupling (Jackson, 2009). In contrast, absolute decoupling is defined as *"...no waste growth"* (Sgostrom & Ostblom, 2010, p.1550).

When exploring the associations of relative decoupling with waste management techniques, the research reveals a commonality. The current dominant waste management techniques, namely - recycling, recovery and disposal, and similar other waste management techniques, such as - reverse logistics, CLSC, PSS and remanufacturing, could potentially be considered as solutions in order to achieve relative decoupling.

Discussion

The continuous technological developments and their adaptation by the growing industry certainly represent positive outcomes in terms of achieving relative decoupling. However, the concerns about the increasing use of resources, the rise in consumption and the growing levels of waste production demonstrate that the industry's predominant focus towards technological solutions is insufficient because these approaches involve *"rethinking the problem rather than solving it"* (Pearce and Barbier, 2000, p.250). Furthermore, since the current dominant waste management techniques are identified as weak sustainable solutions, therefore it could be implied that there is an association between the science first model and weak sustainability.

Therefore, in current challenging climatic environment, relying alone on technological solutions is not enough and thus, the paper (and research) emphasises that considering human-based solutions to achieve an absolute decoupling is one of the essential requirements for the economy. This is reinforced by the fact that absolute decoupling presents a means of discovering a middle ground or consensus between conventional economic growth and waste reduction in order to protect the environment, and, it can also be argued, as representing a 'highly contested' type of sustainable development (Chatterton & Style, 2001).

Within the waste management techniques, re-use is a purely human action, which is currently overshadowed in the waste hierarchy by the term 'preparing-for-reuse' (Tavri, 2016). Furthermore, research found out that particularly the manufacturing and waste service sectors do not consider re-

use as a crucial activity, meriting a change in behaviour. In addition, for these organisations the engagement with technological solutions is relatively easy and has become normalised, which makes re-use a comparatively unappealing potential activity, unless it becomes mandatory or necessary. Such perceptions within the manufacturing and waste service sectors could perhaps be considered as potential short-sightedness, where the current ease, accessibility and profitability of technological solutions overshadows any potential long-term benefits which might be gained by exploring strategies towards reuse, and the resultant profitability of reuse, both towards the organisation, and towards society as a whole.

Nonetheless, research illustrates that based on types of material and collaboration among the types of sector; re-use could be considered as possessing the capability of resolving the seemingly irreconcilable dichotomy of reducing waste production, while maintaining economic growth, in order to achieve an absolute decoupling. In particular, this is evident among retail and construction sectors. They consider themselves as forerunners in the field of re-use, and present several collaborative pilot studies demonstrating the economic, environmental, and social benefits of re-use. They consider re-use as a realistic practice instead of simply an idealistic opportunity. Furthermore, this initiative for change is also seen within their re-use supply chain, which is predominantly Third Sector Organisations (TSOs).

Conclusion

The paper (and research) is not stating that recycling and recovery (or any other technological solution) is not significant. Rather, is indicating that it is important to acknowledge that collaborative re-use measures could lead to absolute decoupling. Furthermore, it is crucial for the industry to understand the association between waste management techniques and environmental solutions. This awareness, when applied to real life situations, could present a holistic view for the businesses to use technological and human-based solutions in an effective way, in order to achieve a long-term

circular economy. The result of these changed behaviours and attitudinal shifts would, effectively lead the industry to adopt a new 'normal' behaviour. A behaviour where – organisations prioritise environmental solutions and waste hierarchy, while creating business development strategies.

Reference

- Atasu A, Daniel V, Guide R and Wassenhove LVN (2008) Product Re-use Economics in Closed-Loop Supply Chain Research, Production and Operation Management, **17(5):** 483-496.
- Chatterton P and Style S (2001), Putting Sustainable Development into Practice? The Role of Local 'Policy Partnership Networks, Local Environment, **6(4)**: 439-452.
- DEFRA (Department for Environment, Food and Rural Affairs) (2015) Digest of waste and resource statistics - 2015 edition. DEFRA, London, UK, Report PB14292.
- Feldmann K, Reinhart G, Seliger G and Westkamper E (1999), Integrated Development of Assembly and Disassembly, Scientific Technical Committees, Germany: CIRP, **48(2)**: 557-565.
- Global Footprint Network (GFN) (2015) Do we fit on the planet? See http://www.footprintnetwork.org/en/index.php/GFN/page/world_footprint/ (accessed 15/12/2015).
- Hawken P, Lovins A and Lovins LH (1st eds) (1999) *Natural Capitalism*, USA.
- Jackson T (2009) *Prosperity Without Growth*, Earthscan, London & New York.
- Kumar S and Malegeant P (2006), Strategic Alliance in a Closed-loop Supply Chain, a Case Manufacturer and Eco-non-profit Organization, Technovation, **26 (1)**: 1127-1135.
- Kumar A and Tan AWK (2006), A Decision Making Model for Reverse Logistics in the Computer Industry, The International Journal of Logistics Management, **17(3)**: 331-354.
- Lynas M (2008) *Six Degrees: Our Future on a Hotter Planet*, National Geographic Society, London, UK.

- Office for National Statistics (ONS) (2013) Updated estimates of UK resource use using raw material equivalents. ONS, UK.
- Pearce D and Barbier ED (2000) *Blueprint for a Sustainable Economy*. Earthscan, London, UK.
- Sgostrom M and Ostblom G (2010) Decoupling Waste Generation from Economic Growth- A CGE Analysis of the Swedish Case, Ecological Economics, **69(1)**: 1545-1552.
- Tavri P, (2017), What is Reuse? Chartered Institute of Wastes Management, **August issue**: 48-49.
- United Nations Environment Programmes (UNEP) (2011) Decoupling Natural Resource Use and Environmental Impacts from Economic Growth. UNEP, Nirobi/Kenya, Report DTI/1388/PA.
- Urry J (2010), Consuming the Planet to Excess, Theory, Culture & Society, **27(2-3)**: 191-212.
- Urry J (2011) *Climate Change and Society*. Polity Press: Cambridge, UK.